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Proceedings of the Third International Urban
Research Symposium held in Brasilia
April 2005

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Land and Urban Policies for Poverty Reduction

Edited By

Volume 2

Mila Freire

Christine Kessides

Ricardo Lima

José Aroudo Mota

Dean Cira

Diana Motta

Bruce Ferguson



The World Bank

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Brasília, 2007



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FORWARD

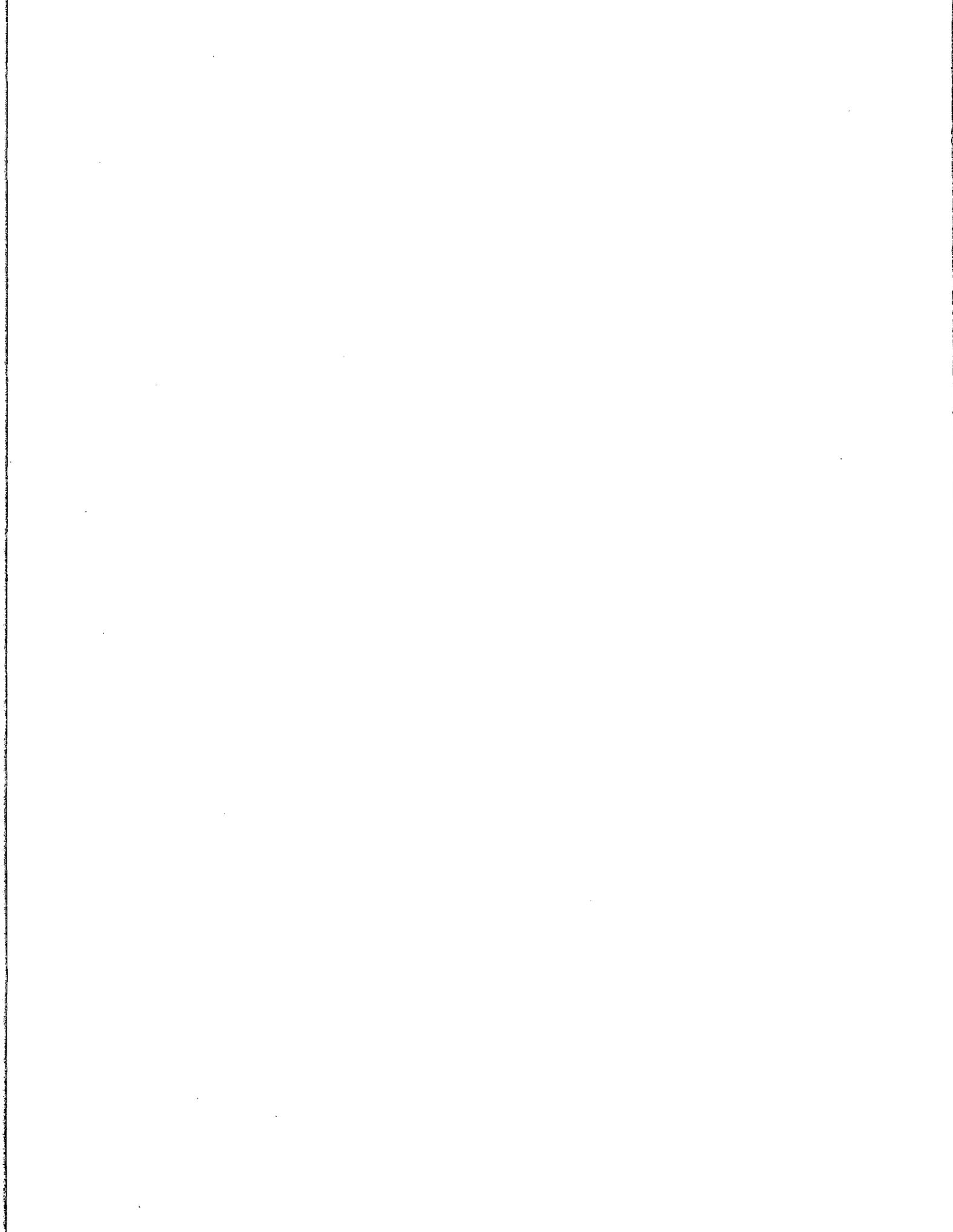
Within his role to promote and disseminate research and support the Brazilian government in the design, evaluation and follow-up of public policies, the *Instituto de Pesquisa Econômica Aplicada*, IPEA has partnered with the World Bank in the organization of the Third International Research Urban Symposium. The event which took place in Brasilia in 2005, was supported by several partners including the Swedish International Development Agency (SIDA), the Lincoln Institute of Land Policy, Caixa Econômica Federal, o Governo do Distrito Federal – GDF, Cities Alliance, and GTZ.

The papers included in this publication represent the contribution of many researchers from all over the world who have been working on the role of urban and land policies in promoting development and alleviating urban poverty. We believe this is an important contribution that will be widely used in the design of urban policies not only in Brazil but in many other countries.

Many thanks to all the authors and partners who made this work possible.

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While this book reflects the authors' own view and not necessarily the view of the World Bank, of IPEA or any of the sponsors, its production was institutionally housed at the World Bank and IPEA for the final editing and the printing and dissemination. We are grateful to the guidance provided by Maryvonne Plessis-Feissard, Director of the Urban Department, World Bank, Makhtar Diop, Director of Infrastructure for Latin America, World Bank, Glauco Arbix, President of IPEA, Marcelo Piancastelli, Director of Regional and Urban Studies in IPEA, and Martim Smolka, Director of Latin America Programs in Lincoln Institute of Land Policy. We also appreciated the contribution of David Dowall, Victor Serra, and Marianne Fay who guided us into the next stages.

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We recognize the importance of all participants at the Symposium held on April 2005, in Brasilia, and thank Luis Henrique Proença who invited the Bank to hold the Third International Symposium in Brazil.

The Brasilia Symposium not only brought together a majority of authors under one roof for three days of candid discussions but also included Brazilian officials, including the Executive Secretary for the Ministry of Cities, Erminia Maricato, the National Secretary of Urban Policies, Raquel Rolnik, and the National Secretary

for Housing Development, Jorge Hereda and the Vice-President of CAIXA, Aser Cortines, and Diana Motta, Secretary for Urban Development and Housing in the Federal District.

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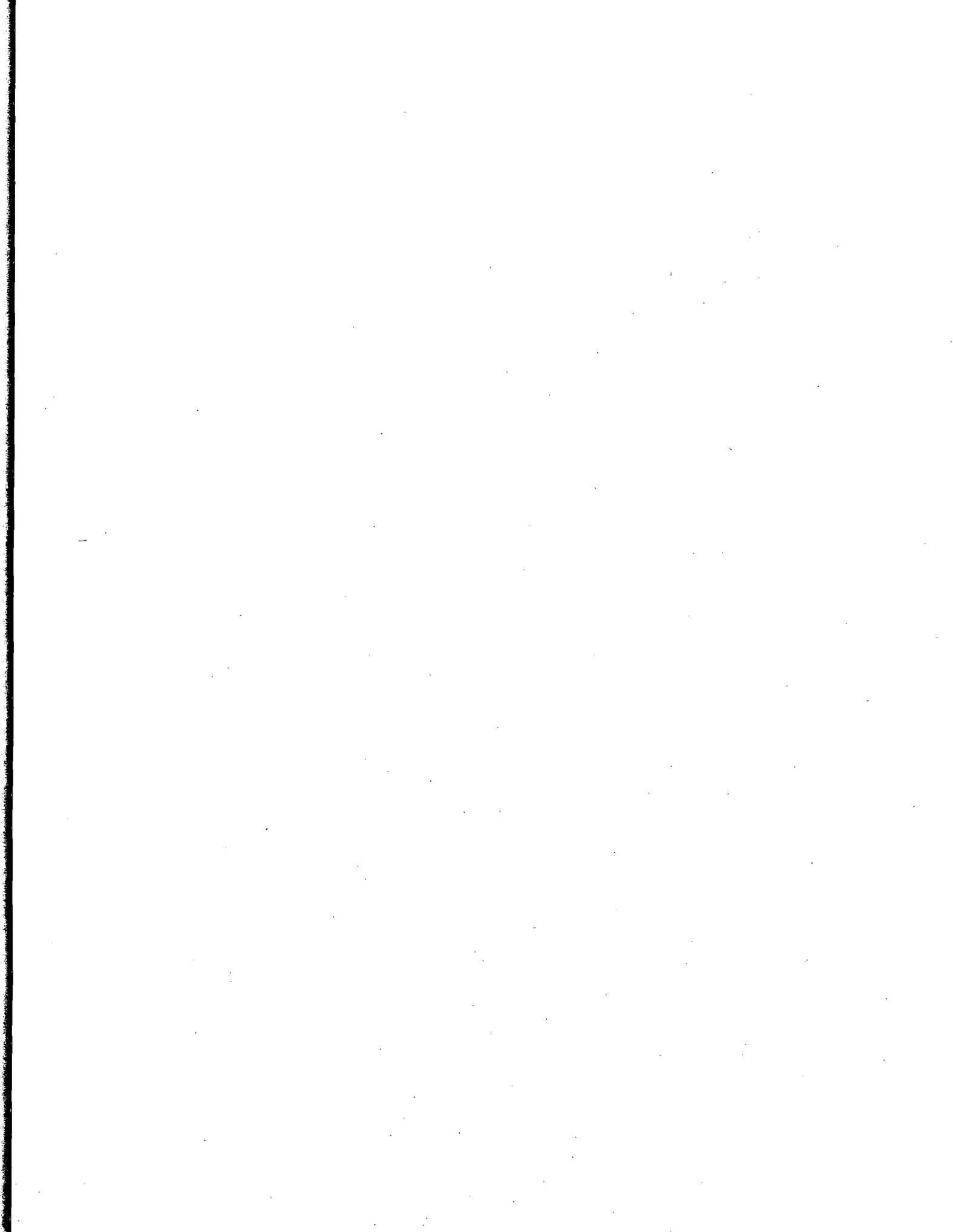
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GLOSSARY OF ABBREVIATIONS

ABL	Public Lighting, Street Sweeping and Cleaning (Argentina)
ASEAN	Association of East Asian Nations
AusAID	Australia Assistance International Development
AVSI	Organizzazione non Governativa di Cooperazione Internazionale
BMZ	German Ministry of Economic Cooperation
BNDES	Banco Nacional de Desenvolvimento Econômico e Social (Brazil)
BACEN	Banco Central (Brazil)
BIRD	Banco Internacional para Reconstrução e Desenvolvimento
BPO	Business Process Outsourcing
BRT	Bus Rapid Transit
CAFTA	Free Trade Agreement of Central America with the United States
CANON	Municipal Transfer (Peru)
CA	Cellular Automata
CBD	Central Business District
CBOs	Community Organizations (South Africa)
CCF	City Challenge Fund (India)
CDHU	Companhia de Desenvolvimento Habitacional e Urbano (Brazil)
CEDAE	Companhia Estadual de Água e Esgoto (Brazil)
CEDEPLAR	Centro de Desenvolvimento e Planejamento Regional da Faculdade de Economia da Universidade Federal de Minas Gerais (Brazil)
CEF	Caixa Econômica Federal (Brazil)
CEMEX	Cement of Mexico
COBRAPE	Companhia Brasileira de Projetos e Empreendimentos (Brazil)
COFOPRI	Registration of Informal Urban Property
COHRE	Center on Housing Rights and Evictions (South Africa)
COMEC	Coordenação da Região Metropolitana de Curitiba (Brazil)
CMR	Colombo Metropolitan Region
CONACYT	National Council of Science and Technology (Mexico)
CONATA	Consejo Nacional de Tasación (Peru)
CONDER	Companhia de Desenvolvimento Urbano do Estado da Bahia (Brazil)
CORETT	Commission for Land Tenure Regularization
CORVIDE	Housing and Social Development Corporation of Medellín
CPF	Central Provident Fund (CPF) (Singapore)
CRIC	Comité de Reconstrucción de la Iglesia Católica (Honduras)
DECSAL	Decentralization and Competitiveness Loan (Peru)

DFID	UK Department for International Development
DMC	Delhi Municipal Corporation
EDB	Economic Development Board Singapore
ESAF	Escola de Administração Fazendária (Brazil)
FAME	Financial Analysis Made Easy
FAT	Fundo de Amparo ao Trabalhador (Brazil)
FGTS	Fundo de Garantia do Tempo de Serviço (Brazil)
FIDC	Fundos de Investimento em Direitos Creditórios (Brazil)
FIDEM	Fundação de Desenvolvimento Municipal (Brazil)
FJP	Fundação João Pinheiro (Brazil)
FONAVI	Argentina's National Housing Fund
FONCODES	Fund for Community Development (Peru)
FONCOMUN	Transfer to Municipalities (Peru)
FPE	Fundo de Participação dos Estados (Brazil)
FPM	Fundo de Participação dos Municípios (Brazil)
FUNDEVI	Fundación para el Desarrollo de la Vivienda Social y Rural (Honduras)
GAM	Metropolitan Region of San Jose
GDP	Gross Domestic Product
GC	Gated Communities
GIS	Geographic Information System
GOI	Government of India
HBB	Programa Habitar Brasil (Brazil)
HDB	Singapore Housing and Development Board (HDB)
HDI	Human Development Index
HDPE	High Density Polyethylene
HUDCO	Housing and Urban Development Corporation (India)
IADB	Inter-American Development Bank
IBGE,	Instituto Brasileiro de Geografia e Estatística (Brazil)
ICMS	Imposto sobre Circulação de Mercadorias e Prestação de Serviços (Brazil)
ILD	Instituto Libertad y Democracia (Honduras)
INR	Indian Rupees
IP	Instituto de la Propiedad (Honduras).
IBAMA	Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (Brazil)
IBRD	International Bank for Reconstruction and Development
IGP	Índice Geral de Preços (Brazil)
IMF	International Monetary Fund
INURBE	National Institute for Social Interest Housing and Urban Reform
IPEA	Instituto de Pesquisa Econômica Aplicada (Brazil)

IPPUC	Instituto de Pesquisa e Planejamento Urbano de Curitiba (Brazil)
IPTU	Imposto Predial Territorial Urbano (Brazil)
IPV	Provincial Housing Institutes (Argentina)
ISGM	Informal Settlement Growth Model
LDC	Less Developing Country
LUD	Law of Urban Development (Mexico)
MCD	Municipal Corporation of Delhi
MCR	Mega City Region
MDF	Municipal Development Fund
MIC	Middle Income Country
MAG	Metropolitan area of Guadalajara
MRBA	Metropolitan Region of Buenos Aires
MUDPA	Ministry of Urban Development and Poverty Alleviation
NCAER	Council of Applied Economic Research
NIE	New Institutional Economics
NGO	Organização Não Governamental (Brazil)
NSDP	National Slum Dwellers Program (India)
OECD	Organização para Cooperação e o Desenvolvimento Econômico (Brazil)
OODC	Outorga Onerosa do Direito de Construir
PDG	Population Density Gradient
PETT	Registration of Rural Property Program (Peru)
PNAD	Pesquisa Nacional por Amostra de Domicílios (Brazil)
PPP	Parceria Público-Privada (Brazil)
PREZEIS	Plano de Regularização das Zonas Especiais de Interesse Social (Brazil)
PRIMED	Program of Regularization of Low-income Settlements
PROAP	Low-income Settlements Urbanization Program (Brazil)
PROCEDE	Ejidal Rights Certification Programme (Mexico)
PRONAA	Programa Nacional de Assistência Alimentaria (Peru)
PROSANEAR	Programa de Saneamento para Populações em Áreas de Baixa Renda (Brazil)
PROVIAS	Program of Road Construction (Peru)
PTO	Permits to Occupy (South Africa)
RIDE	Região Integrada de Desenvolvimento (Brazil)
RMC	Região Metropolitana de Curitiba (Brazil)
RMR	Região Metropolitana do Recife (Brazil)
RUS	Régimen Único Simplificado (Peru)
SABESP	Companhia de Saneamento Básico do Estado de São Paulo (Brazil)
SANAA	Servicio Autónomo Nacional de Agua y Alcantarillado (Honduras)
SATs	Servicio de Administración Tributaria (Peru)

SDUV	Sub-Secretaría de Desarrollo Urbano y Vivienda (México)
SENA	National Skill Training Institute (Colombia)
SFH	Sistema Financeiro de Habitação (Brazil)
SIDA	Swedish International Development Assistance
SIPP	Survey of Income Program and Participation (USA)
SME	Small and Medium-Sized Enterprises
STN	Secretaria do Tesouro Nacional (Brazil)
SUNARP	National Register Entity (Peru)
TDR	Transfer Development Rights
UBN	Unsatisfied Basic Needs of the Population
ULA	Urban land Act (Honduras)
ULO	Urban Land Organisation (Honduras)
UN	United Nations
UNCHS	United Nations Centre for Human Settlements - Habitat
UNFPA	United Nations Population Fund
UIT	Unidad Impositiva Tributaria
URIF	Urban Reform Incentive Fund (India)
VAMBAY	Valmiki Ambedkar Awaaz Yojana (India)
WHO	World Health Organization
ZACs	Zones d' Aménagement Concerté (France)
ZEIS	Zonas Especiais de Interesse Social (Brazil)

PREFACE

LAND, SHELTER, TRANSPORT: THE LATIN AMERICAN WAY

Peter Hall

We're just passing one of the great milestones in human history – but hardly anyone is noticing. It isn't anything outwardly dramatic, like a revolution or a war. But it is fundamental, in the sense that the Industrial Revolution in Britain was fundamental. Future historians, doubtless, will call it the Urban Revolution. For the first time in history, a majority of the world's six billion people are living in cities. Between 2000 and 2025, on the best estimates we have from the United Nations, the world's urban population will double, to reach five billion; city-dwellers will rise from 47 per cent to over 61 per cent of the world's population.

But that's not all. Most of this explosive growth will occur in the cities of the developing world. There will be a doubling of the urban population, in the coming quarter century, in Latin America and the Caribbean, in Asia and in Africa together – above all in Africa. Even by 2015, the UN predict that there will be 358 “million cities”, with one million or more people; no less than 153 will be in Asia. And there will be 27 “mega-cities”, with ten million or more - 18 of them in Asia. It is here, in the exploding cities of some of the poorest countries of the world, that the central challenge lies.

Table 1: World Urban Population, 1980-2000-2020

Urban Population	Urban Population in %			Urban Population Growth Rate in %		
	1980	2000	2000	1980-85	2000-05	2020-25
World	39	47	57	2.6	2.2	1.7
Africa	27	38	49	4.4	4.0	3.0
Europe	69	75	80	0.8	0.3	0.1
North America	74	77	82	1.2	1.0	0.9
Central America	80	67	73	3.1	2.0	1.5
South America	68	80	85	3.1	1.8	1.1
Asia	27	38	50	3.6	2.0	2.0
Oceania	71	70	72	1.4	1.3	1.3
Developing Countries	29	41	52	3.8	2.9	2.1
Developed Countries	71	76	81	0.9	0.5	0.3

Source: World Resources 1998-99

A huge challenge, to be sure – but also a huge range of opportunities: opportunities for greater freedom, greater freedom above all for development, as people leave behind their traditional bondage to the land and the total dominance of the daily struggle for food. Urbanization is a fundamental form of liberation of the human spirit: in the famous German quotation from the Middle Ages, *Stadtluft macht Frei*: the city air makes you free. It does more than that: just because it frees up human creativity, the city is the place where the great advances occur – artistic, intellectual, technological and also organisational. You need urbanisation if you're going to get development. City growth is potentially a great thing.

But only potentially. Urbanization is a basic precondition for development. But it doesn't of itself guarantee development. There's good urban growth and there's bad urban growth. Managing urban growth so that it contributes positively to economic advance, reconciling it with ecologically sustainable forms of development and reducing social exclusion, represents the key challenge for urban planners and urban managers in this new century.

The Fundamental Challenge

The major challenge, for all those of us who care about cities, comes from the burgeoning cities of the developing world, where there is a paradox: people are still flooding into these cities, too many children are being born in those cities based on the hope for a better life; but too often they are being cheated. For urban growth has brought a sharp rise in urban poverty: according to UNFPA estimates, over one in four of the people in the cities of the developing world lives below official poverty lines, and that proportion rises to more than one in three in the Middle East and North Africa and to more than two in four in sub-Saharan Africa. And a large proportion of the poorest are women.

In these cities, the quality of the environment is not improving; in far too many cases, it is deteriorating. The problem is daunting. Many of these cities are already bigger than their equivalents in the developed world, and are projected to become yet larger. Most have only recently started on their development process. And, with some conspicuous exceptions, they lack the governmental structures and the administrative traditions to tackle the resulting problems. Let's be fair: they have achieved a great deal against overwhelming odds; and some have emerged as models for the rest of the world. But they are too few, and their example is not spreading fast enough.

Three Kinds of City: Three Kinds of Problems

However, and this is the first important point I want to make this morning, the term "developing city", like the term "developing country", is no longer very meaningful. In fact, I want to argue that it's fundamentally confusing. The World Commission on 21st-Century Urbanism, which presented its report *Urban Future 21* to a major conference in Berlin in the year 2000 (Hall and Pfeiffer 2000), argued that we can most usefully divide cities worldwide into three major categories, and that so-called "developing cities" in fact fall into two different categories. Even this is crude and simplistic, but it makes the point.

The first the Commission called *the City coping with Informal Hypergrowth*. It is represented by many cities in sub-Saharan Africa and in the Indian subcontinent, by the Moslem Middle East, and by some of the poorer cities of Latin America and the Caribbean. It is characterized by rapid population growth, both through migration and natural increase; an economy heavily dependent on the informal sector; very widespread

poverty, with widespread informal housing areas; basic problems of the environment and of public health; and difficult issues of governance.

The second they called *the City Coping with Dynamic Growth*. It is the characteristic city of the middle-income rapidly-developing world, represented by much of East Asia (including China), some of South Asia, much of Latin America and the Caribbean and the Middle East. Here, population growth is falling, and some of these cities face the prospect of an ageing population. Economic growth continues rapidly, but with new challenges from other countries. Prosperity brings environmental problems.

The City coping with Informal Hypergrowth

In this first kind of city, the key problem is that the urban economy can't keep pace with the growth of the people. There are high birth rates – a product of sexual ignorance, superstition and above all poorly-educated, often illiterate women. This, plus continued migration from the countryside, produces a huge surplus of unskilled labour. Many of the migrants have been pushed off the land rather than positively pulled into the cities, by famine or civil war or insurrection: too often, they are virtually starving. They go into the only work they can find, in the informal economy: casual work and petty trading. This leaves them in dire poverty – especially the women and above all the female-headed households, which typically form more than 30 per cent of the poor population.

The problem is that in these cities the formal or modern sector is too often struggling to survive, and too often giving up the battle. This is particularly true of indigenous enterprises. They can't compete, for multiple reasons: under-education, poor infrastructure, lack of credit and failure to access global markets. So you find cities that – apart from global enterprises like hotel chains or fast food outlets - lack a formal economic base, cities in which the great majority of people live in informal slums, often in very bad conditions, and eke out an existence in the informal economy. They have little work and they live at the margin of existence, in places that lack the basics for a civilised life. They have no respect for the environment, because they can't afford to do anything except struggle for survival: if keeping warm means cutting down the remaining trees for firewood, they'll do it; if keeping alive means drinking polluted water, they'll do that. And they find it hard to contact worthwhile jobs, even if they had the skills, because they can't physically reach them: lacking either a bicycle or a bus fare, they have nothing but their own two feet.

If you visit such cities, your first reaction may well be despair. But there is actually a solution to this huge raft of problems, though it may sound paradoxical. First, it's to get the birth rate down, which means basic education, above all education for the girls. Our report argues that there's a tremendous role for information technology here, if we can get low-cost machines that don't need to depend on erratic mains electricity. In fact technology has taken a huge leap even in the five years since we were working on our report, through the development of battery-powered mobile phones that can hook up directly to the Internet. And this is just the beginning.

Then, the key is progressively to formalise the informal economy. Cities can do this in various ways: strengthening relationships to the mainstream economy, both for inputs and outputs – for instance, through schemes to provide microcredit, providing building materials and food and water, and more effective transportation to help people access a wider range of jobs. They can achieve this best through communal self-

help neighbourhood projects, backed up by informal levies to pay for materials, which can help overcome bottlenecks in basic infrastructure. Microcredit schemes, providing tiny loans so people can start their own businesses, will play a particularly crucial role.

The City Coping with Dynamic Growth

This kind of city is important for this conference, because most Latin American cities belong to it. Here there's good news: the trend is for population growth to fall sharply, because of urbanisation, as people see that the costs of education and rearing children rise while the economic value of children goes down. (These are two sides of the same coin: crudely, the value of uneducated young people tends to decline, so it simply takes much longer and costs more to get them to the point when they become effective earners). And this has a further knock-on effect: there is a big rise in the number of working-age people relative to the young and the old, who have to be looked after. In the jargon, the dependency ratio falls to a minimum.

So that's the good news, and it isn't the end. In these cities, the great passage from the informal to the formal economy is already well under way. Many of them are very attractive to inward investment, because they offer a well-educated and well-trained labour force at lower wages than in developed cities, and besides economic growth is generating big domestic markets for consumer durables like cars and refrigerators and personal computers. China is the outstanding case here, following on a hugely bigger scale the example earlier set by "tiger economies" like Singapore, Hong Kong or South Korea. But there's a sting in the tale there: this foreign direct investment can always be diverted to even lower-cost countries and cities, as some Latin American cities are now finding to their cost. The key is to keep trading up into more sophisticated levels of production, especially advanced services, as both Singapore and Hong Kong have done during their forty years of sustained growth, and as leading Chinese cities like Shanghai are now doing.

The main result of all this is that cities in this group all find themselves in a state of quite extraordinary dynamism but also of rapid transition. It often seems as if they're going through every stage of economic development at once. Or rather, different sections of their population are going through different stages. Side by side, in the downtown business districts you can see gleaming new high-rise office towers housing global corporations that provide advanced business services; along the arterial expressways, sleek suburban factories that are pouring out consumer goods as well as forests of new apartment towers; and, in between, wretched informal slum settlements where the people struggle to make a basic living by performing odd jobs or selling trinkets. These cities often look as if they're simultaneously first world cities and third world cities.

One result is that they are highly polarised. Many of them, though not all, display extraordinary contrasts in wealth and poverty. Cities in South Africa and Brazil, two of the most unequal countries on earth, display this pattern to an extreme degree – but it's now observable in China and in Poland. A significant sign is to see heavily gated, even armed luxury apartment blocks or country-club type developments, next to wretched shacks or worn-out slum apartments. All too often, in many though not all of these cities, there are reports of escalating crime and violence. The poor, some of them, may find solace in drink or drugs, compounding the problem. Because the poor have to find somewhere to live, they often contribute to environmental disasters by building their homes on unstable hillsides or on floodplains, with results that are sometimes tragic. Even

when they and their homes survive, they are often located far from job opportunities, with poor or non-existent bus services, compounded by traffic congestion.

The answer to these problems is to continue to push the economy in the direction first of advanced manufacturing and then of advanced services, always keeping one step ahead of the global competition. (Again, Eastern Asian cities provide the classic model). Of course, cities cannot provide all the necessary policies on their own: nation states have to provide the right framework of macro-economic policies. But cities can do a lot, especially if they are given the right degree of administrative and fiscal autonomy – which many of them have been getting, already, during the last twenty years. Above all, they must and they can help their poorest citizens to join the mainstream economy and the mainstream society.

Then and Now...

It's helpful at this point, I think, to turn from a geographical kind of comparison to an historical-geographical comparison. In some important ways, not least I come levels, cities in this group compare with cities in the mature developed world about a hundred years ago. London, Paris, Berlin, New York in 1905 can be compared with São Paulo, Mexico City, Caracas and Bogotá today. Both groups of cities were, or are, growing explosively both in population and wealth. Both displayed, or display, extreme divisions of wealth. Both contained, or contained, huge high-income areas of great affluence and also huge slum areas of great wretchedness. But there are, I would argue, two key differences.

The first is in housing. Then, the slums had a formal characteristic: they were of permanent construction, generally large houses built for wealthy people (as in London), sometimes apartment blocks (as in Paris or New York), subdivided and sometimes again subdivided, and therefore chronically overcrowded. Now the corresponding slums are informal: self-built and unserviced. In fact, they correspond very precisely to the slums of the first category of cities, which shows us that this second category is really an amalgam of the first type and the fully-developed mature city.

The second key difference was, or is, in transport. The basic reason for the slums of 1905 was that the poor, who depended on informal employment, had to crowd ever more closely into housing near their work – that is, in or near the city centre. In London at that very time, the great social reformer Charles Booth wrote a paper entitled *Improved Means of Locomotion as a first Step towards the Cure of the Housing Difficulties of London* (Booth 1901). And in fact, just that was happening. Already, London had the world's first underground railway; in 1900, it was already nearly forty years old. And, aided by American capital, the tunnelling teams were burrowing under London's streets. Most of the tube network, on which you travel if you visit London today, was built by the year 1907. And simultaneously, the municipal authority for London, the London County Council, was electrifying and extending the tramcar system to serve new public housing estates, offering very low workmen's fares so that poor people could afford to live in good housing on the edge of the city while getting to their jobs in the centre. Latin American cities today, in contrast, are in some cases very much larger – the São Paulo metropolitan area is three times the size of London one hundred years ago – yet have much less well-developed public transport systems. The paradoxical, even perverse, result is that relatively speaking, the poor in these cities have much greater problems in getting to work than their counterparts in London or New York in 1905.

Housing in the Developing World

How adequate is housing in the developing world? UN-Habitat figures show a mixed picture. Very evident is the fact that two areas – Latin America and the Caribbean, and Asia – show far better standards than Sub-Saharan Africa or North Africa and the Middle East. The same is evident for provision of basic infrastructure like water, sewerage, electricity or telephone service. To a remarkable degree, throughout the developing world, most housing is well-serviced. But for informal housing, the position varies very much. Generally, however, provision in Sub-Saharan Africa falls well behind that in the rest of the developing world.

That raises the basic question; what is sub-standard housing? How do we define a slum? UN Habitat has sought to produce a rigorous, generally-applicable definition. They use five key elements: access to water, access to sanitation, structural quality of housing, overcrowding and security of tenure. Using that as the basis, Table 2 from UN-Habitat shows the relative proportion of slum housing by region, worldwide, in 2001. Overall, slum dwellers constitute 32 per cent of the world's urban population. For developing countries, the figure is 43%; for the least developed countries, 78 percent. This represents a huge differential between Sub-Saharan Africa and the rest of the developing world.

Table 2: Distribution of the World's Urban Slum Dwellers, 2001

Region	Urban population (000)	% in total population	% slum dwellers in total urban population
Sub-Saharan Africa	231,052	34.6	71.9
Asia Pacific	1,211,540	35.4	43.2
Latin America and Caribbean	399,385	75.8	31.9
Middle East and Northern Africa	145,624	57.7	29.5
Transition economies	259,091	62.9	9.6
Advanced economies	676,492	78.9	5.8
World	2,923,184	47.7	31.6
<i>Developing countries</i>	<i>2,021,665</i>	<i>40.9</i>	<i>43.0</i>
<i>Least developed countries</i>	<i>179,239</i>	<i>26.2</i>	<i>78.2</i>

Source: UN-Habitat, 2003a.

Slum development is systematically associated statistically with GDP per capita and with the UN's Human Development Index. But there is a striking systematic relationship between the prevalence of slum housing and inequality of income (rather than absolute income), as Table 3 shows. The UN-Habitat analysis suggests that generally throughout the developing world, despite rising per capita income levels, housing is becoming less rather than more affordable, both for owners and renters. But there are major differences between the least and the most developed regions: Latin America appears quite highly developed in terms of housing affordability, suggesting that the process of formalising informal settlements has been successful overall. Rather remarkably, most inhabitants of informal housing do not squat rent-free, but pay rent to a landlord. This suggests the degree to which there is an incentive to own.

Table 3: Slums and Income Inequality

Country	Income ratio (richest 20% to poorest 20%)	Slum dwellers (% of urban population)
Sierra Leone	57.6	96
Nicaragua	48.8	81
Guatemala	46.0	62
South Africa	45.9	33
Lesotho	43.4	57
Honduras	42.7	18
Nigeria	40.8	79
Cameroon	36.6	67
Kenya	36.1	71
Cambodia	33.8	72
India	33.5	55
Central African Republic	32.7	92
Bolivia	32.0	61
Morocco	30.9	33
Lao People Democratic Republic	30.6	66
Ghana	30.1	70

Source: UN-Habitat, 2003b; UNDP, 2002.

Housing and Transport: The Pacific Asian and Latin American Ways

One important key for the people in such areas is to help them formalise their housing: to use communal self-help to provide the necessary infrastructure, so that they begin to turn their informally-built areas into middle-class neighbourhoods. In countless Latin American cities, it has been happening and is still happening. In many eastern Asian cities, the approach has been different: the city itself has intervened to tear down informal neighbourhoods and provide high-quality housing, first for rent, later for sale, either through public provision or, increasingly, by policies that foster the growth of owner-occupation, as now in Singapore. There is no one right way here; there are different paths towards the same goal.

The UN-Habitat 2003 report contains a number of urban case studies, several located in Latin America. Bogotá demonstrates forty years of “informal” growth – here, mainly not due to squatting, but to illegal subdivision. Vast settlements such as Ciudad Bolívar, Bosa and Usme at first lacked water, drainage, sewerage, power, education and health care. But they saw consistent improvement, in which the city authorities worked collaboratively with local inhabitants (UN-Habitat 2004, 88).

Here in Bogotá, which is characterised by a special form of low-income neighbourhood called the *barrio pirata* (pirate neighbourhood), formed not through land invasions through an informal process of land subdivision and granting of title, there has recently been a huge “de-marginalisation mega-project”, which between 1998 and 2000 used a budget of US\$800 million to construct 110 kilometres of local roads, 2300 kilometres of drainage, six hospitals, 51 schools, 50 parks, four major public libraries and legalising 450

settlements. It did not fully achieve these targets, falling significantly short on surfacing and lighting of roads, partly because it depended on the sale of a telephone company that failed to go through – but it is nevertheless impressive. The problem, as in so many other Latin American cities, is that though the city achieved measurable and significant improvements on key measures¹, none the less poverty rose sharply (from 35% below the official poverty line in 1997, to 49.6% in 2000) and income inequalities grew as more and more internal refugees flood into the city escaping political violence outside, causing new household formation to surge ahead of housing provision (Skinner 2004, 80-1).

The São Paulo case study demonstrates that here, there are two distinct kinds of slum: *corticós* (rented rooms in subdivided inner-city tenements), of very poor quality but close to jobs and urban services, and *favelas*, found everywhere, but for the fact that in the city itself, private owners tended to regain possession of squatted areas - two only survive here, both very large (Heliópolis and Paraisópolis) but the great majority are now found in the poorest, peripheral, environmentally-fragile areas (UN-Habitat 2004, 89).

Mexico City produces two case studies in the UN-Habitat 2003 report. The first, *Nezahualcóyotl*, concerns a huge irregular settlement that developed from the 1950s on a drained lake bed outside the federal District. Here, legal title was ambiguously legal: speculators “sold” plots and the state government subsequently regularised title. But the resultant developments lacked basic services such as paved roads, lighting, water and main sewerage. From the end of the 1960s a citizens’ movement, *Movimiento Restuarador de Colonos*, successfully campaigned to secure progressive legalisation of titles and basic servicing, even extending, at the Millennium, to extension of the Metro outside the Federal District. As a result, by the end of the 1990s, only 12% of the area was still held in irregular title. But the quality of basic services varies greatly: 63% of households have inside water supply, but 15% still have poor roofing (UN-Habitat 2004, 94).

The second Mexico City case study concerns the *Valle de Chalco Solidaridad*, a vast informal settlement south east of the federal District. This was an agricultural area, where in the early 20th Century, after the Mexican revolution, the land was expropriated and given to the peasants. But after 1950 the plots became uneconomic to farm at just the time when, resulting from urban sprawl, the land became attractive to speculators. The land was subdivided and sold on credit, and between 1970 and 2000 the population rose from 44,000 to 323,000. Here, too, by 1998 90% of the plots had regularised title, and major infrastructure had taken place. Even so, at that date basic housing conditions remained very bad: 78% of households had no inside tap, 40% still had cardboard roofing, 20% lived in one room (UN-Habitat 2004, 91).

The conclusions from these UN-Habitat case studies are very clear, and they give mixed signals. Informal settlement tend quite rapidly to become regularized, and their inhabitants to receive legal title, while services are progressively provided: first basic ones like piped water, sewers, paved streets and street lighting, then more advanced services like schools, libraries and even Metro service. But the resultant provision is still incomplete, with different standards. Meanwhile, the entire invasion/improvement process ripples ever farther out from the urban core, bringing a problem of access to jobs, with long commuting distances and even longer times. As a result, the quality of transport service becomes crucial.

¹ Between 1993 and 2001, the percentage lacking more than one of five key measures – inadequate housing, lack of drinking water or sewerage, overcrowded shelter, non-attendance at school by at least one child in the household, and dependence of more than three household members on a head with less than four years of primary school – fell from 3.5 to 2.4.

Here, too, there is a basic difference in approach. Some Eastern Asian cities have deliberately encouraged high-density development which will support a top-quality metro system – and some, like Hong Kong and Singapore, had no choice because they had so little land. China seems to be going the same way, as can be seen in Shanghai. Some Latin American cities, in contrast, have made extraordinary innovations in operating bus systems to serve their more far-flung residential neighbourhoods – and one of the most extraordinary of all, Curitiba in Brazil, has created a bus system that works like a metro, with local buses that feed into an express system travelling on its own tracks; Bogotá in Colombia has developed a very similar system.

Latin American cities, above all Brazilian cities, have taken a world lead over the past thirty years in developing highly innovative urban bus-based transit systems. For this there have been very good reasons. As we have seen, rail-based metro systems have been far less developed, especially 30 years ago; Brazilian cities simply lacked the resources for expensive tunnelled rail systems, and made a virtue out of necessity. Curitiba's "Bus Metro" system was the great pioneer, widely hailed and now widely imitated in cities as diverse as Bogotá, São Paulo and many others. Brazilian engineers took the lead in developing these solutions. But at their best they involved not just engineering but also planning approaches, since they integrated bus service and land use planning.

The central feature of the Curitiba system is a variety of services – express buses running along special bus corridors, orbital services and local services, all integrated through high-speed transfer stations at a variety of points all over the city, and used as the basis of a land-use policy that encourages high-density development and redevelopment along the express corridors. The buses on the express corridors are very high-capacity bi-articulated vehicles with a total capacity of 270, more akin to a light rail train than an ordinary bus. Painted red, they interchange at the transfer stations with buses running on orbital routes from suburb to suburb, painted green, and with local feeder or "conventional" buses painted yellow. The comparative capacities of the buses on the different systems vary greatly. All are operated privately on a franchised system. The express corridors have been deliberately developed through planning and zoning controls for very high-density, high-rise mixed development – as is very evident from the tourist's view from the top of the city's television tower.

Thus Curitiba's success became a Brazilian success. Brazilians make over 60 million bus trips a day; Americans, living in a country with twice the urban population, make only one third as many. Brazilian cities demonstrate some of the highest rates of bus ridership in the world: São Paulo and Rio between them have about as many daily bus journeys as the entire United States, which has ten times their combined population. All the major Brazilian cities have made major innovations in bus operation: in the 1970s, São Paulo and Porto Alegre pioneered the idea of running buses in convoys along a dedicated lane, and Porto Alegre developed an integrated paratransit system. These innovations were driven by necessity: bus-based transit systems average \$5 million per mile (\$3 million per kilometre) against \$20-\$100 per mile (\$12-62 per kilometre) for light rail or metro systems. The success of these bus-based solutions – urban bus operations in Brazil yield positive net revenues of over \$3 billion per year – have created a flourishing export industry, with worldwide consulting operations; the engineer Pedro Szasz, developed the bus convoy systems in São Paulo and Porto Alegre, engineered the combination of local, skip-stop and express services that constitute the *Transmilenio* Bus Rapid Transit (BRT) in Bogotá (Golub 2004, 4-5; Skinner 2004, 78).

But there's a funny point: if you visit Singapore and Curitiba, the two cities look very alike, because both have integrated their land use and transportation policies, encouraging high-density and high-rise development along their main transportation corridors. Again, there's more than one way towards the same goal, but in the end the outcomes may be very similar.

It's no accident, perhaps, that Curitiba and Singapore are now two of the richest cities in this group; in effect both have made the transition into the developed world, and both are technologically and organisationally among the world's most advanced cities. These cities are leading their countries in technological and organisational innovation, showing the way for other cities either to imitate them or to go in a different, equally innovative, direction. That is the path of rapid development.

There are some important conclusions, therefore, regarding transport. Latin American cities demonstrate that bus-based cities do work: they can deliver good service, with high passenger volumes, at remarkably low cost. But there is a basic question. Can they do so everywhere – especially, to the urban periphery? If they fail to do this, is the urban transport problem in the largest cities destined to become steadily worse? I want to argue that it will not, because of the emergence of a new urban phenomenon: the *Mega-City-Region*.

A New Urban Phenomenon: The Mega-City-Region

Another key difference between the great cities of a century ago, and now, is this new phenomenon: the Global Mega-City-Region. This is a pattern of extremely long-distance deconcentration stretching up to 150 kilometres from the centre, with local concentrations of employment surrounded by overlapping commuter fields, and served mainly by the private car. The Pearl and Yangtze River Deltas in China and South East England, around London, are two of the world's leading examples of this phenomenon. In Pacific Asia, it has recently been predicted that by 2020 two-thirds of the population of the ASEAN group of countries will be found in only five MCRs: Bangkok (30 million), Kuala Lumpur-Klang (6 million), the so-called Singapore Triangle (10 million), Java (100 million) and Manila (30 million). In adjacent Eastern Asia, these agglomerations are even bigger: Japan's so-called Tokaido corridor (Tokyo-Nagoya-Kyoto-Osaka-Kobe) is predicted as having a total population of 60 million, China's Pearl River Delta (Hong Kong-Shenzhen-Guangzhou) 120 million, and the Yangtze River Delta (Shanghai-Suzhou-Hangzhou-Nanjing) 83 million (McGee 1995, Wo-Lap 2002, quoted in UN-Habitat 2004, 63).

The precise spatial details vary from country to country according to culture and planning regime, and for this reason population figures and predictions should be treated with caution, but the pattern is emerging very clearly and very rapidly around some of the largest cities in this second category: it is very evident around São Paulo, and has recently been analysed in some detail by Adrián G. Aguilar and Peter M. Ward for Mexico City (Aguilar and Ward 2003).

Latin America is highly urbanised. In 2000, in Latin America and the Caribbean, 75.4% of the total population, 400 million, were urban; 31.6% of the total population, 41.8% of the urban population lived in cities of more than one million, while 15.1% of the total, 31.5% of the urban population, lived in metros with 5 million and more people. And these included some of the biggest urban agglomerations in the world: Mexico City, with 18.1 million, 2nd; São Paulo, with 17.9 million, 3rd; Buenos Aires, with 12 million, 11th; and Rio de Janeiro, with 7.4 million, 15th. Also in this list were Bogotá (6.8 million) and Santiago (5.5 million) (UN-Habitat 2004, 64).

However, it is extremely important that the term "city", in this sense, is not the administrative entity but a much larger metropolitan area. In the largest cases, such as Mexico City and São Paulo, it is in fact an equivalent of the Asian mega-city region. These mega-city-regions develop through a complex process of

simultaneous decentralisation at a regional scale, and recentralisation at a more local scale: a process that Dutch planners in the 1960s called "concentrated deconcentration". Thus they are increasingly polycentric. In recent decades, it has been observed that central city growth has slowed while peripheral growth has speeded up. As the UN-Habitat 2004/5 report notes, "...significant shifts from city-centred to regional forms of urbanization are currently taking place" (UN-Habitat 2004, 65): multi-nodal, urban regional systems are developing, in which new sub-centres are independent in terms of their social and economic patterns, but are functionally linked to the big city, a process that in a recent European study we have termed *functional polycentricity* (Hall and Pain 2004). In the Mexico City metro, more than half the population lives outside the central *Distrito Federal*, which is generally regarded as the city. In São Paulo, the city contains 10 million people, just half that found in the wide metropolitan area (19.8 million). In Buenos Aires, out of a total metropolitan population of 12 million, only 3.5m live in the *Capital Federal* (UN-Habitat 2004, 65-66).

Failure to appreciate or understand this process has led to some quite serious errors. In the 1970s, urban analysts incorrectly predicted further explosive growth of metro areas: Mexico City for instance was predicted in UN publications as growing by the year 2000 to 30 million. In fact, almost as these predictions were being made, growth tapered sharply and stopped at the 20 million point. There were two reasons for this, neither having conspicuously much to do with planning. First, because of obvious emerging negative externalities in the Mexico City metro, migrants from rural areas diverted to second-order cities such as Guadalajara and Monterey. Secondly and even more significantly, within the general ambit of Mexico City growth diverted to "secondary cities" at increasing distances, many informal settlements of vast size such as Nezahualcóyotl and Ecatepec, located in the adjacent State of Mexico (UN-Habitat 2004, 50, 65).

Aguilar and Ward show that Mexico City's Federal District is now merely the core of a huge and polycentric mega-city-region stretching up to 100 kilometres and more from the Zócalo. In fact more than half the population of the region is now found outside the District. Over the last 35 years, population growth has rippled out in concentric circles at steadily increasing distances from the city centre, and the most rapid growth is now in the peripheral areas. This outer zone is characterised by huge informal settlements like Ecatepec and Nezahualcoyotl, with up to one or two million people apiece. Very significantly, these settlements suffered from serious deficiencies in basic infrastructure thirty years ago, but had largely caught up by the 1990s (Aguilar and Ward 2003, *passim*). I will return to that point a little later.

Equally important however is another point: these outer areas are not just vast residential zones. They now contain economic subcentres which are increasingly important in their own right. And in this process, which could be called the increasing polycentralisation of the region, there is an increasing specialisation of function: the more advanced or formal parts of the economy remain within the Federal District, even in its core, while the outer centres attract manufacturing and retail functions. To the north these are dominated by heavy, large-scale and high-technology enterprises such as metallic and chemical industries; to the east, they are dominated by small-scale informal activities; in some parts of this zone, significantly, there was a decline in employment in traditional craft industrial employment. But there was also a notable growth of tertiary activity in this zone along major transportation corridors (Aguilar and Ward 2003, 15-16).

The process has distinct advantages. As jobs develop in the outer rings of these metropolitan areas, the burden of commuting can lessen. In Bogotá, though population grew 40%, it was found that travel distances stayed the same (UN-Habitat 2004, 52).

The Basic Emerging Problem: Governance in the Mega-City-Region

There is currently a basic problem with all these Mega-City-Regions: they suffer from fragmented governance. The Mexico City metropolis has 28 municipalities, and more than half the population lives outside the *Distrito Federal*. The São Paulo metro is similarly divided among 39 districts/municipalities; Rio de Janeiro among 13 municipalities, and Buenos Aires among 20 municipalities that enjoy varying degrees of autonomy; the Curitiba metropolitan area is governed by no less than 25 municipalities (UN-Habitat 2004, 58, 66). This last case is particularly significant: within the Curitiba metropolitan area the population of the city accounts for only 61% of the population - and is falling. And, despite the legendary worldwide reputation of the city for delivery of highly innovative services, the evidence from the wider region is far less encouraging: 500,000 live below the Brazilian official poverty line, there are 89,000 substandard units in 903 problem housing areas, only 58% of the area is sewered and only 35% of the sewerage is treated. A regional planning authority, COMEC, has existed for nearly twenty years and has generated plans but no action, because it has no effective powers (Macebo 2004, 547-8).

In conclusion, therefore, the overwhelming need in all these great metropolitan areas is for effective metropolitan governance across the entire mega-city-region. Such regions are the new reality of urban existence in the 21st century. They are, as earlier said, both the solution and the emerging problem. They are a *Solution* because they offer the prospect of re-equilibrating homes, jobs and transport across a new and vast spatial scale. But they are also the *Problem* because this demands effective planning, powers and action across a very wide Metropolitan scale. Unless this opportunity can be grasped, the evident risk is that such regions will be characterised by a deepening economic and social imbalance and polarisation, between rich central cities and marginalised poor peripheries. The signs are already evident. There is some time to grasp the problem and resolve it – but, perhaps, less than we think.

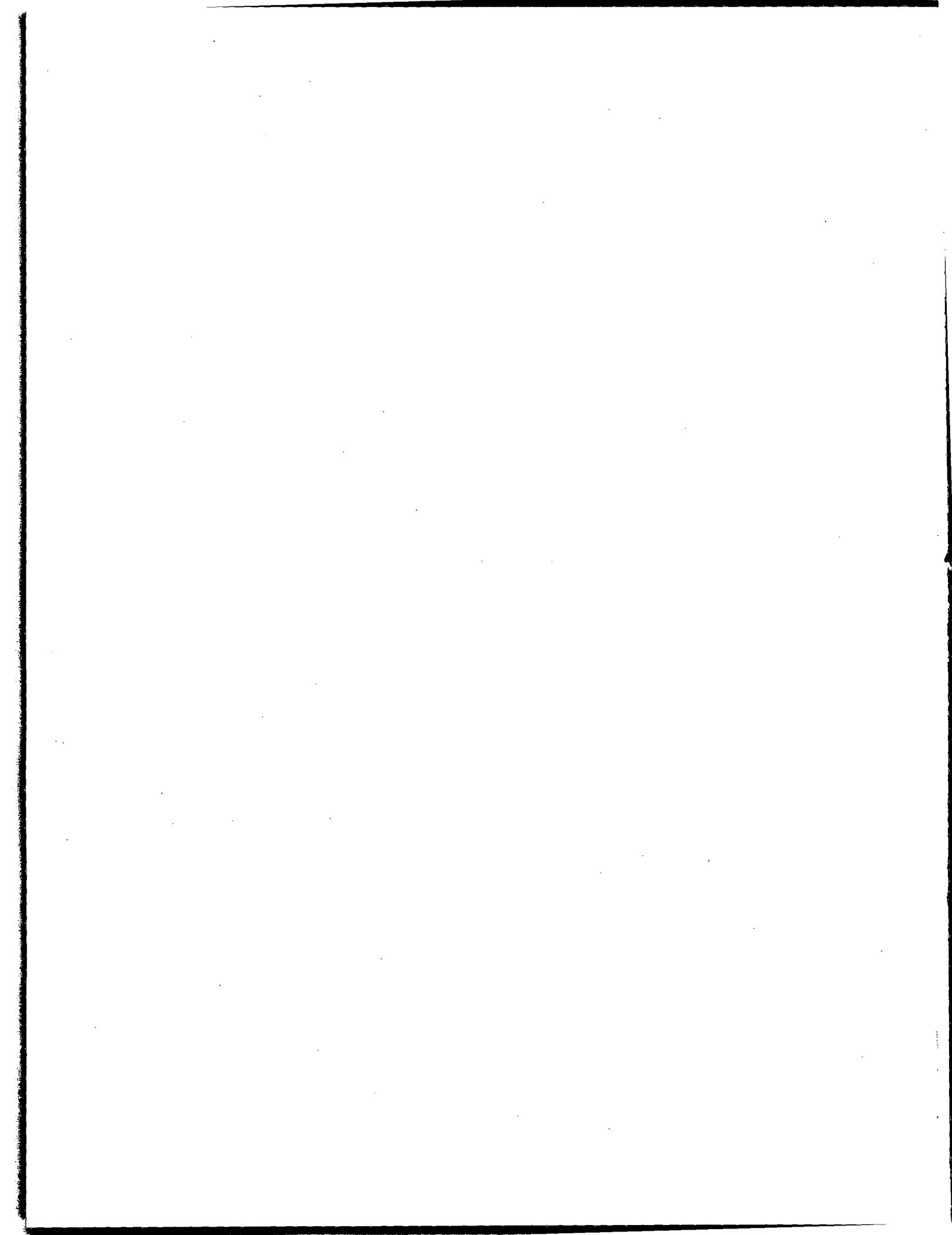
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GENERAL INTRODUCTION

INTERNATIONAL URBAN RESEARCH SYMPOSIUM 2005

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As Sir Peter Hall notes in his preface, the “Urban Revolution” now occurring largely in developing countries presents great opportunities and risks. Urbanization can help raise standards of living, provide the infrastructure and services for immense improvement in human welfare, and free people from the bondage to land and total dominance of the daily struggle for food. The attractive neighborhoods and downtowns, efficient transport, many amenities, impressive social indicators, and high standard of living of Singapore and Curitiba signal this potential.

However, if mismanaged, the urban wave can bring a sharp rise in urban poverty, result in surrealistically desperate conditions, and foment disease and violence. The pavement dwellers of Mumbai living cheek by jowl with the immense wealth of this commercial capitol of a newly-prosperous India, and the seemingly endless slums and hovels that consume many sub-Saharan African cities are emblematic of this other urban present and possible future.

Urban land lies at the center of many of these opportunities and risks. Assembling reasonably priced, well-located land parcels has become the most crucial challenge for affordable housing development. When – as is often the case – such programs are unavailable, the low/moderate-income majority in many developing country cities usually cannot afford to purchase the least-expensive commercially-built home and, instead, use “informal” systems to house themselves. Such “progressive housing” also starts with and depends on access to a lot. Similarly, efficient transport and the ability of households to connect with jobs and services depend on land-use and density.

Near the start of the great urban wave in developing countries – in the 1950s – poor households migrating to cities from the countryside could, with some frequency, find centrally-located low-cost land on which to settle. The film “Black Orpheus” that re-creates the myth of Orpheus and Eurydice in the shantytowns on the steep hills with panoramic views above Rio de Janeiro paints an idyllic picture of favela life at this time. It is impossible to imagine that such a lyrical film on favela life would be made now. Indeed, the Brazilian cinema currently produces many gritty, neo-realistic films featuring the blow-back from the spread and worsening conditions in favelas, including street orphans, kidnapping, and urban violence.

In this regard, the era of easy access to urban land is long gone in most developing-country cities. Continuing urbanization has used up the most developable areas around many cities. Although government agencies frequently own some land in urban and peri-urban areas, large development companies that build mainly for middle and upper-income households now appear to own most of the remaining developable parcels. The low rates, high technical requirements, and political difficulties of the real property tax in developing countries allow such large landowners to continue to hold their parcels at little cost. Without mitigating measures, land titling and other market reforms have resulted in the “commodification” of land and housing (Durand-Laserve), often raising prices and excluding the poor. For many reasons, urban land has now become the main “binding constraint” to housing the poor.

This anthology collects and organizes 32 papers presented at the International Urban Research Symposium held on April 4-6, 2005 in Brasilia focused on urban land. IPEA and the World Bank jointly sponsored this event.

The papers presented at this 2005 Symposium have been organized around six key themes in the sections of this anthology:

- Land markets, land development, and land policy
- Secure tenure, property rights, and informal land delivery systems
- Informal settlement, slums, and upgrading
- Transport, density, urban planning and urban form
- Housing markets and program design
- Development on the urban fringe and the city center, and the environment

The remainder of this general introduction briefly describes these six thematic areas. In addition, the “section introduction” to each of these six sections in the text of the anthology will delve more deeply into these themes in order to place each paper in a useful framework.

Land markets, development and policy. Legal land development for low-income households has dried up or is in the process of drying up in many developing country cities. For example, in Buenos Aires, the formal submarket for sales of individual lots in monthly installments to low-income households was important from 1950 to 1970 (World Bank, 2006), but has disappeared since then – see Box 1. During this period, land developers extended purchase-money loans to buyers (typically 150 monthly installments) – the most common form of credit finance for selling lots to low-income households in emerging countries. However, indexation of such contracts mandated by government, hyper-inflation during the 1990s eliminated these loans. Partly as a result, many subdivisions remain largely unoccupied on the fringes of Buenos Aires, and legal low-income land markets are paralyzed (World Bank, 2006).

Simply adding money – either through subsidies or credit finance – without addressing such land bottlenecks results mainly in raising land prices. Put another way, the inelasticity of supply produces mainly higher prices rather than more units when demand increases.

The mounting pressure on urban land has driven the rise in the price of housing, and made housing markets surrealistically dysfunctional in many major metropolitan areas of developing countries. In Dhaka, for example, the price of the median house is a startling 106 times the median annual household income. In comparison, the highest-priced metropolitan housing markets in the U.S. – New York City and San Francisco – have median-price-to-annual-household-income ratios of around 6.

The extreme pressures on and high cost of land have also led to innovative approaches to land development that, in effect, lower the price and capture a portion of the added-value of public investment in urbanization. In particular, Asian countries – Singapore, Hong Kong, and, most recently, China – have taken measures to lower the cost basis of urban land for affordable housing and other types of development. Earlier, Japan and South Korea encouraged owners of land on the urban fringe to pool their property as a means of more efficient development – a method called “land readjustment.”

Some governments own considerable amounts of land in peri-urban and urban areas that is significantly under-utilized. Publicly-owned land frequently has fundamental importance for both the public and private

sectors. Typically, however, public landownership remains fragmented among many different agencies at various levels of government, each with its own mandate and administrative turf to be guarded. The ownership and legal rights to particular parcels are often in confusion. Hence, the first step usually consists of inventorying publicly-owned land along with selected privately-owned plots to clarify the legal status of these vacant or under-utilized parcels. Such investigations usually show that some parcels can be developed in a straightforward way. Other parcels are likely to have complex ownership problems that are difficult to solve in the short term. Clarifying the legal status of these parcels represents a pre-requisite for action to stimulate their use such as incentive mechanisms to place privately-owned property on the market.

The first two papers of this anthology's first section explore innovative efforts to transform urban land development in order to reduce greatly its cost for affordable housing and other uses. In Iran (Keivani, Mattingly, and Majed), government limited the size of individual land holdings, resulting in transfer of large amounts at low cost to the public sector, which passed on these benefits to individuals and developers, and resulted in housing roughly 7% of the country's lowest-income households. Maldonado analyzes the experience of Colombia with a new legal framework for land readjustment that captures a portion of the value added by public investment in urbanization to order to finance and develop affordable serviced lots. The third paper (Pearce-Oroz) investigates the institutional realities and limits of urban land markets – which are often captured by a small elite – in the context of massive reconstruction aid after Hurricane Mitch hit Honduras in 1998. The fourth and final paper of this section documents the failure of the local property tax in Peru to produce substantial revenue due to weak local governance – a common problem in emerging countries – and the introduction of tax collecting agencies independent from municipalities that has led to great increases in property-tax revenue, although from a miniscule base.

Secure tenure, property rights, and informal land delivery systems. The drying up of legal low-income land markets leaves illegal development (variously termed “pirate”, “informal”, and “clandestine”) and informal markets as the main source of land for low-income settlement, and the progressive housing process as the principal means of occupation and building of habitat in many developing country cities for low/moderate-income families. Typically, households invade land or purchase a lot in an informal sub-division and build their housing over 10 to 15 years. They finance this construction largely through their own savings, but also through many other sources including small loans, pension funds (if available), and mutual-aid arrangements with other families. As the families consolidate the house, the community lobbies for services and greater tenure security. The legal upgrading of community and the extension of services parallels the physical upgrading and building of the individual houses. Thus, progressive housing is partly an individual process – that of the house – but with a strong collective component – upgrading of services and legal status of the community.

Informal land delivery mechanisms constitute parallel systems for land development and tenure. Although these “para-legal” systems are lower cost, they are often less transparent. Again, Argentina – a middle-income, relatively sophisticated country – provides one example. Households may obtain ownership through peaceful occupation of land for 20 years, in general, and for 10 years in limited cases, and a 1994 law provides for registering the purchase agreements for such lots to increase security of tenure. This informal land system co-exists with the formal registration of property deeds. However, the cost of formal-sector registration typically ranges from US \$400 to \$700 including title expenses, and most low-income purchasers of lots on installments from land developers in the 1950s and 1960s have yet to sign their deeds due to lack of funds (World Bank, 2006).

These parallel informal systems also often out-compete the formal ones. In effect, the entry costs are much lower (although the total costs over time usually far exceed those of formal-sector development) and the characteristics appear better suited to the needs and effective demand of low/moderate-income households. That is, informal development typically demonstrates some combination of: (a) more central location (closer to jobs and social networks crucial to the poor); (b) larger lot size that allows poor households more room to expand and customize their habitat to their needs (larger families, home-based micro-businesses, urban agriculture); and (c) more flexible financing terms (payments can be missed if justified by temporary sickness, job loss, or other compelling causes) better suited to these household's intermittent informal incomes and employment, although interest rates are usually very high. In addition, informal land development also often benefits from the implied promise of subsequent service provision and upgrading by government, largely at public cost. These benefits get capitalized to some extent into a higher price that households pay illegal developers for a lot of raw land.

"Secure tenure" of land protects these households against eviction and bull-dozing of their communities. Hence, it provides the foundation for households to invest progressively in their homes and build their communities. Full legal title backed by modern land systems (property registry, cadastre, effective legal enforcement) gives the greatest security of tenure, but is costly, technically demanding and often pushes the entry price of access to the lot beyond the reach of low/moderate-income households. In many regions, intermediate and traditional forms of property ownership have provided a sufficiently secure basis for the progressive land and housing process.

Other aspects of property rights systems offer ways to address urban-land issues including: group rights vs. individual rights; and leasing/rental as opposed to ownership. Individual rights facilitate markets and transparency, but are problematic in reaching low-income households. Experiments with group rights in low-income communities – such as in Recife and Porto Alegre, Brazil and the Community Land Trusts of Kenya (see Payne) – have proved interesting, but hard to ramp up.

Rental housing and long-term land leases have theoretical virtues. Long-term land leases, in principle, can offer security of tenure sufficient for financing (Deininger, 2003). Informal rental housing in poor neighborhoods already provides the main source of rental accommodation in most developing countries (Gilbert). Typically, households build an extra room or unit onto their existing home (horizontally or vertically) and rent it as a source of income. As they do not have to pay extra for land and gain other economies (e.g. existing clandestine and legal service connections) from their adjacent owner-occupied unit, such accessory units are the least expensive way to produce low-income housing. Subsidized rental housing is the main form of affordable housing in most affluent countries.

Thorny technical and political problems, however, make the expansion of formal low-income rental housing and leasing of land difficult and rare in emerging countries. From a technical perspective, no one has solved the problem of who will own, operate, and maintain low-income rental units in a way that ensures satisfactory affordable shelter, and that channels the benefit of any public subsidy or publicly-financed improvement largely to the low-income renters rather than mainly to the owners. Western Europe, the U.S., and Canada use networks of sophisticated non-profits and/or municipal corporations supported by public subsidy systems backed by a well-functioning legal framework to operate, maintain, and – increasingly – develop affordable rental housing.

However, most low and middle-income countries still lack such organizations and the funding and legal/regulatory structure necessary to make this approach work, although a few are beginning to develop affordable rental systems (e.g. Singapore, Hong Kong, China). From a political perspective, most developing-country governments find production of homeowner units much more rewarding than support of rentals. In many regions – particularly in Latin America and South Asia – it could be argued that a strong cultural preference for homeownership eclipses any government effort at rentals, except for rent control, which generally shuts these markets down and ends up greatly reducing the stock of rental units. In contrast, the bulk of urban dwellers in some parts of sub-Saharan Africa view their urban residence as a transient place for commuting to work in the city before returning to their real homes in their tribal areas, and rental accommodations are much more common.

The first paper of this section (Durand-Laserve) documents how increasing pressures on urban land and the “commodification” of shelter and settlement has increased “market evictions” of families holding intermediate title to property, although international declarations and pressures have contributed to reducing “forced evictions.” The second paper (Mooya and Cloete) uses the tools of the New Institutional Economics to analyze the argument in Hernando De Soto’s path-breaking book, *The Mystery of Capital*, that full legal title is the key to turning “dead capital” in the form of informal property held by many low-income families into an economic asset and to detonating broad-based economic growth. The paper concludes that intermediate forms of tenure can have the virtues of full legal title if properly constructed, and then examines the case of Namibia in this context. The third paper (Fernandes) documents and assesses the recent efforts of the Brazilian federal Ministry of Cities to develop a comprehensive approach for regularizing title throughout that country. In the fourth paper, Abramo gives a structural and theoretical over-view of informal settlement in Brazil. The fifth paper (Rakodi) looks at traditional land delivery systems in five medium-sized Sub-Saharan African cities, and concludes that policies and programs can build on their strengths.

Informal Settlement, Slums, and Upgrading

Although progressive housing is a crucial solution, it is also an immense problem that exacts enormous public and private costs when unguided. Increasingly, tight land markets force households to settle on precarious locations including ravines, steep hillsides, marshes, riverbanks, garbage dumps, watersheds, sidewalks, the edges of public facilities and infrastructure lines and associated rights-of-way, and distant sites far from existing infrastructure lines that are often environmentally fragile or inappropriate. Alternatively, these families crowd into ever-denser existing informal settlements: inner-city tenement units divided into many rooms with each rented to a family; and shantytowns on the urban fringe and beyond that expand horizontally into every free space and then vertically by adding stories to existing structures

Slum upgrading involves retrofitting these areas with infrastructure to create a viable road network underlain by water lines, and accompanied by drainage and sanitation. This process often requires relocating a modest share of a slum’s population (around 5%) – frequently, a problematic and costly step. Slum upgrading frequently occurs piecemeal and without an overall plan or layout, mainly close to election time when candidates for political office trade an improvement or commitment for an improvement for votes. In contrast, “integrated” slum upgrading programs provide the missing basic services together based on a plan, and – often – join them with organized community participation and selected social and economic services and with legal tenure. For

these reasons, retrofitting these areas through slum upgrading is usually much more expensive than new formal-sector development. Government typically ends up absorbing the high capital costs of improving or replacing the infrastructure of these communities, selective resettlement, and regularizing their legal situation.

The relatively high costs of slum upgrading have created problems for financial sustainability and program scale. Particularly when an integrated approach is taken that lifts these areas to standards approaching (but still below) those of the rest of the city, the high cost per household tends to make these programs into boutique, small-scale efforts. The model project looks good, but cannot be expanded much.

In addition to the public costs of upgrading programs, informal housing development also has high costs for families. The process of home construction is typically long and wasteful. One market study (see Box 3) found that building a basic 2-bedroom house takes Mexican families 11 years, and costs 30% more because of the high cost of small purchases of building materials, theft and damage of these materials, and poor planning. Households also end up paying high sums for purchasing a raw lot, for improving security of tenure, for basic services (e.g. private water supplied by tanker, which is typically 5 to 10 times the cost of publicly-supplied water) prior to consolidation, and to save and to borrow sums for the steps in the progressive housing process. Irregularly-settled neighborhoods also have substantially higher levels of crime and insecurity than other neighborhoods of a similar socio-economic profile. The bad reputation of these neighborhoods can brand their residents, and make them largely unemployable in the formal sector (e.g. Jamaica).

The high public and private costs of upgrading existing slums have called attention to the importance of slowing the formation of new slums through getting ahead of demand by expanding low-income land development. This strategy holds particular importance in South Asia and Africa where urbanization is still cresting. Most medium and large developing-country cities are still growing at rates that will double their size in 20 to 25 years. The global population is projected to increase by 1.5 to 2 billion over this period, and the bulk of these people will constitute low-income households living in developing country cities. Where will all these new city residents live? As Payne notes, the international community has come to realize that the "real challenge of slums is two-fold:"

First, there is a need to improve the living conditions of people living in slums and various types of unauthorized settlements. And second, there is an equally urgent need to create conditions in which all sections of urban society, especially the poorest and most vulnerable, can obtain access to legal, affordable shelter in ways that prevent the need for future slums and unauthorized settlement.

In the first paper of this section, Abiko, Azevedo, Reinaldelli, and Haga quantify slum upgrading costs in Brazil, and find that providing a basic package of services costs through these programs costs around three times (US \$3,000) that of formal-sector development (US \$1,000) on average, although these costs range widely between simple and complex projects. The second and third papers show that the likelihood that certain areas will become slums and that households will become slum dwellers can be predicted, and – thus – that proactive advance planning can have a large impact on meeting the challenges of slums. Sietching's application of a Geographic Information System based on mathematical "cellular automata" dynamically maps urban development in Yaounde (Cameroon in West Africa) and predicts the location of slums with 73% accuracy. Piedade, Oliveira, and Albuquerque use a probit model to determine the likelihood that Brazilian households with specific socio-economic characteristics (higher unemployment, lower quality of employment, lower schooling, higher household sizes, etc.) will live in a slum. The fourth and final paper

(Betancur) examines an integrated slum upgrading program in the context of urban violence and local politics in Medellin, Colombia.

Transport, density, urban planning and urban form

The immensity and paradoxes of the urban land challenge suggest that the most effective solutions must join the micro level of projects with that of the macro-development of the city region as a whole. Here, innovations in transport and urban planning, systems of settlements and the form of large metropolitan areas are crucial.

Urban-density studies (such as density-gradient analysis) demonstrate that housing and transport are a binomial equation. Improvement in urban transport opens up much larger land areas for residential development and improves economic productivity. In turn, higher residential densities make public transport systems economically feasible. The form of metropolitan areas is crucially important to both housing and transport. This is particularly true for the immense urban agglomerations – or “megapolitan areas” – that contain an increasing share of populations – such as those of Mexico City, Sao Paulo, and Jabotabek (i.e. Jakarta and surrounding areas).

Based on the experience of Asian megapolitan areas, Laquian concludes, “allowing a monocentric settlement to grow in an uncontrollable and haphazard fashion is a recipe for disaster... (These areas are) sprawling, and extremely expensive to provide basic services.” Instead, macro land-use decisions and other measures can create poly-nucleated urban region. Traditional master planning (zoning, subdivision regulation), typically leaves blank spaces for the huge informal settlements within developing country cities, and is of little use. Instead, strategic plans should focus on systems of settlements. Relatively simple actions such as laying out main roads in a rational way (Angel) in expansion areas can also have an important impact.

Improving the governance and management of metropolitan regions (Freire and Stren) has crucial importance for implementing such macro approaches. However, many metropolitan regions in developing countries as developed countries are fragmented into dozens of local jurisdictions and authorities, and the institutions for coordination among them are only gradually emerging.

The first paper (Serra, Dowall, Motta, and Donovan) examines the form of three Brazilian cities – Recife, Curitiba, and Brasília – through calculating population density gradients and regression analysis of the determinants of land prices. The relatively well-functioning land markets of Recife and Curitiba contrast with those of Brasília, and raise important issues for social welfare and economic development. Coelho and Irving continue this type of analysis by calculating density gradients for 10 Brazilian cities. The third paper (Graham) concerns the links between city size, productivity, and infrastructure provision through calculating elasticities of productivity with respect to city size for different industrial sectors in the United Kingdom. Kumarage then examines the impact of transport investment on urban poverty and land development in Colombo, Sri Lanka, concluding that improving transport holds key importance for low-income households. The final paper (Pujol) analyzes the metropolitan development of San Jose, Costa Rica. While Costa Rica has, in significant measure, met its housing challenge, many urban-development issues remain.

Housing Markets and Low-Income Housing Programs

Starting in the early 1990s, many governments and donors – influenced by the World Bank – adopted an “enabling markets” approach to housing (World Bank, 1993). The context of the emergence of this approach

consisted of the fall of the Soviet Union and entry into the market system of a large share of the world's population (in China, India, and the Newly-Independent States), the poor results of highly-subsidized housing programs that attempted to replace the market in many countries – particularly in Latin America, the limited impact of sites and services and slum upgrading projects, and the Savings and Loan debacle of the 1980s in the U.S., where ignoring the logic of markets cost taxpayers US \$500 billion.

The enabling-markets approach has encouraged reform of various aspects (land, property rights, infrastructure, housing finance, housing institutions) of the housing “sector”, and embraced land issues within a housing framework. This approach led the World Bank to shift from supporting sites and services and slum upgrading – which were viewed as isolated projects with little systemic impact – to reforming and expanding mortgage credit in the hope of eventually pushing this and other aspects of formal-sector housing “downmarket” to reach low/moderate-income households.

Enabling housing markets has had a number of successes. In particular, mortgage finance – which was formerly available mainly in OECD countries – has now spread throughout the world (Buckley, 2005). However, formal systems – including mortgage credit – have largely failed to go downmarket to reach low-income households. In most countries, even moderate-income families remain left out of formal-sector housing and land systems. Meanwhile, the “informal sector” and slums – which appeared a limited market failure in the early 1990s – have continued to grow in many regions. In Sub-Saharan Africa, where many countries have urbanized rapidly without economic growth (Fay), these irregular settlements consume the great bulk of many cities. It is now clear that these impoverished, poorly housed, and poorly serviced areas are at least semi-permanent features of the urban landscape in many regions.

In retrospect, the initial enabling-markets approach appears too sanguine about the difficulties of creating “well-functioning” housing markets – where “everyone is housed adequately.... at a reasonable share of income” and “residential land is available at a reasonable price” (World Bank, 1993). The urban process is also much more complex and diverse now than when the World Bank first started its work (Buckley). Well-functioning housing and land markets are powerful but difficult to create and maintain, and must frequently be supplemented with interventions to overcome large-scale market failures. This is not only true in developing countries but also, arguably, in affluent countries. Housing affordability has sharply declined in Western Europe and the U.S. in recent years.¹

Some (Laquian) have speculated that the “enabling markets” approach appears to be a “transition to a moment when much greater and more systematic attention needs to be paid to housing, land, and urban development.” This is not just the job of the public sector. GDPs of developing countries as a whole are growing at over 6% per annum, compared to rates of around 2% for the developed world. Housing is the largest single investment of the low/moderate-income majority.

Surely, if markets are to play a substantial role in development, then the private sector could have a substantial role in low-income housing and land. However, the private-sector organizations that employ the most effective

¹ Although both the U.S. and much of Western Europe are in the middle of a housing market correction, housing affordability has declined steadily for half a century, particularly in large metropolitan areas. For example, the median house price-to-median household income for the U.S. as a whole has gone from 2 in the 1950s to over 3 today. Only more favorable finance (some aspects of which create greatly increased risks for households and for the financial system) and two-income families have kept the rate of homeownership from falling in the U.S.

management methods and that have the greatest capacity to help low-income households – multi-nationals and large local companies – generally do not understand low-income markets, and – with some notable exceptions (Prahalad) - have kept out of them. Instead, marginal producers and suppliers of land, building materials, finance and other inputs to the land/housing process dominate. The result is, too often, very high-cost, “savage” low-income housing and land markets (Buckley) in which local bosses and public and private mafias greatly increase costs at transition points.

Thus, the methods and models for involving the private-sector constructively in solving low-income housing problems largely remain pending. An encouraging exception is that of CEMEX, the third largest cement maker in the world, in satisfying markets for progressive housing in Mexico. . The CEMEX Patrimonio Hoy program organizes small groups of families who commit to a 70-week saving program, arranges with local building materials suppliers to deliver high-quality product at competitive prices, and advances microcredit to these families in the form of delivering building materials well prior to payment by households. CEMEX operates this program through establishing offices located in low-income communities, and local “promoters” – 98 percent of them women - to inform local households about the program. Patrimonio Hoy has proved astonishingly successful. reaching 100,000 people in its first two years with plans to expand this number to 1,000,000 in the next 5 years. The program operates without subsidies and the other two of the top three cement manufacturers of the world – Holcim and Lafarge - have recently launched initiatives to reach the progressive housing market in a number of developing countries. Hence, the involvement of large corporations and application of modern management methods to low-income housing still has potential, despite the uneven results of a decade and a half of “enabling housing markets.”

Due to the crucial importance of urban land for the poor and the failure of the enabling markets approach to address this problem, a land-centered approach appears to be replacing a housing-centered approach to low-income shelter and settlement. Nevertheless, the traditional issues of housing finance – including how to join housing credit, housing savings systems, and housing subsidies to make shelter more affordable – remain.

On the real side, an important area for innovation and program design is the various forms of “low-cost housing solutions.” “Low-cost land and housing solutions” consist of a wide range of options that compose the steps of the progressive housing process. These include serviced and unserviced lots, rehabilitation and improvement, expansion, construction of a core unit on a lot already owned by the family (for replacement, to add a unit, for rental), tenure regularization, infrastructure and service upgrading etc). These incremental housing solutions cost a small fraction of purchasing of a new commercially-built unit. Thus, they represent a fundamental key to large-scale provision of affordable shelter and housing policy in many countries.

Joining such project approaches with new technologies including housing microfinance (Ferguson), organized community participation (Ruster and Imparato), and selective involvement of the private sector – such as the Patrimonio Hoy program of CEMEX – may hold the key to creating a new generation of more effective, more sustainable, and more massive low-income housing projects that really do reach the poor at scale. In this context, it may be time (Buckley) to re-evaluate the earlier experience of the World Bank and county governments with sites and services, and slum upgrading programs.

In contrast, many government housing programs still often focus on making moderate and middle-income families bankable in order to move formal-sector credit and other systems downmarket to these groups and to

spur economic growth. Physically, the prototype moderate-income housing solution in Latin America consists of a core expandable unit of 25 to 45 m² that families upgrade and expand in programmed steps, as need and available resources dictate; and, in East Asia, a 40 to 80 m² unit in a multi-storey building. The vested interests of the construction and development industry often play a large role in promoting this policy approach. However, most developing countries usually have a very small housing credit system and a potentially more important instrument is subsidies (Buckley).

The art of low-income housing program design consists mainly of joining financial resources (subsidies, credit, and household savings) with different types of low-income housing solutions to suit local housing conditions, the financial capacity of government to fund these efforts, and the institutional capacity of other key actors (housing NGOs, local governments, lenders) to perform their roles in these efforts.

Within the developing world, the housing programs of Latin America, and those of East Asia are particularly noteworthy. While Latin America has focused on housing subsidy systems, East Asia has emphasized forceful public management of urban land. The first two papers of this section examine housing programs in Latin America. Zanetta examines the decentralization of Argentina's National Housing Fund to provincial governments during the 1990s, while Fonseca, Trani, and Wakisaka document the large effort of the state of Sao Paulo in affordable housing, in general, and the experience of its self-help housing partnership with the state's municipalities, in particular. The third paper adapts the model used in the state of Florida in the U.S. for estimating housing need to Brazil. The last two papers deal with East Asia. Yuen examines the strikingly successful experience of Singapore, and Zhu surveys that of Singapore, China, Bangladesh, and Vietnam. The most successful Asian cases – Singapore, Hong Kong, and China – join forceful public management or ownership of urban land with private-sector development and ownership of the resulting units.

Development on the urban fringe, the city center, and the environment

Development on the urban fringe increasingly takes polarized forms in developing countries. Low-income households – although not the poorest, whose main priority is to locate close to jobs in the city center – tend to occupy sprawling informal subdivisions on the periphery. Subsidized government housing development for low/moderate-income families depends on the availability of low-cost land, also located on or beyond the urban fringe. At the other end of the income spectrum, the elite follow manufacturing subsidiaries of international companies (Buenos Aires, Curitiba, Sao Paulo), universities, locally-grown high-tech manufacturers and international service-providers (Bangalore and some other Indian cities), and commercial establishments to the suburbs, and increasingly live in gated suburban communities.

The resulting sprawl has strong negative environmental impacts. It consumes agricultural and environmentally-sensitive land. City growth also contributes to threatening an absolute global shortage of fresh water. Utility companies must go further and further afield to find sources, and spend skyrocketing sums on processing, pumping, and transporting it. De-salinization technologies may have a role to play here in coastal cities. Most troubling of all, sprawl joined with the export of old, highly-polluting automobile technologies from rich countries to China has substantially increased the carbon-dioxide emissions of the world, and contributed to global warming.

The alternative to sprawl involves greater densification of existing urban areas, particularly around transport nodes. In this regard, many larger and older developing-country metropolitan areas have come to assume the

donut form of U.S. cities. Congestion, crime, and departure of the middle-class to the suburbs leave a declining central city, which sometimes falls in population.

Redevelopment of central cities appears to make sense. After all, these areas already have infrastructure and services, and are much closer to jobs than the periphery. On closer inspection, however, the costs of purchasing, cleaning (necessary for “brownfields” sites formerly used for polluting industries), and developing centrally located sites are usually higher than development on the fringe. Strong public-private partnerships are essential to assemble sufficiently-large parcels of centrally located land to make such redevelopment projects economically viable. While redevelopment of central cities has a long history in the U.S. and Western Europe, most developing countries are only now beginning to build the institutions and legal framework for such partnerships.

The first four papers of this final section of the anthology examine the dilemmas of rapid development on the urban fringe – the pattern of most developing-country cities. The last two papers look at the theoretical advantages and practical difficulties of redevelopment of the central city and the densification of existing urban areas. Pantelic, Srdanovic, and Greene note that the distinct features of the urbanization of the past two decades constitute a “post-modern period” in which the segregation of the rich and poor increasingly makes low-income urban households vulnerable to natural and man-made disasters. Sridhar then examines suburbanization of newly-prosperous Indian cities. The third paper (Torres) analyzes the urban sprawl of the Sao Paulo metropolitan area, the expansion of its poor periphery, and the impact on the environment. The fourth paper of this section (Goytia) focuses on the polarization of development of the urban fringe into gated communities for the rich and slums for the poor in Pilar, a municipality in the northeast corner of the Buenos Aires metropolitan area. Aragao then investigates the central-city redevelopment experience of Paris and Barcelona, and compares it with that of Sao Paulo. The final paper of this anthology examines the densification of Guadalajara, Mexico’s second largest city, concluding that the methods to promote a more compact city are still incipient in this metropolitan area.

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INTRODUÇÃO GERAL

SIMPÓSIO INTERNACIONAL SOBRE PESQUISA URBANA 2005

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Como observou Sir Peter Hall em seu prefácio, a “Revolução Urbana” verificada em especial nos países em desenvolvimento representa grandes oportunidades e riscos. A urbanização tem a faculdade de ajudar na elevação dos padrões de vida, pode oferecer a infra-estrutura e os serviços que resultam em enorme aprimoramento em termos de bem estar humano, além de libertar as pessoas do jugo da terra e do domínio total da busca quotidiana por alimentos. Os bairros e centros atraentes, o transporte eficiente, as várias amenidades, os impressionantes indicadores sociais e o elevado padrão de vida de Cingapura e de Curitiba são sinais desse potencial.

Por outro lado, caso seja mal administrada, a onda urbana poderá resultar em acentuado crescimento da pobreza nas cidades, gerando condições surrealisticamente desesperadoras e fomentando a doença e a violência. Os moradores de rua de Bombaim, que convivem lado a lado com a imensa riqueza desse capitólio comercial de uma Índia que vem recentemente conhecendo a prosperidade, e os casebres e favelas aparentemente sem fim que consomem tantas cidades da África subsaariana são exemplos emblemáticos desse outro presente urbano e de seu possível futuro.

No centro de muitas dessas oportunidades e riscos, está o próprio terreno urbano. Encontrar lotes de terra bem localizados e a preços razoáveis é hoje o desafio mais crucial para o desenvolvimento de habitações acessíveis. Nos casos em que esse tipo de programas não estejam disponíveis – como ocorre com frequência – a maioria formada por pessoas de renda baixa a moderada em muitas cidades de países em desenvolvimento em geral não consegue pagar por uma casa mais barata construída comercialmente, recorrendo em vez disso aos sistemas “informais” para solucionar o próprio problema habitacional. Mesmo esse tipo de “habitação progressiva” inicia-se com o acesso a um lote, dependendo também dele. Da mesma forma, a eficiência do transporte e a capacidade das famílias de garantirem a conexão com seus empregos e serviços estão condicionados ao uso e à densidade da terra.

No período que caracterizou o início da grande onda urbana nos países em desenvolvimento – a década de 1950 – as famílias pobres que migravam dos campos para as cidades conseguiam com alguma frequência encontrar terrenos baratos e de localização central onde instalar-se. O filme “Orfeu Negro”, que recria o mito de Orfeu e Eurídice nas favelas localizadas em morros íngremes e com vistas panorâmicas da cidade do Rio de Janeiro, pinta um quadro idílico da vida na favela na época. Hoje em dia, é impossível imaginar um filme lírico como esse sendo produzido sobre a vida que ali se desenrola. Na verdade, atualmente o cinema brasileiro produz muitos filmes neo-realistas ásperos, que descrevem os resultados das condições cada vez piores e mais espalhadas das favelas, incluindo os órfãos de rua, seqüestros e violência urbana.

Em relação a isso, na maior parte das cidades de países em desenvolvimento a era de acesso fácil a terrenos urbanos há muito tempo acabou, uma vez que o avanço da urbanização terminou por ocupar as melhores áreas para desenvolvimento ao redor de muitas cidades. Muito embora alguns terrenos localizados em setores

urbanos e periurbanos sejam frequentemente de propriedade de órgãos dos governos, as grandes empresas incorporadoras, que constroem principalmente visando famílias de renda alta e média, agora parecem ser donas da maior parte dos lotes adequados à construção que ainda restam. Os valores reduzidos, os altos requisitos técnicos e as dificuldades políticas dos impostos sobre a propriedade imobiliária nos países em desenvolvimento permitem que esses grandes proprietários de terras continuem mantendo os terrenos, incorrendo em custos reduzidos. Na ausência de medidas que venham a melhorar essa situação, de processos que formalizem a propriedade da terra e de outras reformas, o resultado vem sendo a “*commodificação*” da terra e da habitação em geral (Durand-Laserve), o que com frequência leva à elevação dos preços e à exclusão dos pobres. Por muitos motivos, a terra urbana tornou-se hoje a principal “restrição vinculante” à questão habitacional relacionada à população carente.

A presente antologia reúne e organiza 32 trabalhos apresentados durante o Simpósio Internacional de Pesquisa Urbana, realizado em Brasília de 4 a 6 de abril de 2005, sob o patrocínio conjunto do IPEA e do Banco Mundial, e que focalizou a terra urbana.

Os trabalhos apresentados durante esse Simpósio de 2005 foram organizados ao redor de seis áreas temáticas nas seções desta antologia:

- Mercados e desenvolvimento da terra e política do solo
- Garantia de posse, direitos de propriedade e sistemas informais de acesso à terra
- Assentamentos informais, favelas e urbanização
- Transportes, densidade, planejamento urbano e conformação urbana
- Mercados de imóveis residenciais e desenho de programas
- Desenvolvimento na periferia urbana e nos centros das cidades e o meio ambiente

A seguir, nesta introdução geral, passaremos a descrever brevemente essas seis áreas temáticas. Ainda, a “introdução da seção” que antecede cada uma das seis seções constantes do texto da antologia tratará em maior detalhe dos tópicos, de forma a colocar cada um dos trabalhos em seu contexto.

Mercados e desenvolvimento da terra e política do solo. Em muitas cidades de países em desenvolvimento, o desenvolvimento de terrenos destinados a habitações que venham a atender famílias de baixa renda legalmente está estagnado, ou em processo de estagnar-se. Por exemplo, em Buenos Aires o submercado formal representado pela venda de lotes individuais a famílias de baixa renda através de prestações mensais foi importante de 1950 a 1970 (Banco Mundial, 2006), mas desapareceu desde então – ver Quadro 1. Durante esse período, os incorporadores forneceram diretamente aos compradores empréstimos para a aquisição dos imóveis, que ficavam garantidos por gravames sobre os mesmos (tipicamente, 150 prestações mensais) – a forma mais comum de crédito para a venda de lotes a famílias de baixa renda nos países emergentes. Entretanto, a indexação desses contratos exigida pelo governo e a hiperinflação dos anos 90 terminaram por impossibilitar esses empréstimos. Em parte como resultado disso, muitos bairros na periferia de Buenos Aires permanecem em grande parte desocupados, enquanto estão paralisados os mercados legais de terra destinada à população de baixa renda. (Banco Mundial, 2006).

Simplesmente acrescentar dinheiro – quer seja através de subsídios ou crédito para financiamento – sem solucionar esses gargalos relacionados à terra principalmente tem como resultado a elevação dos preços dessa

terra. Em outras palavras, a falta de elasticidade da oferta produz principalmente preços mais altos, em vez de um número maior de unidades, quando a demanda cresce.

A pressão crescente sobre o solo urbano determinou o aumento dos preços dos imóveis residenciais, tendo tornado o mercado surrealisticamente disfuncional em muitas das principais áreas metropolitanas dos países em desenvolvimento. Em Dacca, por exemplo, o preço de uma casa média atinge o nível chocante de 106 vezes a renda anual familiar mediana. Em comparação, os mercados de residências metropolitanas mais caros nos Estados Unidos – os da cidade de Nova Iorque e de São Francisco – exibem proporções entre os preços médios e os rendimentos anuais médios das famílias que correspondem a aproximadamente 6.

As pressões extremas sobre o solo e o seu alto custo geraram ainda abordagens inovadoras ao desenvolvimento da terra, que efetivamente reduzem o preço e capturam uma porção do valor agregado do investimento público em urbanização. Em especial, os países asiáticos – Cingapura, Hong Kong e mais recentemente a China – tomaram medidas para reduzir a base de custo dos terrenos urbanos para residências acessíveis e para outros tipos de desenvolvimento. Ainda antes disso, o Japão e a Coreia do Sul já estimulavam os proprietários de terras nas periferias das cidades a reunirem suas propriedades, como forma de promover um desenvolvimento mais eficiente – um método denominado “reajuste da terra”.

Alguns governos são os proprietários de extensões consideráveis de terras nas áreas periurbanas e urbanas, que são significativamente subutilizadas, ainda que frequentemente essas terras públicas tenham importância fundamental tanto para o setor público quanto para o privado. Por outro lado, o que é mais típico é que a propriedade do poder público sobre a terra fique fragmentada entre vários órgãos de diferentes níveis de governo, cada um com o seu próprio mandato e seção administrativa a ser guardada. É comum haver confusão entre a propriedade e os direitos legais sobre determinados lotes; assim, o primeiro passo em geral envolve a realização de um inventário da terra pública, juntamente com terrenos de particulares, para que se possa esclarecer a situação legal desses lotes vazios ou subutilizados. Essas investigações comumente revelam que alguns lotes estão prontos para desenvolvimento de forma bem direta, enquanto que outros envolvem problemas complicados de propriedade, que dificilmente podem ser resolvidos a curto prazo. A determinação da situação legal desses terrenos é pré-requisito para qualquer tipo de ação que possa estimular o seu uso como mecanismos de incentivo para a colocação no mercado de terras particulares.

Os dois primeiros trabalhos da primeira seção desta antologia exploram os esforços inovadores de transformação dos desenvolvimentos em terras urbanas, com a finalidade de reduzir em muito os seus custos para construção de residências acessíveis e outros usos. No Irã (Keivani, Mattingly e Majed), o governo limitou a extensão das terras de propriedade individual, o que resultou na transferência para o setor público de grandes áreas a baixo custo, benefícios que foram repassados a indivíduos e incorporadores, o que por sua vez resultou na oferta de habitações para aproximadamente 7% das famílias de mais baixa renda no país. Maldonado analisa a experiência da Colômbia, com uma nova estrutura jurídica para o reajuste de terras, que captura uma parte do valor agregado por investimentos públicos em urbanização para financiamento e desenvolvimentos de lotes com disponibilidade de serviços e a preços acessíveis. O terceiro trabalho (Pearce-Oroz) investiga as realidades institucionais e os limites dos mercados de terras urbanas – que com frequência são dominados por uma reduzida elite – no contexto da vultosa assistência para reconstrução que se seguiu à passagem do furacão Mitch por Honduras, em 1998. O quarto e último estudo dessa seção documenta o fracasso dos impostos locais sobre a propriedade no Peru em produzir um volume substancial de receitas, como resultado das fragilidades da governança local – problema comum em países emergentes – e a introdução de órgãos para a

arrecadação de impostos independentes dos municípios, que resultou em grandes aumentos na receita gerada por impostos sobre a propriedade, apesar da base reduzidíssima.

Garantia de posse, direitos de propriedade e sistemas informais de acesso à terra. A estagnação dos mercados legais de terra para a população de baixa renda faz com que os desenvolvimentos ilegais (que recebem várias denominações, como “piratas”, “informais” e “clandestinos”) e os mercados informais passem a ser a principal fonte de terrenos para assentamentos das famílias carentes. Aqui, o processo de habitação progressiva é o principal meio de ocupação e construção de moradia para famílias de renda baixa ou moderada em muitas cidades de países em desenvolvimento. Tipicamente, as famílias invadem a terra ou adquirem lotes em um bairro informal, construindo suas casas ao longo de dez a quinze anos. Financiam a construção em grande parte através da sua própria poupança, mas também através de muitas outras fontes, que incluem pequenos empréstimos, fundos de pensão (se houver disponibilidade) e arranjos que envolvem assistência mútua entre outras famílias. À medida que as famílias vão consolidando a sua casa, a comunidade passa a demandar serviços e uma maior garantia de posse. As melhorias legais acrescentadas às comunidades e a expansão dos serviços acompanha a urbanização física e a construção de moradias individuais. Assim sendo, a habitação progressiva revela-se em parte um processo individual – o da própria habitação – ainda que inclua um forte componente coletivo – a melhoria dos serviços e a condição de legalidade da comunidade.

Os mecanismos informais de acesso à terra constituem sistemas paralelos para desenvolvimento e posse da terra. Muito embora esses sistemas “paralegais” envolvam custos mais baixos, com frequência são menos transparentes. Mais uma vez, um exemplo é a Argentina – país de renda média e relativamente sofisticado. As famílias conseguem obter a propriedade através da ocupação pacífica da terra durante vinte anos, de forma geral, e durante dez anos em um número limitado de circunstâncias; uma lei de 1994 regula o registro dos acordos de compra desses lotes, para aumentar a garantia da posse. Esse sistema informal coexiste com o registro formal de escrituras de propriedade; por outro lado, o custo do registro no setor formal tipicamente varia de 400 a 700 dólares, incluindo despesas de escritura, e a maior parte das famílias de baixa renda que nas décadas de 50 e 60 adquiriu lotes de incorporadores para pagamento em prestações ainda não possui suas escrituras, devido à falta de recursos (Banco Mundial, 2006).

Além disso, na concorrência, esses sistemas informais paralelos derrotam os formais. Na verdade, os custos de ingresso são muito inferiores (ainda que com o tempo, os custos totais em geral excedam em muito os verificados no desenvolvimento do setor formal) e as características parecem ser mais adequadas às necessidades e às efetivas demandas das famílias de renda baixa a moderada. Os desenvolvimentos informais tipicamente demonstram algum tipo de combinação entre fatores como (a) localização mais central (mais próxima do local de trabalho e de redes sociais que são cruciais para a população carente), (b) lotes maiores, que oferecem mais espaço para que as famílias de baixa renda possam expandir e adaptar os imóveis às suas necessidades (famílias mais numerosas, microempresas sediadas nas próprias residências, agricultura urbana) e (c) condições mais flexíveis de financiamento (prestações que podem deixar de ser pagas em caso de enfermidade temporária, perda do emprego ou outros motivos importantes), e que são mais adequadas às rendas e aos empregos informais dessas famílias, que são inconstantes, apesar do fato de as taxas de juros serem em geral bem altas. Ainda, o desenvolvimento informal utiliza também o argumento da promessa do governo em relação à prestação subsequente de serviços, aliada à urbanização, ambas em grande parte financiadas pelo setor público. Esses benefícios até certo ponto são capitalizados através de preços mais altos que as famílias terminam por pagar aos incorporadores ilegais, por um lote de terra bruta.

A “segurança de posse” da terra protege essas famílias contra o despejo e a derrubada de seus imóveis por tratores, representando assim a base para que elas possam progressivamente investir em suas casas e construir suas comunidades. As escrituras com pleno valor legal, respaldadas por modernos sistemas fundiários (registro e cadastro de imóveis, validação legal efetiva), resultam em maior segurança de posse, muito embora o sistema seja caro, exigente do ponto de vista técnico e freqüentemente empurre o valor do acesso aos lotes para além do alcance das famílias de renda baixa a moderada. Em muitas regiões, as formas intermediárias e tradicionais de propriedade imobiliária têm representado base suficientemente segura para o processo progressivo relacionado à terra e à habitação.

Outros aspectos dos sistemas de direitos de propriedade oferecem formas de solucionar questões ligadas ao solo urbano, incluindo os direitos de grupos versus direitos individuais e o arrendamento/aluguel em oposição à propriedade. Os direitos individuais facilitam os mercados e a transparência, muito embora envolvam problemas em alcançar as famílias de baixa renda. Experiências realizadas com os direitos de grupos em comunidades de baixa renda – como as desenvolvidas em Recife e em Porto Alegre, no Brasil e os Regimes Fiduciários de Terrenos Comunitários do Quênia (ver Payne) – revelaram-se interessantes, mas difíceis de serem expandidos.

O aluguel de moradias e o arrendamento de terras em longo prazo possuem virtudes teóricas. Em princípio, esses arrendamentos por períodos prolongados de tempo podem oferecer segurança de posse suficiente para a obtenção de financiamento (Deininger, 2003). Quanto ao aluguel informal de residências nos bairros pobres, já representa a principal fonte de acomodações para aluguel na maior parte dos países em desenvolvimento (Gilbert). O que comumente ocorre é que as famílias constroem um cômodo ou uma unidade a mais na moradia já existente (seja horizontal ou verticalmente) e alugam, como forma de obtenção de renda. Considerando-se que não necessitam pagar nada a mais pela terra e que ganham outras economias (como por exemplo conexões clandestinas e legais com serviços) a partir das unidades adjacentes, ocupadas pelos proprietários, essas unidades acessórias são a forma mais barata de produzir moradia para os grupos de baixa renda. Nos países mais ricos, as moradias de aluguel subsidiado são a forma principal de habitação a preços acessíveis.

Entretanto, a expansão de moradias de aluguel para a população de baixa renda e de terras para arrendamento, de acordo com os sistemas formais, é difícil e rara nos países emergentes, como resultado de complicados problemas de natureza técnica e política. Do ponto de vista técnico, não foi possível ainda resolver o problema de quem deverá possuir, operar e manter as unidades de aluguel para pessoas de baixa renda, de maneira que possa ser garantida uma forma de abrigo satisfatória e acessível, e que canalize os benefícios de quaisquer subsídios públicos ou de melhorias financiadas pelo setor público principalmente para os locatários de baixa renda, em vez de basicamente para os proprietários. Na Europa Ocidental, nos Estados Unidos e no Canadá, utilizam-se redes de sofisticadas empresas sem fins lucrativos e/ou empresas municipais, que recebem o suporte de sistemas públicos de subsídios respaldados por um arcabouço legal com bom funcionamento, que então operam, mantêm e – cada vez mais – desenvolvem moradias de aluguel acessíveis.

Por outro lado, a maior parte dos países de renda baixa ou média ainda carece dessas organizações e das estruturas de financiamento e jurídicas/regulatórias necessárias para que essa abordagem possa funcionar, muito embora alguns poucos já comecem a desenvolver sistemas acessíveis de aluguel (como são os casos de Cingapura, de Hong Kong e da China). Do ponto de vista político, a maioria dos governos dos países em desenvolvimento acredita que a produção de unidades para proprietários seja mais recompensadora do que o

apoio ao sistema de aluguéis. Em muitas regiões – em especial na América Latina e no Sudeste da Ásia – é possível argumentar que a forte preferência cultural pela casa própria reduziria em muito a importância de qualquer ação governamental que focalizasse o aluguel, excetuando-se o controle dos aluguéis, o que de maneira geral resulta no fechamento desses mercados e termina por reduzir em muito a oferta de unidades para aluguel. Em contraste, a grande parte dos moradores de cidades em algumas partes da África subsaariana consideram suas moradias urbanas como um lugar transitório enquanto vão trabalhar na cidade, antes de retornarem aos seus verdadeiros lares nas regiões das tribos, sendo muito mais comuns as acomodações alugadas.

O primeiro trabalho desta seção (Durand-Laserve) documenta como as crescentes pressões sobre o solo urbano e a “*commodificação*” de abrigos e assentamentos fizeram aumentar os “despejos pelo mercado” de famílias detentoras de documentos intermediários de propriedade, muito embora declarações e pressões internacionais tenham contribuído para reduzir os “despejos forçados”. O segundo estudo (Mooya e Cloete) emprega os instrumentos da Nova Economia Institucional para analisar o argumento apresentado por Hernando de Soto em seu livro pioneiro *O Mistério do Capital*, de que o título pleno e legal é a chave para transformar “capital morto”, na forma de imóveis ilegais de tantas famílias de baixa renda, em um ativo econômico e para impulsionar o crescimento econômico em bases amplas. O trabalho conclui que as formas intermediárias de posse podem ter as virtudes do título legal pleno caso sejam construídas adequadamente, para em seguida examinar o caso da Namíbia nesse contexto. O terceiro trabalho (Fernandes) documenta e avalia os recentes esforços do Ministério das Cidades no Brasil, em desenvolver uma abordagem abrangente para a regularização da titularidade imobiliária em todo o país. No quarto estudo, Abramo oferece uma visão geral estrutural e teórica dos assentamentos informais no Brasil. O quinto (Rakodi) examina sistemas tradicionais de acesso à terra em cinco cidades de porte médio da África subsaariana, concluindo que as políticas e os programas podem potencializar os seus pontos fortes.

Assentamentos Informais, Favelas e Urbanização - Muito embora a habitação progressiva seja uma solução crucial, é também um imenso problema, que ao carecer de orientação resulta em enormes custos para os setores público e privado. Cada vez mais, os rígidos mercados da terra forçam as famílias ao assentamento em locais precários, que incluem campos, encostas íngremes de morros, alagadiços, leitos de rios, lixões, mananciais, calçadas, extremidades de instalações públicas e linhas de infra-estrutura e áreas de direito de passagem associadas, além de locais distantes das linhas existentes de infra-estrutura, que são freqüentemente frágeis ou inadequados do ponto de vista ambiental. A opção é ver essas famílias aglomerando-se em assentamentos informais cada vez mais densos: unidades de aluguel no interior das cidades, divididas em muitos cômodos, cada um alugado a uma família, ou ainda favelas nas periferias das cidades ou até mais longe, que se expandem horizontalmente tomando todo e qualquer espaço livre, para em seguida continuar verticalmente, sendo acrescentados andares às estruturas existentes.

A urbanização das favelas envolve dotar essas áreas de infra-estrutura para a criação de uma malha viária viável, construída sobre redes de abastecimento de água e acompanhada por sistemas de drenagem e saneamento. Com freqüência, esse processo exige a transferência de pequena parte da população das favelas (aproximadamente 5%) para outros locais – o que em geral é uma fase problemática e cara. É comum a urbanização das favelas ocorrer pouco a pouco, sem que haja um plano geral ou um desenho estabelecido, em geral perto de períodos eleitorais, quando os candidatos a cargos públicos trocam melhorias ou o compromisso de promover melhorias por votos. Em contraste, os programas “integrados” para a melhoria das favelas fornecem juntos os serviços básicos que faltam, com base em um plano e – freqüentemente – os combinam com a participação

organizada das comunidades, com determinados serviços sociais e econômicos e com a posse legal. Por esses motivos, a urbanização dessas áreas através da realização de melhorias nas favelas é em geral muito mais cara do que novos desenvolvimentos do setor formal. Tipicamente, o governo termina por absorver os altos custos de capital necessários para melhorar ou para substituir a infra-estrutura dessas comunidades, promovendo o reassentamento seletivo e regularizando a situação legal.

Os custos relativamente elevados das melhorias em favelas criaram problemas para a sustentabilidade financeira e para a escala dos programas. Em particular quando se adota uma abordagem integrada, que eleve essas áreas aos padrões que se aproximem (ainda que permaneçam inferiores) dos encontrados no resto da cidade, o alto custo por família tende a fazer com que esses programas sejam reduzidos a ações específicas e de pequena escala. O projeto modelo é bom, mas não consegue expandir-se muito.

Além dos custos dos programas de urbanização para o poder público, o desenvolvimento de moradias informais representa também altos custos para as famílias. O processo de construção de uma residência é tipicamente longo, além de envolver desperdício. Um estudo do mercado (ver Quadro 3) concluiu que são necessários onze anos para que as famílias mexicanas consigam construir uma casa básica de dois quartos, que sai por 30% a mais, devido ao alto custo representado por pequenas compras de material de construção, roubo e danificação desse material, além do planejamento inadequado. Ainda, as famílias terminam por pagar muito pela compra de lotes em estado bruto, para garantir mais segurança de posse, por serviços básicos antes da consolidação (como por exemplo água fornecida por carros-pipa, que custa tipicamente de 5 a 10 vezes mais do que a água abastecida através de serviços públicos) e para poupar ou tomar emprestado recursos para o custeio das etapas envolvidas no processo de construção progressiva de habitações. Quanto aos bairros assentados de forma irregular, experimentam ainda níveis substancialmente mais altos de criminalidade e insegurança, em comparação com outras áreas de perfil sócio-econômico semelhante. A má reputação desses bairros pode vir a rotular os seus moradores, prejudicando-lhes em grande medida a empregabilidade no setor formal (por exemplo, na Jamaica).

Os elevados custos para os setores público e privado da urbanização das favelas existentes vêm chamando a atenção para a importância de refrear a formação de favelas novas, através da antecipação da demanda e da expansão de desenvolvimento de terrenos para a população de baixa renda. Essa estratégia reveste-se de especial importância no Sul da Ásia e na África, onde a urbanização ainda está chegando ao auge. A maior parte das cidades de tamanho médio e grande dos países em desenvolvimento ainda vem experimentando taxas de crescimento que farão com que dobrem de tamanho em 20 a 25 anos. Nesse mesmo período, as projeções indicam que a população global deverá aumentar em 1,5 a 2 bilhões de pessoas, sendo que a maioria dessas pessoas estará em famílias de baixa renda que residirão em cidades de países em desenvolvimento. Onde viverão todos esses novos habitantes das cidades? Como observa Payne, a comunidade internacional já percebeu que “o verdadeiro desafio das favelas é na verdade duplo:”

Primeiro, é preciso melhorar as condições de vida das pessoas que moram em favelas e nos vários tipos de assentamentos não autorizados. E em segundo lugar, existe uma necessidade igualmente urgente de criar condições para que todas as seções da sociedade urbana, em especial os mais pobres e os mais vulneráveis, possam ter acesso a abrigo de caráter legal e a preços acessíveis, de maneiras que evitem a necessidade de futuras favelas e assentamentos não autorizados.

No primeiro trabalho desta seção, Abiko, Azevedo, Reinaldelli e Haga quantificam os custos de urbanização de favelas no Brasil, concluindo que o fornecimento de um pacote básico de serviços custa em média através desses programas aproximadamente três vezes (3.000 dólares) mais do que o desenvolvimento promovido pelo setor formal (1.000 dólares), embora esses custos variem grandemente entre projetos simples e complexos. O segundo e o terceiro trabalho mostram que a probabilidade de determinadas áreas virem a transformar-se em favelas, e de famílias virem a ser moradoras de favelas pode ser prevista e que – portanto – o planejamento avançado proativo pode ter impacto considerável, quando se trata de enfrentar os desafios das favelas. A aplicação por Sietchiping de um Sistema de Informações Geográficas baseado em “autômatos celulares” matemáticos mapeia de forma dinâmica o desenvolvimento urbano em Yaounde (Cameroun, na África Ocidental) e prevê a localização de favelas com 73% de precisão. Piedade, Oliveira e Albuquerque utilizam um modelo *probit* para determinar a probabilidade de famílias brasileiras com características sócio-econômicas específicas (maior nível de desemprego, qualidade inferior de emprego, mais baixa escolaridade, famílias mais numerosas, etc.) virem a morar em favelas. O quarto e último trabalho (Betancur) examina um programa integrado de urbanização de favela no contexto da violência urbana e da política local em Medellín, na Colômbia.

Transportes, densidade, planejamento urbano e conformação urbana - A imensidão e os paradoxos do desafio relacionado ao solo urbano sugerem que as soluções mais efetivas deverão unir o nível micro dos projetos ao macrodesenvolvimento da região da cidade como um todo. Aqui, são cruciais inovações na área de transportes e planejamento urbano, sistemas de assentamentos e na forma de áreas metropolitanas.

Os estudos de densidade urbana (como a análise de gradientes de densidade) demonstram que habitação e transporte formam uma equação binômica. As melhorias no transporte urbano resultam na abertura de áreas muito mais extensas de terras para desenvolvimento residencial e aumentam a produtividade econômica. Por sua vez, a maior densidade residencial faz com que sejam viáveis economicamente os sistemas de transportes públicos. Quanto à forma das áreas metropolitanas, possui importância crucial, tanto do ponto de vista da habitação quanto do transporte. Isso é particularmente verdadeiro no caso dos imensos aglomerados urbanos – ou “áreas megapolitanas”- que abriga uma parte cada vez maior da população – como se verifica na Cidade do México, em São Paulo e em Jabotabek (como em Jakarta e nas áreas ao seu redor).

Com base na experiência das áreas megapolitanas da Ásia, Laquian conclui que “permitir que um assentamento monocêntrico cresça de forma aleatória e descontrolada é uma receita para o desastre... (Essas áreas estão-se) esparramando, sendo extremamente caro o fornecimento de serviços básicos.” Em vez disso, decisões macro em relação ao uso da terra e outras medidas podem resultar em uma região urbana polinucleada. O planejamento-mestre tradicional (zoneamento, regulamentação de condomínios) deixa tipicamente espaços vazios para os enormes assentamentos informais dentro das cidades dos países em desenvolvimento, e tem pouca utilidade. Em seu lugar, os planos estratégicos deveriam focalizar os sistemas de assentamentos. Ações relativamente simples, como o desenho de vias principais de um modo racional (Angel) nas áreas de expansão podem também representar impacto importante.

Melhorar a governança e a administração das regiões metropolitanas (Freire e Stren) tem importância crucial para a implementação dessas abordagens macro. Entretanto, muitas regiões metropolitanas de países em desenvolvimento e desenvolvidos são fragmentadas em dezenas de jurisdições e autoridades locais, sendo que as instituições para coordenação entre elas estão surgindo apenas gradualmente.

O primeiro trabalho (Serra, Dowall, Motta e Donovan) examina a conformação de três cidades brasileiras – Recife, Curitiba e Brasília – calculando gradientes de densidade populacional e análises de regressão dos fatores que determinam os preços da terra. Os mercados de terra em Recife e em Curitiba, que funcionam relativamente bem, contrastam com os de Brasília, levantando questões importantes relacionadas ao bem estar social e ao desenvolvimento econômico. Coelho e Irving continuam com esse tipo de análise, calculando gradientes de densidade para dez cidades brasileiras. O terceiro trabalho (Graham) focaliza a ligação que existe entre o tamanho da cidade, a produtividade e o fornecimento de infra-estrutura, através do cálculo das elasticidades da produtividade em relação ao tamanho da cidade para diferentes setores industriais no Reino Unido. Em seguida, Kumarage examina o impacto do investimento na área de transportes sobre a pobreza urbana e o desenvolvimento da terra em Colombo, Sri Lanka, chegando à conclusão que a melhoria dos transportes tem importância crucial para as famílias de baixa renda. O último trabalho (Pujol) analisa o desenvolvimento de São José da Costa Rica: se por um lado o país vem enfrentando de forma significativa o desafio da habitação, restam ainda muitas questões relacionadas ao desenvolvimento urbano.

Mercados de Imóveis e Programas de Habitação para a População de Baixa Renda - A partir do início dos anos 90, muitos governos e muitos doadores – influenciados pelo Banco Mundial – adotaram uma abordagem da questão da habitação que incluía a “capacitação dos mercados” (Banco Mundial, 1993). O contexto do surgimento dessa abordagem incluía a queda da União Soviética e o ingresso no sistema de mercado de uma grande proporção da população mundial (na China, na Índia e nos Estados Recentemente Independentes), os maus resultados dos programas de habitação fortemente subsidiados que tratavam de substituir o mercado em muitos países – em especial na América Latina, o limitado impacto representado pelos locais e pelos serviços e pelos projetos de melhoria das favelas, além da decepção dos Bancos de Poupança e Empréstimos nos Estados Unidos na década de 80, onde o desprezo da lógica dos mercados custou aos contribuintes 500 bilhões de dólares.

A abordagem que envolve a capacitação dos mercados estimulou a reforma de vários aspectos (solo, direitos de propriedade, infra-estrutura, financiamento habitacional, instituições habitacionais) do “setor” habitacional, tendo incluído aspectos relacionados à terra na estrutura da habitação. Essa abordagem levou o Banco Mundial a transferir sua atenção dos locais e dos serviços, além da urbanização de favelas – ações que eram vistas como projetos isolados, com pouco impacto sistêmico – para a reforma e a expansão do crédito hipotecário, na esperança de eventualmente impulsionar esse e outros aspectos envolvidos no setor formal de habitação “para o mercado mais baixo”, de modo a alcançar as famílias de renda baixa a moderada.

O esforço de capacitar os mercados habitacionais já rendeu algumas histórias de sucesso. Em especial o financiamento hipotecário – antes disponível principalmente nos países da OCDE – hoje se estende por todo o mundo (Buckley, 2005). Entretanto, os sistemas formais – incluindo-se aqui o crédito hipotecário – na maior parte dos casos não avança para as camadas inferiores do mercado, para acesso das famílias mais pobres. Na maioria dos países, até mesmo as famílias de renda moderada permanecem à margem do setor habitacional e dos sistemas ligados ao solo do setor formal. Nesse meio tempo, o “setor informal” e as favelas – que no início dos anos 90 pareciam falha limitada do mercado – continuam a crescer em muitas regiões. Na África subsaariana, onde muitos países experimentaram urbanização muito rápida, na ausência de crescimento econômico (Fay), esses assentamentos irregulares consomem uma parte muito considerável de muitas cidades. Hoje em dia já é claro que essas áreas empobrecidas, com moradias inadequadas e carentes de serviços representam pelo menos características semipermanentes do cenário urbano em muitas regiões.

Olhando para trás, a abordagem inicial, que envolvia a capacitação dos mercados, parece excessivamente ansiosa em relação às dificuldades de criar mercados habitacionais “que funcionem bem” – em que “todos disponham de moradias adequadas mediante porções razoáveis de sua renda” e em que “haja disponibilidade de terras residenciais a preços razoáveis” (Banco Mundial, 1993). Além disso, o processo urbano é hoje muito mais complexo e muito mais diversificado do que era na época em que o Banco Mundial deu início ao seu trabalho (Buckley). Mercados habitacionais e de terra que funcionem bem são poderosos, mas difíceis de criar e de manter, freqüentemente necessitando ser suplementados através de intervenções destinadas a superar falhas de mercado em larga escala. Argumenta-se inclusive que essa afirmação não seja verdadeira apenas no caso dos países em desenvolvimento, mas também entre os mais afluentes. Nos últimos anos, a disponibilidade de moradias sofreu declínio acentuado na Europa Ocidental e nos Estados Unidos.¹

Alguns pesquisadores (Laquian) especularam que a abordagem da “capacitação dos mercados” parece ser uma “transição para um momento em que será necessária uma atenção muito maior e muito mais sistemática às questões de habitação, do solo e do desenvolvimento urbano”. E essa não é apenas responsabilidade do setor público. Os PIB's dos países em desenvolvimento como um todo estão crescendo a taxas de mais de 6% por ano, em comparação às taxas aproximadas de 2%, no caso do mundo desenvolvido. A habitação representa o maior investimento isolado da maioria da população de renda baixa e moderada.

Certamente, se é que os mercados devem desempenhar papel substancial no desenvolvimento, o setor privado pode ter função substancial quanto à habitação e à terra para as pessoas de baixa renda. Por outro lado, as organizações do setor privado que empregam os métodos mais efetivos de administração e que dispõem da maior capacidade para oferecer assistência às famílias de baixa renda – as multinacionais e as grandes companhias locais – em geral não compreendem os mercados de baixa renda e – com algumas exceções dignas de nota (Prahalad) – mantiveram-se fora deles. Em vez disso, dominam os produtores e fornecedores marginais de terra, de materiais de construção, de financiamento e de outros insumos ligados ao processo de habitação/terra. Com freqüência excessiva, o resultado são mercados habitacionais e de terra de custos extremamente altos e “selvagens” (Buckley), onde os chefões locais e as máfias públicas e privadas aumentam em muito os custos em pontos de transição.

Assim sendo, permanecem em grande parte pendentes métodos e modelos para envolver o setor privado de forma construtiva na solução dos problemas habitacionais das classes de mais baixa renda. Uma exceção estimulante é a da CEMEX, o terceiro maior fabricante de cimento no mundo, no atendimento aos mercados de habitações progressivas no México. O programa *Patrimonio Hoy* da CEMEX organiza pequenos grupos de famílias, que se comprometem com um programa de poupança de 70 semanas, providencia com fornecedores locais de material de construção a entrega de produtos de alta qualidade a preços competitivos e oferece microcrédito a essas famílias, sob a forma da entrega de material de construção bem antes de elas efetuarem o pagamento. A CEMEX opera esse programa através de escritórios instalados nas próprias comunidades de baixa renda e de “promotores” locais – 98 por cento mulheres – que informam as famílias sobre o programa.

¹ Muito embora tanto os Estados Unidos quanto a Europa Ocidental estejam passando por um processo de correção de seu mercado habitacional, já há meio século vem-se observando uma queda continuada da acessibilidade de habitações, em especial nas grandes áreas metropolitanas. Por exemplo, nos Estados Unidos como um todo, a proporção do preço de uma residência média para a renda média familiar passou de 2, na década de 1950, para mais de 3 hoje em dia. Apenas esquemas mais favoráveis de financiamento (onde alguns aspectos geram riscos extremamente maiores para as famílias e para o próprio sistema financeiro) e famílias que dispõem de duas fontes de renda é que evitaram a queda da taxa de propriedade residencial naquele país.

O *Patrimonio Hoy* revelou-se um sucesso surpreendente, tendo alcançado 100.000 pessoas durante os dois primeiros anos, com planos para expandir esse número para 1.000.000 nos próximos cinco anos. O programa opera sem subsídios, e os outros dois fabricantes entre os três maiores do mundo – Folcin e Lafarge – recentemente lançaram iniciativas para alcançar o mercado de habitações progressivas em vários países em desenvolvimento. Portanto, o envolvimento das grandes empresas e a aplicação de métodos modernos de gestão ao setor de habitação de baixa renda tem ainda potencial, apesar dos resultados instáveis de uma década e meia de “capacitação de mercados habitacionais”.

Por causa da importância crucial do solo urbano para os pobres, e considerando o fracasso da abordagem da capacitação dos mercados para solucionar esse problema, parece que uma abordagem centrada na terra está substituindo a abordagem centrada na habitação, em relação à questão do abrigo e do assentamento da população de baixa renda. Mesmo assim, permanecem aspectos tradicionais, referentes ao financiamento habitacional – incluindo a participação no crédito habitacional, sistemas de poupança habitacional e subsídios para habitação, que possam tornar mais acessível a casa própria.

Do lado mais realista, uma área importante para inovação e desenho de programas são as várias formas de “soluções habitacionais de baixo custo”, que consistem de uma ampla variedade de opções que compõem as etapas do processo de habitação progressiva. Aqui, incluem-se lotes com e sem serviços, reabilitação e melhoria, expansão, construção de uma unidade nuclear em lote já de propriedade de uma família (para substituição, para o acréscimo de uma unidade, para aluguel), regularização da posse, melhorias na infra-estrutura e nos serviços, etc. Essas soluções graduais de habitação custam uma pequena fração da compra de uma nova unidade, construída comercialmente; portanto, representam chave fundamental para o fornecimento em muitos países de habitação acessível em grande escala e para a própria política habitacional.

A combinação dessas abordagens de projetos com novas tecnologias, incluindo o microcrédito habitacional (Ferguson), participação das comunidades organizadas (Ruster e Imperato) e o envolvimento seletivo do setor privado – como no caso do programa *Patrimonio Hoy*, da CEMEX – pode ser o segredo para a criação de uma nova geração de projetos habitacionais de baixa renda mais efetivos, mais sustentáveis e mais abrangentes, que realmente alcancem em escala a população mais pobre. Nesse contexto, é possível que esteja na hora (Buckley) de reavaliar a experiência anterior do Banco Mundial e de governos de alguns países, com seus programas que focalizavam locais, serviços e urbanização de favelas.

Em contraste, muitos programas habitacionais de governos ainda focalizam freqüentemente a bancarização de famílias de renda moderada e média, com o objetivo de transferir o crédito do setor formal e outros sistemas para camadas inferiores do mercado, para cobrir esses grupos e para estimular o crescimento econômico. Do ponto de vista físico, o protótipo da solução de habitação de renda moderada na América Latina consiste de uma unidade nuclear possível de ser expandida, de 25 a 45 metros quadrados, que as famílias aumentam e melhoram em etapas programáveis, de acordo com a necessidade e com a disponibilidade de recursos. No caso do Leste da Ásia, a realidade corresponderia a unidades de 40 a 80 metros quadrados, em prédios de mais de um andar. Os interesses próprios da indústria de construção e de desenvolvimento freqüentemente desempenham papel importante na promoção desse tipo de abordagem de política, ainda que a maior parte dos países em desenvolvimento em geral disponha de um sistema de crédito habitacional muito limitado, tendo nos subsídios um instrumento potencialmente mais importante (Buckley).

A arte do desenho de programas habitacionais para as camadas de mais baixa renda da população consiste principalmente da combinação de recursos financeiros (subsídios, crédito e poupança familiar) com diferentes tipos de soluções de habitações de baixa renda, que sejam adequadas às condições locais de habitação, com a capacidade de financiamento do governo para essas ações e com a capacidade institucional de outros atores importantes (ONG's dedicadas ao setor habitacional, governos locais e organizações fornecedoras de empréstimos), para que executem os seus papéis como parte desses esforços.

No mundo em desenvolvimento, são dignos de nota em especial os programas habitacionais do Leste da Ásia e da América Latina. Enquanto a América Latina vem focalizando os seus esforços em sistemas de subsídios à habitação, o Leste asiático vem enfatizando a gestão pública obrigatória do solo urbano. Os dois primeiros trabalhos desta seção examinam programas habitacionais na América Latina. Zanetta avalia a descentralização do Fundo Nacional de Habitação da Argentina durante a década de 90, enquanto Fonseca, Trani e Wakisaka documentam o grande esforço do estado de São Paulo na área de habitação a preços acessíveis, de forma geral, além da experiência de sua parceria de auto-ajuda em habitação com os municípios do estado, em particular. O terceiro trabalho adapta o modelo empregado no estado da Flórida, nos Estados Unidos, para estimar as necessidades habitacionais no Brasil. Os dois últimos trabalhos focalizam o Leste da Ásia: Yuen examina a experiência incrivelmente bem sucedida de Cingapura, enquanto Zhu pesquisa Cingapura, China, Bangladesh e Vietnã. Os casos asiáticos mais bem sucedidos – Cingapura, Hong Kong e China – combinam a obrigatoriedade da administração ou propriedade públicas da terra urbana com desenvolvimento e propriedade do setor privado das unidades que resultam da ação.

Desenvolvimento na periferia urbana e nos centros das cidades e o meio ambiente - O desenvolvimento nas periferias urbanas cada vez mais assume formas polarizadas nos países em desenvolvimento. As famílias de baixa renda – muito embora não sejam as mais pobres, cuja principal prioridade é estarem mais próximas do trabalho, nos centros das cidades – tendem a ocupar os bairros informais na periferia, que estão em rápida expansão. O desenvolvimento habitacional subsidiado do governo para as famílias de renda baixa a moderada depende da disponibilidade de terras a baixo custo, localizadas também na periferia ou ainda mais longe. Na outra extremidade do espectro de renda, a elite acompanha as fábricas das subsidiárias das empresas internacionais (Buenos Aires, Curitiba, São Paulo), universidades, fabricantes locais de produtos de alta tecnologia e prestadores internacionais de serviços (Bangalore e algumas outras cidades indianas), além de estabelecimentos comerciais para os subúrbios, cada vez mais estabelecendo-se ali, em comunidades cercadas.

Essa dispersão resultante envolve fortes e negativos impactos sobre o meio ambiente, além de consumir terras agrícolas e sensíveis, do ponto de vista ambiental. O crescimento das cidades contribui ainda para a ameaça global de absoluta falta de água doce. As empresas concessionárias de serviços públicos precisam ir cada vez mais longe para encontrar mananciais, dependendo somas altíssimas no processamento, bombeamento e transporte da água. No caso das cidades costeiras, é possível que a dessalinização tenha um papel a desempenhar. O que é mais preocupante nisso tudo é que o espalhamento das cidades, combinado à exportação de tecnologias antiquadas e altamente poluidoras dos automóveis dos países ricos para a China aumentou de modo substancial as emissões de dióxido de carbono no mundo, contribuindo para o aquecimento global.

A alternativa a esse espalhamento urbano envolve maior densificação das áreas urbanas existentes, principalmente ao redor dos centros de transportes. Aqui, muitas das mais antigas e maiores áreas metropolitanas de países em desenvolvimento assumiram a forma de rosca das cidades dos Estados Unidos. O congestionamento, o crime e o êxodo da classe média para o subúrbio deixam zonas centrais em declínio, às vezes com menos população.

A revitalização das áreas centrais das cidades parece fazer sentido. Afinal de contas, essas áreas já dispõem de infra-estrutura e serviços e estão muito mais próximas dos locais de trabalho do que a periferia. Olhando mais de perto, entretanto, os custos de comprar, limpar (necessário no caso de áreas enegrecidas, antes utilizadas por indústrias poluidoras) e desenvolver as áreas centrais são em geral mais altos do que o desenvolvimento na periferia. Parcerias entre os setores público e privado revelam-se então essenciais para a reunião de terrenos suficientemente extensos nas áreas centrais, para que esses projetos de revitalização sejam economicamente viáveis. Embora a revitalização do centro das cidades já tenha longa história nos Estados Unidos e na Europa Ocidental, na maioria dos países em desenvolvimento apenas agora está-se iniciando a construção das instituições e os arcabouços legais para tais parcerias.

Os primeiros quatro trabalhos dessa última seção da antologia examinam os dilemas do desenvolvimento acelerado nas periferias urbanas – o padrão da maior parte das cidades de países em desenvolvimento. Os dois últimos trabalhos examinam as vantagens teóricas e as dificuldades práticas das revitalizações de áreas centrais das cidades e a densificação das áreas urbanas existentes. Pantelic, Srdanovic e Greene observam que as características distintas da urbanização das duas últimas décadas constituem um “período pós-moderno”, em que a segregação dos ricos e dos pobres cada vez mais coloca as famílias urbanas de baixa renda em situação vulnerável a desastres naturais e aos causados pelo homem. Em seguida, Sridhar examina a sub-urbanização de cidades indianas que experimentam recente prosperidade. O terceiro trabalho (Torres) analisa o espalhamento urbano da área metropolitana de São Paulo, a expansão de sua periferia pobre e o impacto sobre o meio ambiente. O quarto trabalho dessa seção (Goytia) focaliza a polarização do desenvolvimento na periferia das cidades, dividida em comunidades muradas para os ricos e favelas para os pobres em Pilar, um município no canto a nordeste da área metropolitana de Buenos Aires. Aragão investiga a experiência de revitalização das áreas centrais das cidades de Paris e Barcelona, comparando com o que ocorre em São Paulo. O último trabalho desta antologia examina a densificação de Guadalajara, a segunda maior cidade do México, concluindo que os métodos para promover uma cidade mais compacta são ainda incipientes nessa área metropolitana.

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Part IV

TRANSPORT, DENSITY, URBAN PLANNING AND URBAN FORM

Introduction

Bruce W. Ferguson

Urban Land Markets and Urban Land Development:
An Examination of Three Brazilian Cities:
Brasilia, Curitiba and Recife

M. V. Serra, David E. Dowall, Diana Motta, and Michael Donovan

Agglomeration and Urban Productivity: Implications for the
Appraisal of Transport Investment

Daniel J. Graham

Impact of Transport Infrastructure & Services on Urban Poverty
And Land Development: A Case Study – Colombo, Sri Lanka

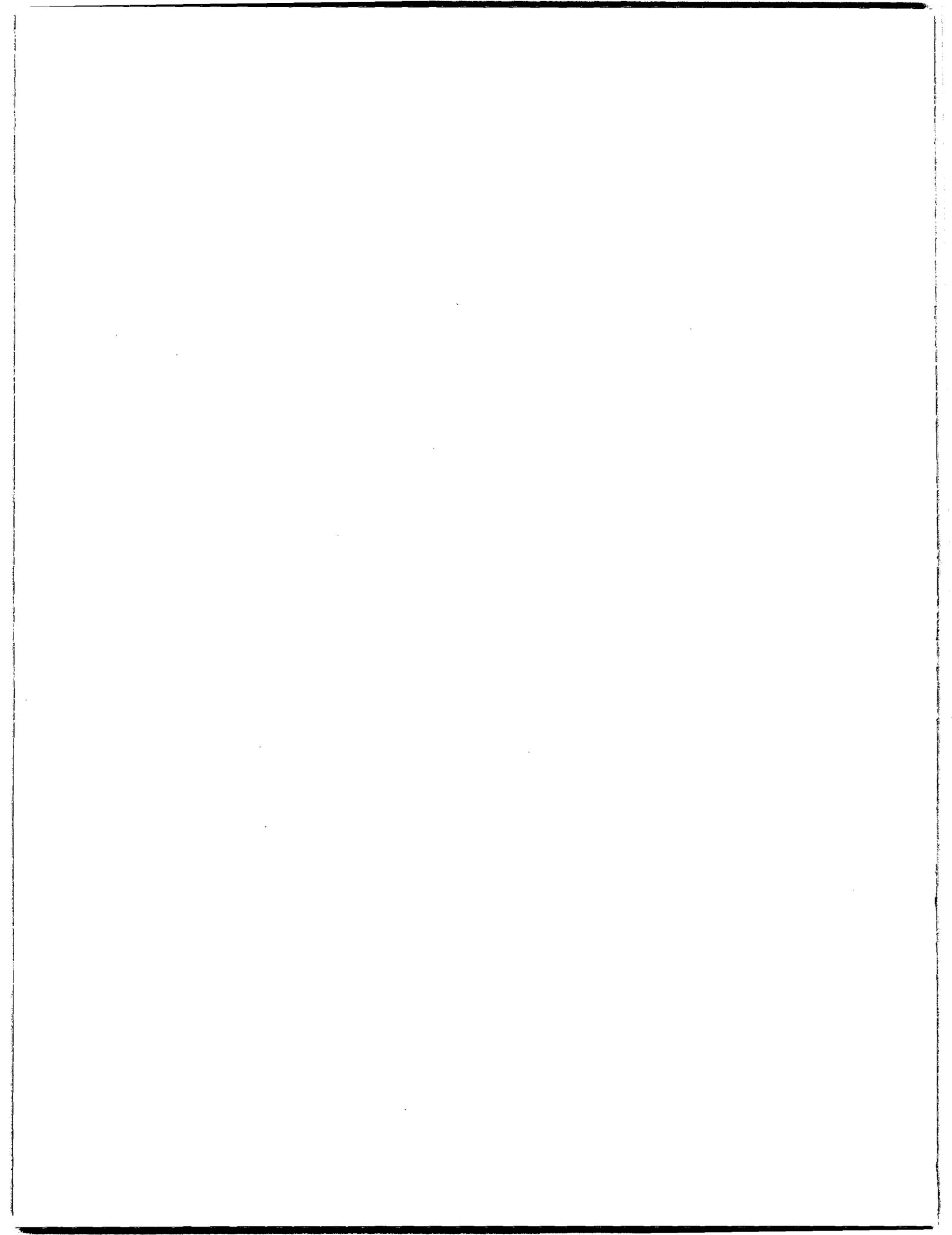
Amal S. Kumarage

Interpretation of Population Density Gradients:
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In San Jose, Costa Rica, Effective Metropolitan Planning and
Selective Infrastructure Investment Can Improve the
Quality of Life for the Poor

Rosendo Pujol



INTRODUCTION TO SECTION IV

TRANSPORT, DENSITY, URBAN PLANNING, AND URBAN FORM

Bruce Ferguson

Informal housing and slums require solutions that go beyond the micro level of projects to the macro level of metropolitan development and urban form. In this regard, transport plays a crucial role.

Transport and housing form the two sides of the binomial equation of urban development. Distant housing (and land) inaccessible to jobs and services has little value. Similarly, density – that is, the concentration of housing and, hence, people – makes investment in transportation (buses, metros, highways) economically viable. “Smart growth” (Katz) involves increasing density near transport nodes – such as bus lines and subway stations. An efficient relation between housing and transport makes for a more compact city; many of Western Europe’s great cities (e.g. Stockholm, Amsterdam) come to mind.

In comparison, sprawl consumes more land, requires greater investment in infrastructure, lowers social welfare by enforcing longer commutes, and generates more vehicle emissions – in particular, carbon dioxide and other greenhouse gases; here, Los Angeles and other cities of the U.S. Southwest are emblematic. Originally designed to transfer manufacturing to the periphery and give working-class families a suburban paradise that avoided over-crowding (Kotkin), the sprawl of Los Angeles has become a notorious problem. Most developing-country cities spread over huge areas as Los Angeles, although a few – e.g. Curitiba and Bogota – have developed more compactly because of efficient transport and/or natural barriers that forcefully contain the urban area. Many cities in formerly socialist countries have a distinctly dysfunctional form characterized by relatively low densities in the center (Bertaud and Renaud).

The market usually fails to price fully these by-products of sprawl – for example, gasoline prices almost always omit the cost of mitigating the impact of greenhouse gas emissions. However, these “externalities” of sprawl – from greater greenhouse gases to the consumption of more agricultural land by urban development – contribute importantly to the global environmental decline that threatens civilization as surely as, if more slowly than, international terrorism.

The mega-cities of emerging countries pose special challenges for relating housing and transport. In 1950, only two cities, London and New York, had populations greater than 10 million. As of 2000, nineteen cities exceeded this threshold, with all but three in the developing world. In this regard, allowing monocentric settlements to grow uncontrollably is a recipe for disaster (Laquian). Creating many urban centers throughout these megalopolitan areas is crucial.

Too often, government agencies devoted to either housing or transport ignore the other function. Housing agencies in emerging countries typically buy distant land parcels because they are “inexpensive” and, thus, fit within the cost and subsidy formulae of their affordable housing programs. Quantitative goals set by the nation’s President or another public executive customarily drive these housing agencies. From this perspective, a new unit in a distant periphery or beyond and a unit accessible to jobs and services have the same value.

However, the distance of these sites matters greatly to their low-income residents who must have good access to jobs to survive and who typically cannot afford private cars and depend on public transport. Predictably, inaccessibility dooms many affordable housing projects in emerging countries to failure. Perversely, housing agencies usually continue to ignore the key importance of transport and accessibility of jobs and services to the success of their programs and projects. In turn, transport agencies sometimes build roads without relation to where housing is, or should be. In the U.S., for example, the routing of major highways through high density central-city areas destroyed many of these neighborhoods in the 1950s and 1960s and/or ended in half-built freeways when political opposition stopped these projects.

Improving transport also increases the productivity of metropolitan areas. It not only lowers costs of moving people and goods within the existing city, but also expands the urban region that enjoys the competitive advantages created by the proximity of firms, services, and skilled labor ("economies of agglomeration"). Transport forms one element of the localized public service system (Freire and Polese) that influences the shape and rate of urban economic growth in the global economy.

The first paper (Serra, Dowall, Motta, and Donovan) of this section examines the form of three Brazilian cities – Recife, Curitiba, and Brasilia – that represent a wide variation of urbanization and development. In particular, it calculates "population density gradients", which measure the relationship between population density and distance from the city center (Dowall). Market economies usually result in negative gradients, with high densities in the city center declining with movement outwards, although, as cities expand over time, population density gradients "flatten out" as people move to the suburbs. Recife and Curitiba have decidedly negative gradients, indicating that density falls with distance from the center, where densities are relatively high. In contrast, Brasilia – the planned capitol of Brazil – has a slightly positive gradient, reflecting the concentration of non-residential activities, monuments, and open spaces in the central area with rings of, first, formal residential development and, beyond a greenbelt, informal residential development. The distance from the city center as well as title, paved roads, and the size of the plot are statistical determinants of land values.

The results raise important issues for social welfare and economic growth, as well as urban development. In particular, the average distance per capita from the center in Brasilia is more than twice that of Curitiba and Recife, and land prices in Brasilia's suburbs are five times higher than in those of the two other cities. Thus, the heavily low-income population of Brasilia's satellite towns must commute much further and pay much more for housing. Infrastructure investment in all three cities substantially increases land value, indicating there is substantial scope for financing infrastructure through property taxation, capture of land appreciation, and other means.

Coelho and Irving continue this type of analysis by calculating density gradients for 10 Brazilian cities. Again, Brasilia is the outlier. Its low central-city densities and concentration of low-income people and housing in satellite towns create major costs for the poor.

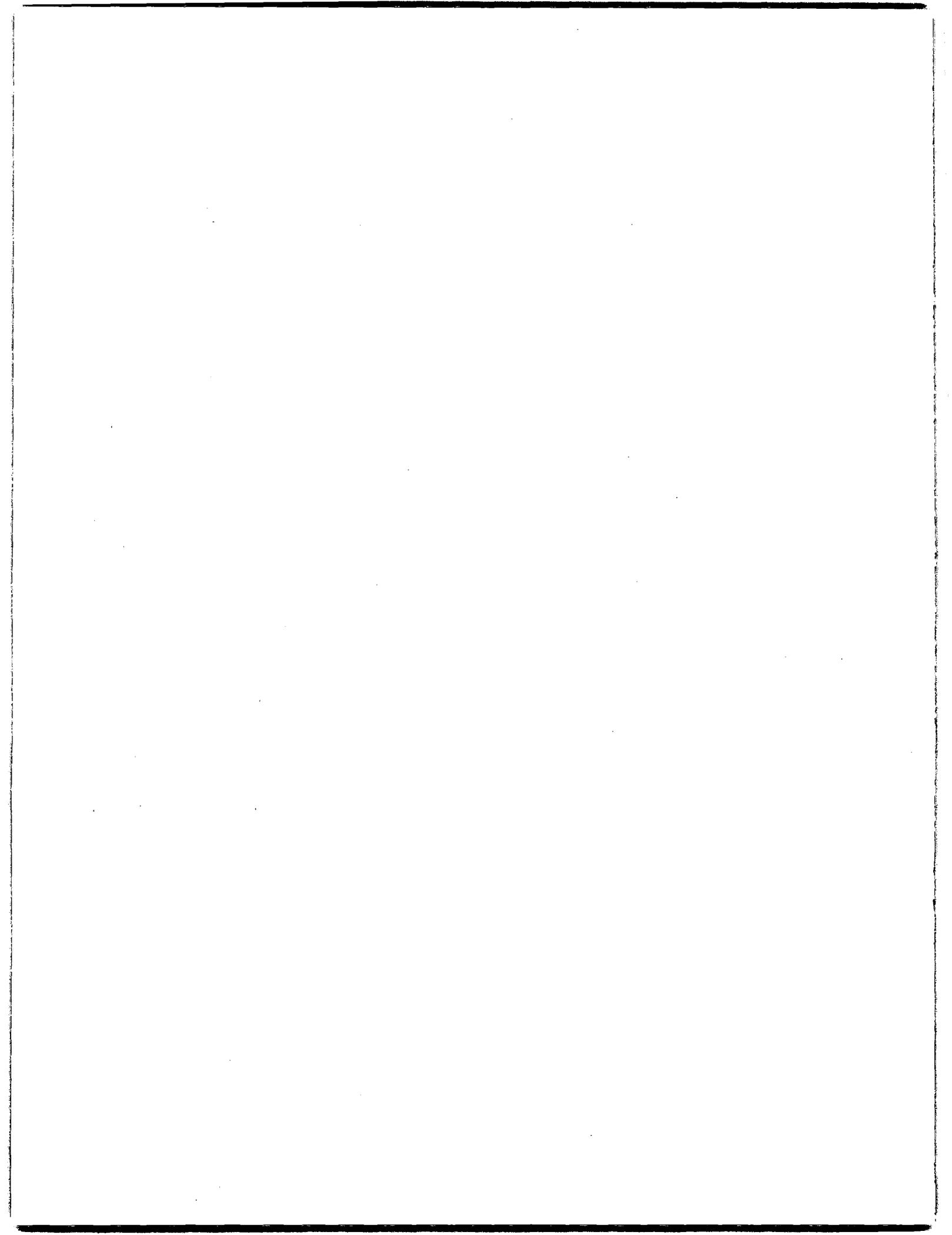
The third paper (Graham) concerns the links between city size, productivity, and infrastructure provision. In particular, it measures elasticities of productivity with respect to city size for different industrial sectors using data on United-Kingdom firms. The results show compelling evidence of a strong association between measures of city size and productivity for both services and manufacturing. Thus, if transport investment increases the effective density of locations, it could raise productivity – an especially relevant conclusion for emerging-country cities still in the process of determining basic transport networks.

The fourth paper (Kumarage) examines the impact of transport investment on urban poverty and land development in Colombo, Sri Lanka. Although average density is 188 persons per hectare, illegal squatter settlements have up to 1,537 persons per hectare. Residents of these areas often rent very small, badly-serviced units or spaces within units. The poor, a survey finds, put up with bad living conditions largely in order to gain access to work. Land values in these central areas are very high compared with suburban locations, where low-income household could conceivably become homeowners. However, alternative suburban locations are poorly served by public transport. In this context, developing transport infrastructure can make a major contribution to the welfare of the poor.

The final paper of this section (Pujol) analyzes the development of San Jose, Costa Rica. A number of important themes stand out. The metropolitan area of San Jose has grown at the intersection of four provincial capital cities, and dozens of small towns in the Central Valley of Costa Rica. The process destroyed thousands of acres of rich agricultural land. At the same time, this large flat expanse joined with Costa Rica's direct-demand housing subsidy program has produced a large number of units relative to new household formation, and greatly reduced informal settlement. A number of intermediate cities within commuting distance of San Jose continue to provide opportunities for residential development. Although the housing challenge has largely been met in Costa Rica, many urban development issues remain. The way forwards involves more metropolitan-wide planning, transport investment, use of the real estate tax to protect environmentally-sensitive land and encourage the development of other parcels, and the strengthening of financially-weak local government.

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URBAN LAND MARKETS AND URBAN LAND DEVELOPMENT AN EXAMINATION OF THREE BRAZILIAN CITIES: BRASÍLIA, CURITIBA AND RECIFE¹

M. V. Serra

David E. Dowall

Diana Motta

Michael Donovan

Introduction

This paper synthesizes and extends the results of urban land market studies carried out in three Brazilian cities—Brasília, Curitiba and Recife. The purpose of the studies is to empirically assess the performance of urban land markets in different cities and to gauge the feasibility of applying the Land Market Assessment methodology in Brazil. The project involved the collaboration of several organizations: The World Bank, Instituto de Pesquisa Econômica Aplicada (IPEA), Secretaria de Estado de Desenvolvimento Urbano e Habitação (SEDUH), Instituto de Pesquisa e Planejamento Urbano de Curitiba (IPPUC), and Fundação de Desenvolvimento Municipal (FIDEM). The field research was carried out in 2003.

A brief overview of urban land market research is followed by a summary of urbanization and housing markets in Brazil. Then the selection criteria for the three cities and their profiles are presented along with a general description of population, urban land development, and housing for the cities. A detailed spatial examination of these demographic, land use, and housing trends gives rise to an evaluation of the effects of location, infrastructure, titling, and other factors on residential land prices. Finally, conclusions and policy implications are considered.

Overview of Urban Land Markets

Urban land markets play a critical role in shaping urban development outcomes – determining the location, density, form and price of residential, commercial and industrial development. Urban land markets are driven by both demand and supply factors. On the demand side, population growth, income, and level of economic activity determine how much land is demanded to support development. Urban land supply is determined by topography and physical conditions, patterns of land ownership, availability of infrastructure – roads, water, electricity – and government regulations. The interaction of urban land market demand and supply determines urban land prices. If urban land supply is very responsive to demand, land prices will tend to reflect the productive value of land. On the other hand, if urban land markets are constrained and cannot effectively respond to demand pressure, land prices will tend to be much higher – exceeding their productive value. These constraints are often the result of restrictive land use regulations, inadequate network infrastructure

¹ This paper is a shortened version of the following full working paper at the following website: Serra, M.V., David E Dowall, Diana Motta, and Michael Donovan, "Urban Land Markets and Urban Land Development: An Examination of Three Brazilian Cities: Brasília, Curitiba and Recife. June 1, 2004. Institute of Urban and Regional Development. IURD Working Paper Series. Paper WP-2004. <http://repositories.cdlib/iurd/wps/WP-2004-03>.

to support urban land development, unclear property ownership and titling records, and the actions of landowners to drive up land prices by withholding land from the market.

Over the past 40 years, an extensive literature has been produced on urban land markets in Latin America. However, this literature has been very theoretical and qualitative in style, and quantitative analysis of urban land markets is strikingly absent from this body of work. The present study, seeks to address this gap in the literature by providing a systematic quantitative assessment of urban land market performance in three Brazilian cities.

Urbanization in Brazil continues to gain momentum. Brazil's cities have grown rapidly over the past thirty years. This growth creates enormous pressure on cities to accommodate development—provision of urban services, access to land for housing, and titling and registration systems.

Profile of Urbanization and Housing Markets in Brazil

Brazil is a highly urbanized country whose urban population, already comprising a massive 81.2% of the population, continues to expand. While population growth declined from 1.93% between 1980 and 1991 to 1.63% from 1991 to 2002, the rate of urbanization continues to increase, growing at a rate of 2.45% a year. While many of Brazil's larger cities absorbed migrants throughout the twentieth century, the current trend in urbanization is marked by a growth of second-tier cities. According to Brazil's 2000 Census, 73% of Brazil's population lived in municipalities with fewer than 20,000 inhabitants.

During the 1991–2003 period, the Brazilian economy attracted foreign investment, and strengthened its competition in world markets. Urbanization in the 1990s was a result, in part, of an economic orientation to foreign markets that created a large decentralized network of “islands of productivity” (*ilhas de produtividade*), dotted with strong highway and port infrastructure that were reinforced with large foreign investment in the automotive industry and the mechanization of agriculture. Slowing growth in the global cities of Rio de Janeiro and São Paulo was accompanied by the emergence of dynamic new centers such as Fortaleza, Manaus, and Brasília-Goiânia. While the population of São Paulo and Rio de Janeiro sluggishly grew at 1.45% and 0.77%, respectively, from 1991–1996, the population of several second-tier cities boomed. These included Cabo Frio (4.62%), Itajaí (4.54%), Petrolina/Juazeiro (4.36%), Brasília (3.64%), Curitiba (3.43%), Goiânia (3.30%), and Belém (2.39%). In several of these cities, the rate of population growth doubled in peripheral areas. For example, in Belém between 1991 and 1996 the population in the periphery grew at an explosive 19.05%; in Goiânia, it grew 7.90%, and in Brasília, 7.56%.

Migrants to these cities confronted substantial shortages of affordable housing. According to a report by SEDU/Presidência da República and the Fundação João Pinheiro (2001), each year approximately sixty percent of the one million new families who enter the housing market are unable to pay the down payment and monthly financing payments to acquire formal housing. As a result of limited financing, low salaries, the overregulation of land markets, and the high cost of regulated housing, Brazil suffers from a housing deficit calculated to encompass 20 million people and 6.7 million homes. It is worth noting that the reported shortage is concentrated in urban areas—representing 81.3% of the deficit.

Left with few housing options in the formal sector, a large number of Brazilians resort to options in informal settlements. A recent report by several Brazilian government agencies and the World Bank calculated the explosiveness of the informal housing market; it is estimated that a staggering 65% of new homes built took

place in the informal housing market (Official estimates describe 5.4 million Brazilians as either homeless or residing in inadequate, overcrowded, and often dangerous housing which often lacks basic infrastructure such as potable water and sanitation.

Brazilian cities vary greatly in the quality of their response to rapid urbanization and the proliferation of informal settlements. In terms of planning, according to Brazil's Census Bureau (IBGE), of a total of 5,506 municipalities in 1999, 4,444 registered multi-year investment plans, 840 were planned according to a master plan (*plano diretor*), 1,548 had urban land subdivision ordinances, and 1,187 implemented zoning laws (IBGE 2001). At the national level, in 2001 the Brazilian government reinforced planning by passing the Statute of the City (*Estatuto da Cidade*) which mandates that Brazilian municipalities over 20,000 people issue a master plan at least every five years. The Statute also provides legal support to enable municipalities to promote land tenure programs, regulates adverse possession rights, and legitimates several new urban legal instruments, such as collective land tenure and the concession of special use for housing purposes. This Statute, combined with the increased involvement in slum upgrading at the local level, has made Brazil a venue for some of the largest and most innovative slum upgrading programs in Latin America. The Inter-American Development Bank's support of the multimillion dollar *Favela Barrio* upgrading program in Rio de Janeiro and São Paulo's Guarapiranga project are but some of the many innovative planning interventions in Brazil.

City Selection and Profiles: Brasília, Curitiba, Recife

Given these trends, the study sought to identify cities which had experienced growth in the nineties, been impacted by global economic integration, and had responded in varying ways to the housing deficit. Another important consideration was the selection of cities from different geographic regions in Brazil and the selection of cities whose land regulations and planning differed so as to be able to evaluate how different regulations affect land markets. The team selected three cities: Brasília, Curitiba, and Recife. The study area of each city includes the surrounding metropolitan areas limited by commuting distance, defined as the distance in which a family could look for housing in the next ten years. In Recife, the study area covers 2,742 km², including a total population of 3.2 million in fourteen municipalities. The Brasília study area is composed of the federal district and five neighboring municipalities with a total population of 2.4 million (2000) and an area of 7,619.2 km². The area of Curitiba, comprising thirteen municipalities, covers 2,082 km² with a population of 2.6 million (2000). An in-depth profile of these three cities follows.

Brasília

There is no city quite like Brasília. Designed in the shape of an airplane by Lucio Costa and Oscar Niemeyer, it was inaugurated as Brazil's capital in 1960. Immediately afterwards, legislation was passed to preserve the original layout, restricting the growth of housing markets near the city center. Due to these rigid restrictions, the subdivision of large lots, and the proliferation of condominiums, the city rapidly grew throughout the 1980s with the enlargement of the surrounding areas of Valparaíso, Novo Gama, Águas Lindas, Luziânia, and Santo Antonio do Descoberto. These areas eventually transformed from "satellite cities" or dormitory suburbs of Brasília to areas with their own economy and identity. Indeed, though Brasília was designed to be an administrative center, the city's economy today is more diverse than imagined: the administrative sector only accounts for 20.9% of all employment.

The restriction of land markets engendered perverse effects on the spatial distribution of the city's inhabitants. In 1991, 90% of homeowners who earned less than the minimum salary lived outside of Brasília in one of the "satellite cities," while 57% of homeowners who earned more than ten minimum salaries resided within the original layout of Brasília (*Plano Piloto*). As only one-fourth of residents live within the *Plano Piloto* and 70% of formal jobs are located there, low-income and middle-income residents are forced to live 12–76 kilometers from their workplace and suffer some of the highest transportation costs in all of Brazil. During the 1990s, Brasília began to seriously address the problems affecting low- and middle-income residents of peripheral areas. Between 1987 and 1994, the local government implemented the Housing Program for Low Income Settlements of the Federal District (*Programa Habitacional de Assentamentos de Baixa Renda do Distrito Federal*) which sought to relocate families from irregular settlements to nearby formalized housing with access to the electrical grid and sewerage. In eight years (1987–1995), 109,128 lots were created for low-income families, benefiting a population of over 600,000 inhabitants. From 1995–2000, the federal district implemented various specialized slum upgrading programs such as *Programa Habitacional de Assentamento para População de Baixa Renda*, *Pró-Moradia*, *Endereço Limpo Legal*, and *Habitar Brasil*. Nevertheless, these programs—consisting of the extension of water and sanitation infrastructure and the construction of semi-urban lots in Recanto das Emas, Santa Maria, Privê, and Lucena Roriz—were inadequate in assisting a significant number of residents. Together they benefited only 12,402 families.

Curitiba

Curitiba, capital of the state of Paraná, is a leader in municipal planning in Latin America lauded for its rapid bus lines and progressive land use planning. Through measures adopted throughout the 1970s and 1980s, the city induced its population to reside near public transit lines and created several social programs that were espoused by its famed mayor, Jaime Lerner. More recently, Curitiba has benefited from a massive level of investment, especially from multinational corporations. With the liberalization of Brazil's economy, the Curitiba Metropolitan Agglomeration (AMC) has benefited from the spill-over growth and industrial deconcentration of nearby São Paulo since 1993. The AMC became one of the most important centers for the automotive industry, biotechnology, oil refining, commerce and services, chemical production, and metals. The most significant investments between 1996 and 1998 included Renault (US\$1 billion), Audi/Volkswagen (US\$800 million), BMW/Chrysler (US\$500 million), the chemical company of Petrobrás – Repar (US\$500 million), the ceramic tile company Incepa (US\$200 million), and the telecommunications firm, Telepar (US\$200 million). Curitiba's high quality of life combined with its robust economic growth has attracted thousands of Brazilians to the city, making it one of the fastest growing cities in the country. The city's population grew at 3.03% and 3.44% from the periods of 1980–1991 and 1991–1996, respectively.

Unfortunately, Curitiba was not prepared to deal with this explosive level of urbanization. The accelerated growth led to the population of peripheral areas lacking adequate infrastructure. Since 1992 informal settlements have grown in several areas of the AMC, like water basins and public property, that lack adequate infrastructure. To deal with informal housing, the government implemented two main projects: *Lote Fácil* and *Lote Legal*. *Lote Fácil* consisted of the integration of informal lots through urban design and land use parameters established by the Instituto de Pesquisa e Planejamento de Curitiba (IPPUC). Complementing this program, *Lote Legal* seeks to regularize informal settlements and relocate at-risk residents to urbanized lots by reconstructing their homes and assisting them both psychologically and technically during the relocation process.

Recife

Historically Recife, as with many urban centers in the northeast, has had some of the highest rates of inequality in Brazil. On one hand, the region maintains a dynamic services sector (finance, software development, consulting, marketing, insurance, and advertising) that responds to the demand from markets in NAFTA, the EEC, and other centers in northeast Brazil, such as Salvador and Fortaleza. On the other hand, the city has one of the highest rates of poverty in Brazil and many of its residents live without basic services. Approximately 37.3% of individuals in 2000 earned less than the monthly minimum wage, compared to the national average of 33.5%. The housing deficit in Recife is equally disturbing, estimated at 122,000 homes in 2000.

Recife has a solid tradition in designing instruments for urban land tenure. To provide access to affordable land for the city's growing poor population, in 1987 the city passed law n° 14.947/97 which instituted an innovative land titling program known as the Plan of Regularization of Zones of Special Interest (*Plano de Regularização de Zonas Especiais de Interesse Social, PREZEIS*). This pioneering program gives favela residents security of tenure, the right to receive infrastructure and government services, and allows them to participate in decision-making at the neighborhood and city levels. According to the IPEA et al. study of Recife (2001b), the local government designated 65 areas as zones of special interest (ZEIS), corresponding to 200 *favelas* and including approximately 300,000 people.

Brasília, Curitiba and Recife: Population, Urban Land Development, Gross Population Density, and Housing

The three cities represent a wide variation of urbanization and development. Total population for the year 2000 ranges from 2.4 million for Brasília, to 2.6 million for Curitiba, to 3.3 million for Recife. Brasília has the fastest rate of population growth, a compound annual average increase of 4.7%. Recife is the slowest growing at 1.5%. Curitiba is growing at 2.7% per year. In absolute terms, all three cities add a significant number of people to their population base each year. Brasília adds over 90,000 persons per year, Curitiba adds over 60,000, and Recife adds nearly 47,000 persons per year.

The total land area of the three cities ranges from 208,159 hectares for Curitiba, to 276,143 hectares for Recife, to 612,376 hectares for Brasília. In all three cities, the total amount of urbanized land area ranges from 109,629 hectares for Curitiba, to 61,648 hectares for Brasília, to 37,669 for Recife. In terms of the proportion of total land area that is urbanized, Curitiba is the most urbanized, with 52.7% of its total land area developed. In Recife, 13.6% of its total land area is urbanized. Brasília is the least urbanized, with 10.1% of its land area urbanized. These ranges reflect the geographic scope of each city's administrative area. Brasília, as a federal district, has a large administrative area. Recife and Curitiba are considerably smaller. Substantial urban land development took place in these three cities between 1991 and 2000. During this nine-year period, Brasília, Curitiba and Recife converted 6,110, 19,970 and 21,435 hectares, respectively.

Comparing urban land conversion trends with changes in population provides a rough assessment of the overall efficiency of urban land use. Table 1 presents changes in population, urban land use and average and marginal rates of change in population density. The differences across the three cities are striking. In the case of Recife, population densities are relatively high—ranging from 89 to 92 persons per hectare of urbanized land for 1991 and 2000. Densities in Brasília are considerably lower, averaging 39 persons per hectare of

urbanized land for both 1991 and 1997. Curitiba has the lowest population density, ranging from 23 to 24 persons per hectare of urbanized land for 1991 and 2000.

The marginal rates of change in density compare the changes in population relative to changes in urban land use. In the case of Brasília, the marginal rate of change of 38 persons per hectare is very close to the average and therefore results in a stable pattern of population density between 1991 and 1997. In the case of Recife, where the 1991 population density is relatively high at 92 persons per hectare, the marginal rate of change is lower – 69 persons per hectare. This results in a decline in the average rate of population density between 1991 and 2000. In low density Curitiba, the marginal rate of change in the population density is higher than the 1991 average – 27 persons per hectare and leads to an increase in average population density between 1991 and 2000.

Table 1: Trends in Population and Urban Land Development in Brasília (1991–2000), Curitiba (1991–2000), and Recife (1991–2000)*

CITY	YEAR	POPULATION	URBAN LAND USE (HECTARES)	GROSS POPULATION DENSITY/ URBANIZED HECTARE	MARGINAL CHANGE IN POPULATION DIVIDED BY MARGINAL CHANGE IN URBAN LAND USE, 1991–2001
Brasília	1991	1,592,000	40,213	39.54	37.8
Brasília	2000	2,403,000	61,648	39.00	
Curitiba	1991	2,051,000	89,659	22.9	27.2
Curitiba	2000	2,594,000	109,629	23.7	
Recife	1991	2,917,000	31,559	92.4	69.1
Recife	2000	3,339,000	37,669	88.6	

*The study relies on Brasília population data from 2000 and urban land use data from satellite maps taken in 1997.

These population density patterns have important implications for how much land will be needed to support future population growth in each city. For example, in Recife, an increase of 10,000 persons is likely to result in a 145-hectare increase in urban land development. In Brasília, the same 10,000-person increase translates into an increase in urban development of 265 hectares. In Curitiba, the same 10,000 increase in population leads to an increase of 368 hectares, more than twice the amount of land required in Recife and 39% more than required in Brasília.

Although there is no optimal gross population density for urban development, it is useful to compare population density patterns of Brasília, Curitiba, and Recife with other Latin American cities. Density patterns of Latin American cities range from 34.6 (Bogota) to 101 (Rio de Janeiro) persons per hectare. With the exception of Curitiba, this range tends to include the population densities for Recife (92.4) and Brasília (39.54). In the case of Brasília, the large land area of the federal district tends to reduce overall gross densities. However, in the case of Curitiba (22.9), the gross density seems low in comparison to other Latin American cities.

Population Density Gradients

Another method for comparing population density is to examine population density gradients. The density gradient measures the relationship between population density and distance from the city center. Table 2 provides population distribution by distance perimeters from the city center for Brasilia, Curitiba, and Recife.

Table 2: Population Distribution, by Distance from the City Center 1991–2000

DISTANCE FROM CITY CENTER (KM)	BRASÍLIA		CURITIBA		RECIFE	
	1991	2000	1991	2000	1991	2000
0–5	222,270 (0.140)	225,286 (0.094)	705,951 (0.344)	727,301 (0.280)	484,567 (0.166)	497,915 (0.149)
6–10	140,814 (0.088)	170,765 (0.071)	820,392 (0.400)	963,860 (0.372)	1,073,322 (0.368)	1,182,787 (0.354)
11–20	340,707 (0.214)	480,534 (0.20)	447,116 (0.218)	749,328 (0.289)	1,019,329 (0.349)	1,237,991 (0.371)
21–30	618,958 (0.389)	793,832 (0.330)	968,232 (0.472)	1,649,296 (0.636)	152,280 (0.052)	192,238 (0.058)
Over 30	269,016 (0.169)	732,423 (0.305)	3,334 (0.002)	3,334 (0.001)	187,685 (0.064)	228,034 (0.068)
Total	1,591,765 (1.000)	2,402,840 (1.000)	2,050,792 (1.000)	2,594,464 (1.000)	2,917,183 (1.000)	3,338,965 (1.000)

Normally, as cities expand, population density gradients “flatten out” as people move to suburban rings of the metropolitan area to find housing (Mills 1972). This flattening out is the result of two changes in the gradient—first, the population at the center declines, and second, there is a decline in the rate at which population density falls with distance from the city center.

Empirical research has shown that the following simple exponential function provides a reasonable basis for describing the pattern of declining population density in metropolitan areas:

$$D_x = D_0 e^{-gx}$$

where D_x is the population density at x kilometers from the city center, D_0 is the population density at the center of the city, and g is a population density gradient parameter to be estimated from the data.

Table 3: Population Density Gradients: Brasília, Curitiba and Recife, 1991 and 2000

CITY	YEAR	INTERCEPT (D_0)*	GRADIENT (g)	R ²
Brasília	1991	4.39 (2.642)	+0.054 (2.186)	0.062
Brasília	2000	15.00 (6.727)	+0.015 (.115)	0.000
Curitiba	1991	140.33 (31.030)	-0.201 (-17.186)	0.690
Curitiba	2000	123.84 (30.678)	-0.166 (-14.395)	0.606
Recife	1991	164.84 (42.637)	-0.076 (-10.833)	0.317
Recife	2000	179.29 (45.872)	-0.073 (11.006)	0.324

* Density in persons per hectare. T-statistics in parentheses.

Table 3 presents the results of separate regression models estimating the population density gradients for Brasília, Curitiba and Recife. The gradients for Curitiba and Recife take the expected form—a large value for D_0 and a negative value for the gradient (g). Although the regression models are statistically weak, Brasília, on the other hand, does not reflect the population density pattern found in market-based cities. It looks more like the population density gradients found in former socialist cities—Moscow, St. Petersburg, and Warsaw during the 1970s and 1980s—reflecting policies to disburse housing to areas outside the DF.

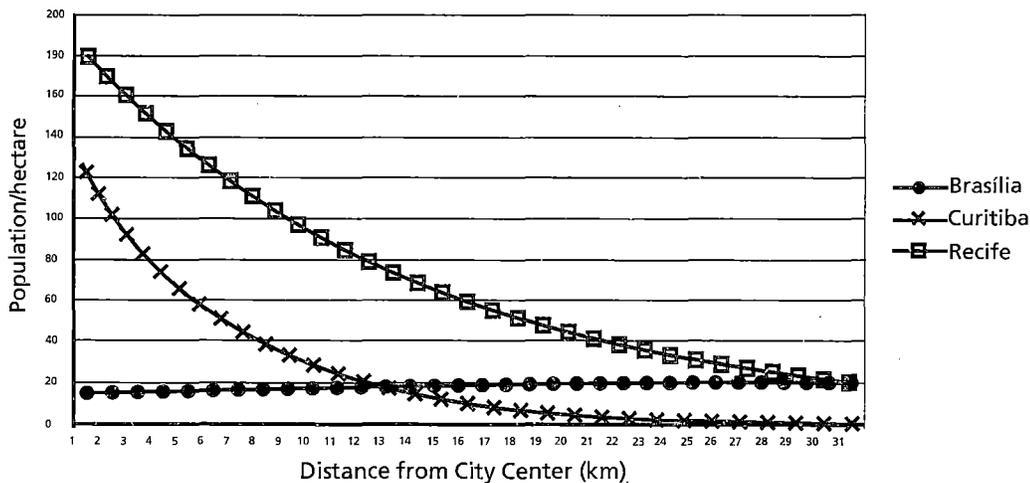
Figure 1: Population Density Gradients: Brasília, Curitiba, and Recife, 2000

Figure 1 illustrates the population density functions for the three cities for the year 2000. Recife's gradient has the highest intercept, at 165 persons per hectare, and has a relatively flat but negative gradient of -7.3%, indicating that its population density declines at 7.3% per kilometer. Curitiba, has a lower intercept value – 124 persons per hectare – and a steeper negative gradient of -16.6%. This is interesting since Curitiba is regarded as having a very efficient transportation system – suggesting that its gradient should be flatter. However, incomes and wages in Curitiba are higher than in Recife and therefore travel time costs are higher.

Brasília's very low population density intercept of 15 persons per hectare reflects the fact that the center of Brasília is comprised of nonresidential activities and open spaces. Its density gradient is positive, indicating that population density increases with distance from the center. Formal residential areas are located outside the central city area, and informal residential developments are located well beyond the capital's center.

Housing Stock Trends in the Three Cities

During the 1990s, all three cities produced substantial housing units. In order to tentatively gauge the size of the housing stock – both informal and formal – the study relies on two sources of data: (1) the IBGE 1991 and 2000 Censuses and (2) detailed local studies on estimations of the housing sector in the three cities. According to local estimates, Brasília added 167,682 units between 1991 and 2000 – a 46.8% increase. In Curitiba, the housing stock increased by 199,655 units between 1991 and 2000 – a 37.4% increase. In Recife, the housing stock grew by 35.1% between 1991 and 2000, registering a 234,240 unit increase. With the exception of Brasília, housing stock growth rates substantially exceeded the rate of increase in the population. It is common for the housing stock to grow at a faster pace than population when household size is falling and when the housing market is responding to a backlog of unmet demand. In the long run housing stock growth should closely match the rate of increase in household formation.

Table 4: Formal and Informal Housing Stock in Brasília, Curitiba, and Recife Metropolitan Regions, 1991–2000

BRASÍLIA				
1991 – 2000 Absolute Increase 167,682 units, Annual Avg Increase 18,631 units, CAGR 4.4%				
TYPE OF HOUSING	1991	% SHARE	2000	% SHARE
Formal	351,803	98.4	482,189	91.8
Informal	5,836	1.6	43,132	8.2
Total	357,639	100.0	525,321	100.0

CURITIBA				
1991 – 2000 Absolute Increase 199,655 units, Annual Avg Increase 22,184 units, CAGR 3.6%				
TYPE OF HOUSING	1991	% SHARE	2000	% SHARE
Formal	499,062	93.6	684,891	93.5
Informal	34,110	6.4	47,936	6.5
Total	533,172	100.0	732,827	100.0

RECIFE				
TYPE OF HOUSING	1991*	% SHARE	2000	% SHARE
Formal	-	-	667,818	74.0
Informal	-	-	234,721	26.0
Total	-	-	902,539	100.0

* The absence of data for 1991 is explained by the city's absence of a cadastre for the metropolitan area. In the mid 1990s, a modernized cadastre was developed, which was used to calculate the 2000 data. Flávio de Souza, of the Department of Architecture and Urbanism of the Universidade Federal de Alagoas, cited research from a 1993 study by the Secretaria do Planejamento e Meio Ambiente calculating that 30.6% of the housing stock in Recife was informal.

In Brazil, as in other countries, it is useful to differentiate between formally and informally provided housing. Formal provision refers to housing development that is located on legally subdivided and permitted land, where there is clear title to properties. The design of the subdivision and the housing units follows all government regulations and standards. Informal housing, on the other hand, refers to housing development that does not follow government regulations and standards and is frequently on lands that are illegally subdivided or occupied. Table 4 provides a breakdown of housing production for the three cities into formal and informal categories.

Formal housing makes up the majority of the housing stock in the three cities, ranging from 92% of the stock in Brasília, to 94% in Curitiba, and 74% in Recife as of 2000. However, in the case of Brasília and Curitiba, there is evidence that the portion of informally produced housing is increasing. Informal housing production in Brasília increased by 639.1% between 1991 and 2000, a compound annual increase of 22.9% (versus 3.6% per year for formal housing). This dramatic difference in growth rates drove up the portion of total informal housing stock – from 1.6% in 1991 to 8.2% in 2000.

In Curitiba, the pattern is similar. Between 1991 and 2000, the informal housing stock increased by 205%, a compound annual increase of 8.3%. Formal housing stock increased by 87.5%, a compound annual increase of 7.2%. As a result, Curitiba's share of informal housing increased from 7.4% to 1.5% over the 1991–2000 period.

A Closer Look: Spatial Patterns of Population, Urban Development, Population Density and Housing in the Three Cities

In this section, we examine the spatial structure of the three cities, looking at the distribution of population, the compactness of urban land development in terms of population and housing, and urban land use, which provides the opportunity to compare and contrast the overall compactness of urban development. We measure compactness by calculating the cumulative percentage of total population located within specific radii of the city center. Compactness will change over time depending on the spatial distribution of residential development taking place between 1991 and 2000.

Tables 5, 6 and 7 array the spatial distribution of population for the three cities for 1991, 2000 and change between 1991–2000 according to seven distance bands, expressed in terms of distance (kilometers) from the city center. In order to foster comparison, the bands are defined to reflect the overall spatial distribution of the three cities.

Table 5: Spatial Distribution of Population: Brasília, Curitiba and Recife, 1991

DISTANCE CATEGORY (KM)	BRASÍLIA		CURITIBA		RECIFE	
	POPULATION	% OF TOTAL	POPULATION	% OF TOTAL	POPULATION	% OF TOTAL
0–5	4,525	0.3	466,467	22.7	335,685	11.5
5.1–10	118,395	8.9	963,747	47.0	106,250	36.7
10.1–15	114,125	8.6	269,572	13.2	740,296	25.4
15.1–20	214,030	16.1	174,146	8.5	372,413	12.8
20.1–25	275,331	20.7	57,633	2.8	151,707	5.2
25.1–30	357,021	26.8	106,449	5.2	601,47	2.1
30+	248,991	18.7	12,780	0.6	187,685	6.4
Total	1,332,418	100.0	2,050,792	100.0	2,917,183	100.0

Table 6: Spatial Distribution of Population: Brasília, Curitiba and Recife, 2000

DISTANCE CATEGORY (KM)	BRASÍLIA		CURITIBA		RECIFE	
	POPULATION	% OF TOTAL	POPULATION	% OF TOTAL	POPULATION	% OF TOTAL
0-5	6039	0.3	480,872	18.5	344,205	10.3
5.1-10	152,212	7.4	1,051,713	40.5	1,146,924	34.3
10.1-15	140,754	6.8	422,786	16.3	869,114	26.0
15.1-20	334,091	16.5	296,169	11.4	488,738	14.6
20.1-25	319,336	15.5	120,767	4.7	183,384	5.5
25.1-30	497,216	24.2	193,643	7.5	78,566	2.4
30+	607,222	29.4	28,513	1.1	228,034	6.8
Total	2,056,870	100.0	2,594,464	100.0	3,338,965	100.0

Table 7: Spatial Distribution of Population Change: Brasília, Curitiba and Recife, 1991-2000

DISTANCE CATEGORY (KM)	BRASÍLIA		CURITIBA		RECIFE	
	POPULATION CHANGE	% OF TOTAL CHANGE	POPULATION CHANGE	% OF TOTAL CHANGE	POPULATION CHANGE	% OF TOTAL CHANGE
0-5	1,514	0.3	14,405	2.6	8,520	2.0
5.1-10	33,817	7.5	87,966	16.2	77,674	18.4
10.1-15	26,629	5.9	153,214	28.2	128,818	30.5
15.1-20	120,061	26.6	122,023	22.4	116,325	27.6
20.1-25	44,005	9.8	63,135	11.6	31,677	7.5
25.1-30	126,885	28.1	87,195	16.0	18,419	4.4
30+	98,286	21.8	15,733	2.9	40,349	9.6
Total	451,197	100.0	543,672	100.0	421,782	100.0

Comparison of the spatial distribution of 1991 and 2000 population and the change in population between 1991 and 2000 reveals several interesting results. The first and most dramatic finding is that Brasília's population is distributed quite differently than Curitiba's and Recife's – most of its population is concentrated far from the city center. In 1991, over half (53.6%) of Brasília's metropolitan population was located more than 25 kilometers from the city. By 2000, the percentage had declined somewhat, to 50%, but still remained distinctly different from the spatial patterns in the other two cities. The percentage of population located within 10 kilometers of Brasília's center averaged about 8% for both 1991 and 2000.

In sharp contrast, in 1991 nearly 70% of Curitiba's population resided within 10 kilometers of the city center. By 2000, Curitiba's population had begun to decentralize and 58.5% of the total metropolitan population was located within 10 kilometers of the center. Peripheral population in Curitiba was low in comparison to Brasília – less than 6% in 1991 and less than 9% in 2000 of the total population residing more than 25 kilometers from the central city.

In Recife, the patterns are similar. In 1991, over 48% of the population resided within 10 kilometers of the city center. In 2000, the portion was 44%. Recife's peripheral population was about the same as Curitiba's

and well below that of Brasília. In 1991, 8.5% lived more than 25 kilometers from the city center. In 2000, the figure increased to 9.2%.

The spatial distribution of population in the three cities between 1991 and 2000 largely reflected the baseline spatial structure of 1991. In Brasília, about half of the population growth took place in areas more than 25 kilometers from the center. It is significant to note that approximately 27% of the population change took place in the distance band of 20.1–25 kilometers – reflecting the growth in the area northeast of the city center. This decentralized, sprawling pattern of population change suggests that planning restrictions and government ownership of land introduces profound distortions into the urban land market. Since development is blocked in areas adjacent to the city center, residential growth is forced to the periphery.

In Curitiba, population growth moved out beyond 10 kilometers from the city center. Between 1991 and 2000, nearly half of the increase took place in areas between 10 and 20 kilometers from the city. This suggests that Curitiba has been relatively successful in achieving compact development – channeling growth into areas that are contiguous to existing urban areas.

In Recife, approximately 58% of the increase in population between 1991 and 2000 occurred between 10.1 and 20.1 kilometers from the city center. Like Curitiba, Recife's growth has been compact, moving out beyond the densely developed core.

Tables 8, 9 and 10 provide breakdowns of developed urban land for the three cities for 1991, 1997, 2000 and change in urban developed land between 1991 and 1997/2000. In Brasília's core of 7,850 hectares (within 5 kilometers), less than 10% of the total urban land area is developed. In contrast, over 90% of the land in the core of Curitiba is developed. In Recife, the portion is nearly 40%. (About half of Recife's core, however, is in the ocean; thus, about 80% of its developable core is urbanized.) Over the 1991 to 1997/2000 period, very little additional land was urbanized. In Brasília, net new urban development in the core – conversion of vacant land to urban uses – is effectively zero (1 hectare). In Curitiba, net urban development in the core increased by 14 hectares, and in Recife, was the greatest increase at 48 hectares.

Table 8: Spatial Distribution of Urban Land Development: Brasília, Curitiba and Recife, 1991

DISTANCE CATEGORY (KM)	BRASÍLIA		CURITIBA		RECIFE	
	URBAN LAND DEVELOPMENT (HA)	% OF TOTAL	URBAN LAND DEVELOPMENT (HA)	% OF TOTAL	URBAN LAND DEVELOPMENT (HA)	% OF TOTAL
0–5	733	2.2	7,232	8.1	3,086	9.8
5.1–10	8,743	26.0	20,321	22.7	8,983	28.5
10.1–15	5,707	17.0	19,260	21.5	6,854	21.7
15.1–20	6,929	20.6	21,594	24.1	5,057	16.0
20.1–25	2,659	7.9	10,049	11.2	2,921	9.3
25.1–30	3,752	11.1	9,909	1.1	1,414	4.5
30+	5,144	15.3	1,294	1.4	3,244	10.3
Total	33,666	100.0	89,659	100.0	31,559	100.0

Table 9: Spatial Distribution of Urban Land Development: Brasília, Curitiba and Recife, 1997/2000

DISTANCE CATEGORY (KM)	BRASÍLIA, 1997		CURITIBA, 2000		RECIFE, 1997	
	URBAN LAND DEVELOPMENT (HA)	% OF TOTAL	URBAN LAND DEVELOPMENT (HA)	% OF TOTAL	URBAN LAND DEVELOPMENT (HA)	% OF TOTAL
0-5	734	1.4	7,246	6.6	3,134	8.4
5.1-10	9,602	18.0	21,278	19.4	9,374	25.0
10.1-15	7,151	13.4	23,325	21.3	8,275	22.1
15.1-20	10,926	20.5	28,861	26.3	7,123	19.0
20.1-25	5,632	10.6	14,452	13.2	3,747	10.0
25.1-30	6,035	11.3	13,361	12.2	1,911	5.1
30+	132,207	24.8	1,106	1.0	3,855	10.3
Total	53,287	100.0	109,629	100.0	37,420	100.0

As far as urban land development beyond the core, Curitiba's and Recife's urban development is concentrated in the 10- to 25-kilometer bands. Between 1991 and 2000, 81% of Curitiba's change in developed, urbanized land was located in this 10-25 kilometer band. In Recife, 73% was similarly located. In contrast, in Brasília, less than 50% was located within 10 to 25 kilometers. In fact, approximately 53% of urban land development in Brasília between 1991 and 1997 took place beyond 25 kilometers from the city center—suggesting that Brasília is sprawling.

Table 10: Spatial Distribution of Change in Urban Land Development: Brasília, Curitiba and Recife, 1991-1997/2000

DISTANCE CATEGORY (KM)	BRASÍLIA 1991 - 1997		CURITIBA 1991 - 2000		RECIFE 1991 - 1997	
	URBAN LAND DEVELOPMENT CHANGE	% OF TOTAL CHANGE	URBAN LAND DEVELOPMENT CHANGE	% OF TOTAL CHANGE	URBAN LAND DEVELOPMENT CHANGE	% OF TOTAL CHANGE
0-5	.5	0.0	14	0.1	48	0.8
5.1-10	860	4.4	957	5.0	391	6.8
10.1-15	1,444	7.4	4,065	21.1	1,421	24.8
15.1-20	3,997	20.4	7,133	37.1	1,942	33.9
20.1-25	2,973	15.2	4,403	22.9	827	14.4
25.1-30	2,283	11.6	2,836	14.8	497	8.7
30+	8,063	41.1	-188	-1.0	611	10.7
Total	19,620	100.0	19,220	100.0	6,738	100.0

What are the implications of these alternative forms of urban land development in the three cities? There are three important issues that emerge from our comparison. First, cities that sprawl – such as Brasília – consume more land per person than those that develop compactly. Brasília developed 19,620 hectares of land to accommodate 811,000 persons – 24 hectares per 1,000 additional persons. In contrast, Recife

developed 6,738 hectares of land to accommodate 422,000 additional persons – 16 hectares of land per 1,000 persons. However, Curitiba developed 19,220 hectares of land to accommodate 543,000 additional persons – 35 hectares of land per 1,000 persons suggesting that Curitiba experienced substantial low-density development.

A second factor is the welfare implications of forcing population to travel greater distances to the center of the city. As Bertaud and Buckley have suggested for India, low-density urban sprawl introduces significant transportation costs on residents. A good comparative measure of compactness is the average per capita distance from the city center. This is calculated as the weighted average distance of each population in each zone. In 2001, the average per capita distance for Brasília was 24.3 kilometers; for Curitiba it was 11.2 kilometers; and for Recife it was 13.1 kilometers. In all cases, the average per capita distance to the city center increased between 1991 and 2001. In 1991, Brasília's average was 22.5 kilometers, Curitiba's was 9.75 kilometers, and Recife's was 12.62 kilometers. In a recent paper, Bertaud and Bruckner illustrated that cities with restrictive development controls take up more space and have lower consumer welfare due to increased commuting costs. Given the fact that distances are approximately twice as great in Brasília than they are in Curitiba or Recife, there is clearly a compelling case for assessing the welfare implications of the capital's dispersed spatial structure.

The third impact is that more compact development economizes on urban infrastructure costs, whereas low-density sprawling development typically requires higher infrastructure costs per capita.

Tables 11, 12 and 13 and Figure 2 provide tabulations of population density by distance from the city center for the three cities for 1991 and 2000. There are sharp density contrasts among Brasília, Curitiba, and Recife. In the areas within 10 kilometers of the city center, densities in Curitiba and Recife are five to ten times greater than in Brasília. Densities on the periphery of Brasília are five to ten times higher than for Curitiba, and about twice as high as Recife. In the case of Curitiba, there is evidence of significant very low-density suburban development in the areas beyond 10 kilometers—despite its success with the development of high-density development corridors.

Table 11: Spatial Structure of Population Density: Brasília, Curitiba and Recife, 1991

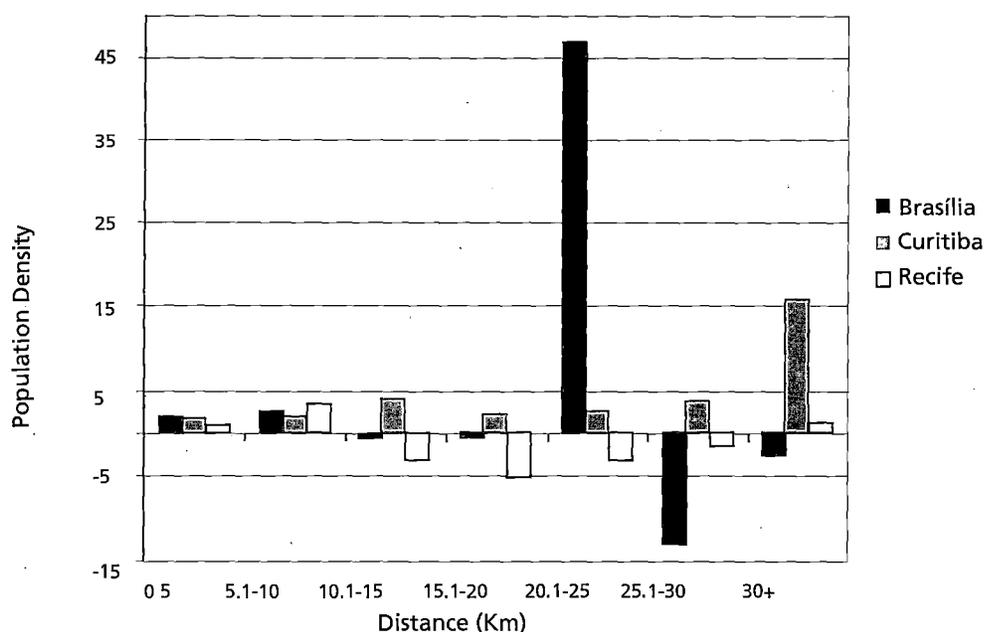
DISTANCE CATEGORY (KM)	BRASÍLIA	CURITIBA	RECIFE
	POPULATION DENSITY POPULATION/ URBANIZED LAND (HECTARES)	POPULATION DENSITY POPULATION/ URBANIZED LAND (HECTARES)	POPULATION DENSITY POPULATION/ URBANIZED LAND (HECTARES)
0-5	6.2	64.5	108.8
5.1-10	13.5	47.4	119.0
10.1-15	20.0	14.0	108.0
15.1-20	30.9	8.1	73.6
20.1-25	103.5	5.7	51.9
25.1-30	95.2	10.7	42.5
30+	48.4	9.9	57.9
Total	39.6	22.9	92.4

Table 12: Spatial Structure of Population Density: Brasília, Curitiba and Recife, 2000

DISTANCE CATEGORY	BRASÍLIA	CURITIBA	RECIFE
	POPULATION DENSITY POPULATION/URBANIZED LAND (HECTARES)	POPULATION DENSITY POPULATION/URBANIZED LAND (HECTARES)	POPULATION DENSITY POPULATION/URBANIZED LAND (HECTARES)
0-5	8.2	66.4	109.8
5.1-10	15.9	49.4	122.4
10.1-15	19.7	18.1	105.0
15.1-20	30.6	10.3	68.6
20.1-25	56.7	8.4	48.9
25.1-30	82.4	14.5	41.1
30+	46.0	25.8	59.2
Total	38.6	23.7	89.2

Table 13: Change in Spatial Structure of Population Density: Brasília, Curitiba and Recife, 1991-2000

DISTANCE CATEGORY	BRASÍLIA	CURITIBA	RECIFE
	CHANGE IN POPULATION DENSITY POPULATION/URBANIZED LAND (HECTARES)	CHANGE IN POPULATION DENSITY POPULATION/URBANIZED LAND (HECTARES)	CHANGE IN POPULATION DENSITY POPULATION/URBANIZED LAND (HECTARES)
0-5	2.0	1.9	1.0
5.1-10	2.4	2.0	3.4
10.1-15	-0.3	4.1	-3.0
15.1-20	-0.3	2.2	-5.0
20.1-25	46.8	2.7	-3.0
25.1-30	-12.8	3.8	-1.4
30+	-2.4	15.9	1.3
Total	-1.0	0.8	-3.2

Figure 2: Change in Spatial Structure of Population Density: Brasília, Curitiba and Recife, 1991-2000

Tables 14 – 19 and Figure 3 provide tabulations of formal and informal housing stock for the three cities for 1991, 2000, and the change between 1991 and 2000. All three cities substantially increased their housing stocks – from 300,000 to over 600,000 units during the 1990s. In Curitiba, most of the housing is located within 15 kilometers of the city – 86% in 1991 and 81% in 2000. The situation in Recife is similar with 66% in 2000. In contrast, Brasília's formal housing stock is predominantly located between 15 and 30 kilometers from the city center – 65% in 1991 and 66% in 2000. Less than 20% of the city's housing stock is located within 10 kilometers of the city center.

The spatial patterns of informal housing are somewhat different from formal housing. Informal housing tends to be more concentrated near the centers of the metropolitan areas. In the cases of Curitiba and Recife, 94% and 89%, respectively, of the informal housing stock in 1991 was located within 15 kilometers of the center. By 2000, the percentage within 15 kilometers in both Curitiba and Recife slightly declined to 92% and 85%, respectively.

In Brasília, informal housing is effectively shunted to the periphery. In 1991, 61% of informal housing was located more than 15 kilometers from the city center. In 2000, the corresponding figure was 68%.

Table 14: Spatial Distribution of Formal Housing Stock:Brasília and Curitiba, 1991

DISTANCE CATEGORY (KM)	BRASÍLIA		CURITIBA	
	HOUSING UNITS	% OF TOTAL	HOUSING UNITS	% OF TOTAL
0-5	1055	0.3	109,501	21.9
5.1-10	29,903	8.5	229,650	46.0
10.1-15	31,662	9.0	109,654	22.0
15.1-20	67,194	19.1	26,014	5.2
20.1-25	68,953	19.6	8,557	1.7
25.1-30	92,878	26.4	14,473	2.9
30+	60,158	17.1	1,213	0.2
Total	351,803	100.0	499,062	100.0

Table 15: Spatial Distribution of Formal Housing Stock:Brasília, Curitiba and Recife, 2000

DISTANCE CATEGORY (KM)	BRASÍLIA		CURITIBA		RECIFE	
	HOUSING UNITS	% OF TOTAL	HOUSING UNITS	% OF TOTAL	HOUSING UNITS	% OF TOTAL
0-5	2,101	0.4	137,618	20.1	67,343	10.1
5.1-10	48,855	9.3	259,085	37.8	201,165	30.1
10.1-15	38,874	7.4	172,697	25.2	172,173	25.8
15.1-20	111,368	21.2	51,662	7.5	121,535	18.2
20.1-25	85,627	16.3	37,258	5.4	38,919	5.8
25.1-30	148,666	28.3	26,026	3.8	18,846	2.8
30+	89,830	17.1	545	0.1	47,837	7.2
Total	525,321	100.0	684,891	100.0	667,818	100.0

Table 16: Spatial Distribution of Formal Housing Stock Change: Brasília and Curitiba, 1991–2000

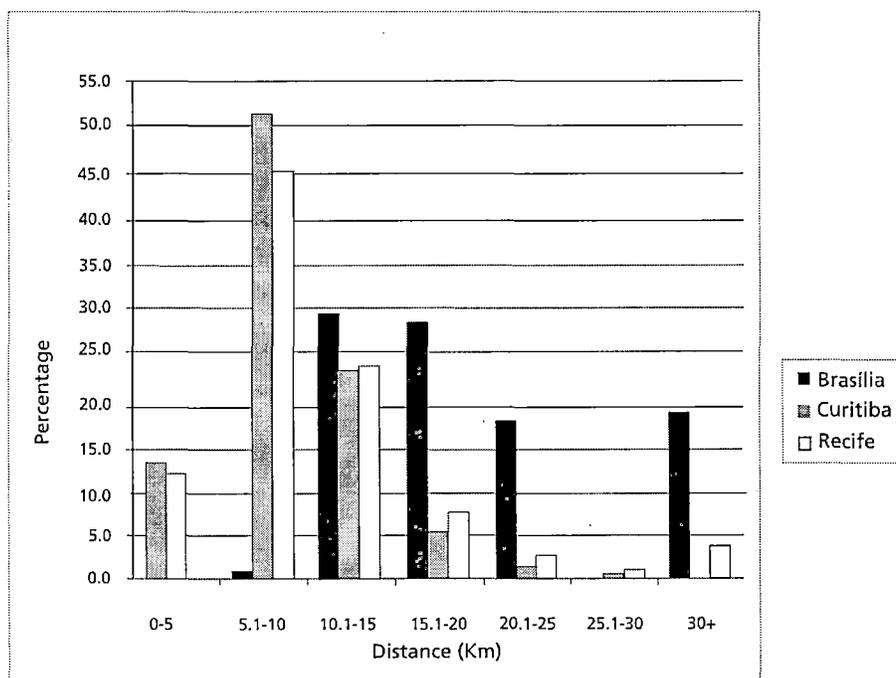
DISTANCE CATEGORY (KM)	BRASÍLIA		CURITIBA	
	HOUSING STOCK CHANGE	% OF TOTAL CHANGE	HOUSING STOCK CHANGE	% OF TOTAL CHANGE
0–5	1,215	0.7	28,117	15.1
5.1–10	19,260	11.1	29,435	15.8
10.1–15	5,726	3.3	63,043	33.9
15.1–20	46,329	26.7	25,648	13.8
20.1–25	13,881	8.0	28,701	15.4
25.1–30	57,435	33.1	11,553	6.2
30+	29,672	17.1	-668	-0.2
Total	173,518	100.0	185,829	100.0

Table 17: Spatial Distribution of Informal Housing Stock: Brasília and Curitiba, 1991

DISTANCE CATEGORY (KM)	BRASÍLIA		CURITIBA	
	HOUSING UNITS	% OF TOTAL	HOUSING UNITS	% OF TOTAL
0–5	0	0.0	3,586	10.5
5.1–10	169	2.9	16,998	49.8
10.1–15	2,136	36.6	10,891	31.9
15.1–20	2,352	40.3	1,913	5.6
20.1–25	444	7.6	640	1.9
25.1–30	70	1.2	82	0.2
30+	665	11.4	0	0
Total	5,836	100.0	34,110	100.0

Table 18: Spatial Distribution of Informal Housing Stock: Brasília, Curitiba and Recife, 2000

DISTANCE CATEGORY (KM)	BRASÍLIA		CURITIBA		RECIFE	
	HOUSING UNITS	% OF TOTAL	HOUSING UNITS	% OF TOTAL	HOUSING UNITS	% OF TOTAL
0–5	0	0.0	3,893	8.1	29,166	12.4
5.1–10	302	0.7	21,192	44.2	111,594	47.5
10.1–15	13,414	31.1	18,543	38.7	57,898	24.7
15.1–20	12,940	30.0	2,526	5.3	17,911	7.6
20.1–25	8,066	18.7	1,315	2.7	6,548	2.8
25.1–30	0	0.0	467	1.0	2,240	1.0
30+	8,411	19.5	0	0	9,364	4.0
Total	43,132	100.0	47,936	100.0	234,721	100.0

Figure 3: Spatial Distribution of Informal Housing Stock: Brasília, Curitiba and Recife, 2000**Table 19:** Spatial Distribution of Informal Housing Stock Change: Brasília and Curitiba, 1991–2000

DISTANCE CATEGORY (KM)	BRASÍLIA		CURITIBA	
	HOUSING STOCK CHANGE	% OF TOTAL CHANGE	HOUSING STOCK CHANGE	% OF TOTAL CHANGE
0-5	0	0.0	307	2.2
5.1-10	133	-1.4	4,194	30.3
10.1-15	11,278	26.0	7,652	55.3
15.1-20	10,587	20.3	613	4.4
20.1-25	7,622	29.2	675	4.9
25.1-30	-70	-1.1		
30+	7,746	27.0	385*	2.8*
Total	37,296	100.0	13,826	100.0

* 25+

The Effects of Location, Titling, Infrastructure and Plot Size on Residential Land Prices in the Three Cities

Land value data from the three cities were gathered through a systematic survey of real estate brokers. Price data were gathered for various types of residential plots in each geographic zone of each city. Price data are therefore available by distance from the city center and according to whether plots are legally titled, have access to infrastructure (electric, water, paved roads), and whether they are under or over 500 square meters in size. Data were collected for two time periods between 2000 and 2003. All price data presented in the report are in 2003 constant prices. Over the 2000–2003 period, the IPCA (*Índice Nacional de Preços*) increased by 32.9% and the IPCA has been used to adjust prices upwards to 2003 terms. The section starts by presenting overall descriptive statistics of residential land values. It then proceeds to report on the results of three multivariate regression models that seek to gauge the independent effects of distance, title, infrastructure, and plot size.

Table 20 presents mean plot prices for the three cities. Interestingly, current plot prices (unadjusted for inflation) did not increase as rapidly as the IPCA, and therefore are higher in the earlier years—for Brasília, 209 reais per square meter in 2001 and 142 reais in 2003; for Curitiba, 67 reais per square meter in 2000 and 66 reais in 2002; and for Recife, 74 reais per square meter in 2001 and 71 reais in 2003. This suggests that real plot prices have not kept pace with inflation. It is also noteworthy that residential land prices are considerably higher in Brasília than in Recife and Curitiba, averaging 142, 71, and 66 reais, respectively, in 2003. While there are a myriad of factors shaping residential land prices, high per capita and household incomes in the capital probably explain much of the difference—higher incomes mean higher ability to pay for housing, driving up land prices. It may also be the case that strict land use planning and development controls in Brasília limited the supply of land for residential development, particularly in the more centrally located areas, and resulted in higher land prices.

Table 20: Mean Plot Prices by Infrastructure Service and Title in 2000, 2001, 2002 and 2003 for Brasília, Curitiba and Recife in Constant 2003 Values (Reais per Square Meter)

DISTANCE CATEGORY (KM)	BRASÍLIA		CURITIBA		RECIFE	
	2001	2003	2000	2002	2001	2003
All plots	209	142	67	66	74	71
Infrastructure						
With	164 ^a	139 ^a	109	108	102	97
Without	157 ^a	47 ^a	38	38	44	42
Title						
With	223	147	68	68	81	78
Without	193	122	66	66	67	64
Infrastructure and Title						
With	213	144	73	73	77	73
without	*	*	29	29	18	17
Plot Size						
< 500m ²	184	153	72	71	75	71
>500m ²	266	99	57	57	73	70

^a Means exclude plots located within 10 kilometers of the city center.

* Sample size less than 30

Deflators: 2000=1.329; 2001=1.244; 2002=1.147 and 2003=1.000.

Provision of infrastructure has a clear and positive impact on residential plot prices in the three cities. As illustrated in Table 20 the mean 2002/2003 value of plots with infrastructure (measured by the presence of paved roads) ranges from 139 reais in Brasília, to 108 reais in Curitiba, and 97 reais in Recife. These means are all greater than corresponding prices for plots without infrastructure: in Brasília, 47 reais; in Curitiba, 38 reais; and in Recife, 42 reais. These patterns reflect the positive impact that infrastructure provision has on land values. Below, we present a more rigorous analytical examination of the effects of infrastructure on land prices.

Although to a lesser extent, the provision of title of property ownership also positively affects residential land prices. As illustrated in Table 20 the mean 2002/2003 value of plots with title ranges from 147 reais in Brasília, to 68 reais in Curitiba, and 78 reais in Recife. These means are all greater than corresponding prices for plots without title: in Brasília, 122 reais; in Curitiba, 66 reais; and in Recife, 64 reais. We have also found that the existence of both infrastructure and title positively affects prices. In Table 20 the mean 2002/2003 value differential for plots with both infrastructure and title and without is 73 reais versus 29 reais for Curitiba and 73 reais versus 17 reais for Recife.

We also found that plot size affects per-meter prices of plots, although the impact is variable across the three cities (see Table 20). In the case of Brasília, large plots have higher prices per square meter – 266 reais as compared to 184 reais for plots under 500 square meters. Since it is normally the case that smaller plots have higher prices per square meter, the results in Brasília may reflect the fact that there is a scarcity of large plots in the metropolitan area. In both Curitiba and Recife, per-square-meter plot prices are higher for small plots than for large plots – 72 reais versus 57 reais for Curitiba and 71 reais versus 70 reais for Recife.

The above results are highly general since they do not incorporate the effects of location into the calculations of means. Table 21 provides tabulations of mean plot prices per square meter based on distance from the central city.

Plot prices in Brasília display the same unique patterns as for population density and housing. Plot prices in 2003 increase as distance from the center increases, up to 10 kilometers, and gradually decline out to 30 kilometers. Beyond 30 kilometers, plot prices are much lower (but still more than double comparable prices in Curitiba and Recife). This distinct pattern of land prices is the result of strict land use planning controls in Brasília, limitations on housing in the core, and strict exclusion of informal housing within the federal district. Beyond the federal district, informal housing is more common and there is an active market for unauthorized houses and condominiums.

Plot prices in Curitiba and Recife display more conventional patterns. Prices are highest at the center of the city and then decline consistently with increasing distances. In 2002, prices in Curitiba were 180 reais per square meter; beyond 10 kilometers, prices range from 44 reais to 11 reais per square meter, depending on location. Interestingly, prices beyond 30 kilometers are higher than in the 25–30 kilometer band, 17 reais versus 11. Further investigation is needed to ascertain what factors cause this up-tick in prices.

In Recife, plot prices are highest in the city center at 169 reais and decline steadily with increasing distance. At the periphery, plot prices average 28 reais, considerably higher than Curitiba, but well below comparable levels in Brasília.

Comparing plot prices over time (2000–2002 and 2001–2003), suggests that prices in both Curitiba and Recife have been fairly constant in real, inflation adjusted terms. In Brasília, real inflation adjusted prices appear to have declined in suburban areas, while increasing in the core (0– 5 kilometers).

Table 21 presents tabulations of residential land prices by distance from the city center. They reveal a striking difference between the highly planned city of Brasília and Curitiba and Recife. In the cases of Curitiba and Recife, residential land prices systematically decline from the city center. In Curitiba, 2002 prices of plots located within five kilometers of the city center average 180 reais. Farther out, from 5–10 kilometers, the mean price falls to 78 reais. This pattern continues all the way out to the 25–30 kilometer band, where prices fall to 11 reais. However, beyond 30 kilometers, prices pick up a bit to 17 reais. In Recife, plot prices decline from 169 reais to 28 reais at the edge.

Table 21: Mean Plot Prices by Distance from City Center in 2000, 2001, 2002, and 2003 for Brasília, Curitiba and Recife in Constant 2003 Values (Reais per Square Meter)

DISTANCE CATEGORY (KM)	BRASÍLIA		CURITIBA		RECIFE	
	2001	2003	2000	2002	2001	2003
0–5	222	317	185	180	173	169
5.1–10	802	512	78	78	96	91
10.1–15	156	203	42	44	45	42
15.1–20	176	176	18	18	27	26
20.1–25	124	145	15	16	34	31
25.1–30	168	121	12	11	38	40
30+	200	64	19	17	27	28
Total	233	142	67	66	74	71

Deflators: 2000=1.329; 2001=1.244; 2002=1.147 and 2003=1.000.

In Brasília, land prices increase from the center out to 10 kilometers. From 10 to 30 kilometers, prices remain very high (particularly in comparison to the other two cities). This pattern appears to reflect the strict land use development regulations that exist in Brasília, with opportunities for housing restricted to limited areas in and around the center, and most residential development located 10 to 20 kilometers from the center. This pattern in prices reflects the population density aspects discussed above in a previous section.

The tabulations of mean plot prices according to plot characteristics and location indicate that prices are strongly affected by these factors. In the remaining portion of this section, we attempt to isolate the effects of each of these factors by building two multivariate regression models to predict residential plot price—one for 2002–2003 price data and one for 2000–2001 price data. In developing the models, we took an exploratory approach, utilizing two functional forms (linear and log-linear) and a step-wise process for determining which independent variable to include in the models. In the case of the linear model, the dependent variable was constant per-square-meter plot price. Independent variables include distance from city center and a range of dummy variables to indicate the presence of a range of plot characteristics—provision of infrastructure (electric, water, paved roads), availability of title, and plot size (over or under 500 square meters). In order to test for potential interaction effects, we also included a variable that captured the presence of both title and infrastructure. In the case of the log-linear model, the dependent variable was the log (base e) of constant per-square meter plot price. The log-linear model used the same independent variables.

The step-wise process iteratively adds independent variables to the regression model in an attempt to build the most robust model. It results in various model specifications, depending on the explanatory power of added variables. Model runs indicated that the log-linear specification was the most robust. Tables 22 and 23 present the results of the log-linear models for Brasília, Curitiba and Recife for 2002–2003 and 2000–2001. In Table 22, the step-wise modeling results in three distinct models for each city.

In the case of Brasília, the best model incorporated distance, pavement dummy and plot size. It excluded electric, water, title, and pavement-title. Overall, the model is highly predictive, with an adjusted R² of 0.585. All of the independent variables are significant at the .000 confidence level and have the expected signs (constant is positive, distance is negative, pavement is positive, and plot size is negative).

The 2002 model for Curitiba is also very significant. It has an R² of .656. The Curitiba model includes constant, distance, pavement, pavement-title and plot size. All of the independent variables are significant at the .000 confidence level and have the expected signs.

The Recife model has the lowest R² of the three cities—.394. It includes constant, distance, pavement, and title. All of the independent variables are significant at the .000 confidence level and have the expected signs.

Table 22: Stepwise Regression Results: Brasília, Curitiba and Recife, 2002 and 2003, Dependent Variable: Log (base e) of Constant Reais per Square Meter

	BRASÍLIA 2003		CURITIBA 2002		RECIFE 2003	
	BETA	SIGNIFICANCE	BETA	SIGNIFICANCE	BETA	SIGNIFICANCE
CONSTANT	6.055 (27.873)	.000	4.469 (76.191)	.000	3.968 (108.869)	.000
DISTANCE TO CBD	-.089 (-13.737)	.000	-.117 (-49.931)	.000	-.047 (-28.910)	.000
PAVEMENT DUMMY	1.027 (7.373)	.000	.748 (19.676)	.000	.639 (20.710)	.000
TITLE DUMMY					.194 (6.440)	.000
PAVEMENT AND TITLE DUMMY			.391 (7.215)	.000		
PLOT SIZE DUMMY	-.993 (-6.313)	.000	-.419 (-11.295)	.000		
ADJUSTED R ₂	.585	df=175	.656	df= 1921	.394	df= 1921

T statistics are in parentheses.

Table 23 presents model results for 2000–2001 years. There are no results for Brasília. The results for Curitiba and Recife, however, were robust and are generally similar to the results for 2002–2003 presented in Table 22.

Tables 24 and 25 interpret the results of the five models. The constant values are presented in the first row of both tables. The constant value is the estimated value of the plot located at the center of the city, with no paved road, no title and small plot size. For the 2002–2003 years, the constants range from 426 reais for Brasília, 87 reais for Curitiba, and 53 reais for Recife. For 2000–2001 (Table 25), the constant values are 86 reais for Curitiba and 56 reais for Recife.

Table 23: Stepwise Regression Results: Brasília, Curitiba and Recife, 2000 and 2001, Dependent Variable: Log (base e) of Constant (Reais per Square Meter)

	BRASÍLIA 2001		CURITIBA 2000		RECIFE 2001	
	BETA	SIGNIFICANCE	BETA	SIGNIFICANCE	BETA	SIGNIFICANCE
CONSTANT			4.451 (75.473)	.000	4.024 (109.862)	.000
DISTANCE TO CBD			-.116 (-49.243)	.000	-.048 (-29.356)	.000
PAVEMENT DUMMY			.760 (19.883)	.000	.636 (20.491)	.000
TITLE DUMMY					.198 (6.515)	.000
PAVEMENT AND TITLE DUMMY			.396 (7.269)	.000		
PLOT SIZE DUMMY			-.439 (-11.766)	.000		
ADJUSTED R_2			.653	df=1921	.396	df=2500

T statistics are in parentheses.

Table 24. Interpreted Regression Results: Brasília, Curitiba and Recife, 2002 and 2003, (from Table 22)

Bold figures are estimates of dependent variable (plot price per square meter [Reais])

	BRASÍLIA 2003	CURITIBA 2002	RECIFE 2003
Constant value, no paved road, no title and small plot (reais per square meter)	426	87	53
Value adjustment for having paved road (factor and reais per square meter)	2.79 => 1,189	2.11 => 184	1.89 => 100
Value adjustment for having title (factor and reais per square meter)			1.21 => 64
Value adjustment for having both paved road and title (factor and reais per square meter)		1.47 => 128	
Value adjustment for having large plot (factor and reais per square meter)	.370 => 158	.658 => 57	
Distance value adjustment per kilometer from city center (factor and reais per square meter)	-.089 intercept value at 10 kilometers 175	-.117 intercept value at 10 kilometers 27	-.047 intercept value at 10 kilometers 33

The second row of Tables 24 and 25 presents estimates of the effect of having a paved road on plot prices. There are two numbers in each cell. The first number is the shift effect (adjustment value) of having a paved road. For example, in the case of Brasília in 2003, the constant value is multiplied by 2.79 (a 179% increase) to estimate the adjusted price of a plot located at the city center, with a paved road, no title and small plot size. The estimated value is 1,189 reais. The effects of pavement (which should be thought of as a proxy for infrastructure) are very strong in all three cities. Presence of infrastructure adds a land price premium of 179% in Brasília, 111% in Curitiba, and 89% in Recife.

Table 25: Interpreted Regression Results: Brasília, Curitiba and Recife, 2000 and 2001, (from Table 23)

Bold figures are estimates of dependent variable (plot price per square meter [Reais])

	BRASÍLIA 2001	CURITIBA 2000	RECIFE 2001
Constant value, no paved road, no title and small plot (reais per square meter)		86	56
Value adjustment for having paved road (factor and reais per square meter)		2.14 => 184	1.89 => 106
Value adjustment for having title (factor and reais per square meter)			1.22 => 62
Value adjustment for having both paved road and title (factor and reais per square meter)		1.49 => 128	
Value adjustment for large plot (factor and reais per square meter)		.645 => 55	
Distance value adjustment per kilometer from city center (factor and reais per square meter)		-.116 intercept value at 10 kilometers 27	-.048 intercept value at 10 kilometers 53

The third row of Tables 24 and 25 presents estimates of the effect of title on land prices. This effect shows up only in Recife and indicates that title adds about 20% to the price of a plot. However, if we combine the effects of pavement and title, effects show up in Curitiba. As row four of Tables 24 and 25 indicate, the value adjustment for having both infrastructure and title increases plot prices by 47%–49%. It is interesting to note that, unlike pavement, title does not generate as consistent and large effects. While this result requires further exploration, it may be the case that Brasília's planning and regulatory system overwhelms the effects of title. Virtually all plots in the federal district have title, and the presence or absence of title is only relevant on the fringes of Brasília's metropolitan area. In Curitiba, title on its own does not generate statistically significant effects. Only when combined with infrastructure does the effect surface.

Here it may be the case that titled but unserviced plots have prices that are similar to untitled and unserviced plots.

The fifth row of Tables 24 and 25 provides estimates of the effects of plot size on plot price per square meter. In Brasília for 2003 and Curitiba for both 2000 and 2002 and in Recife for 2001 and 2003, the price of large plots per square meter is well below the per-square-meter price of smaller plots. This seems to reflect market experience elsewhere.

Finally, row six of Tables 24 and 25 provides estimates of the effect of location (measured in terms of distance from the city center) on plot prices. These adjustment factors, referred to as price gradients, estimate the percentage change in plot prices relative to increases in distance. For example, in the case of Brasília in 2003, for each one kilometer increase in distance from the city center, the price of a plot decreases by 8.9%. At a distance of 10 kilometers from the city, the constant price is reduced to 175 reais (versus 426 reais at the city center). At 10 kilometers from the center, the constant is worth only 41% of its city center value. In Curitiba, the gradient is -0.117 , and at 10 kilometers from the center, the constant is reduced to 27 reais (versus 87 reais) – it is worth only 31% of its city center value. In the case of Recife, the gradient is -0.047 . At 10 kilometers, the constant is worth 33 reais – 62% of its city center value.

Interestingly, the slope gradient for Curitiba is high in absolute terms (-0.117), indicating that distance drives down prices more per kilometer than in either Brasília (-0.089) or Recife (-0.047). This seems counter-intuitive given Curitiba's reputation for an efficient mass transit system. The result may be more of a reflection of the relatively high wages in Curitiba and therefore the higher opportunity cost of travel time. Recife's low price gradient is most likely due to its lower incomes and lower opportunity costs of travel.

Conclusions

This report has presented the results of land market assessments in three Brazilian cities. There are several overarching conclusions that can be drawn from the effort. First, it is feasible to carry out such assessments. Second, they result in the compilation of socio-economic, land use and land price information that is useful for gauging the effectiveness of urban planning, infrastructure provision and land titling. Third, the results indicate that urban land market dynamics in less regulated cities (Curitiba and Recife) perform well and reflect patterns and trends found in other cities around the world.

Spatial patterns of urban development dramatically vary between the highly planned Brasília and the more market-driven cities of Curitiba and Recife. Average distance per capita in Brasília is more than double the levels of Curitiba and Recife. Data on formal housing stock patterns indicate that housing is abundant in the core areas of Curitiba and Recife—over half of Curitiba's stock is located within 10 kilometers of the city center, and in Recife, 40% is located within 10 kilometers. In contrast, less than 10% of Brasília's formal housing stock is located within 10 kilometers of the center.

Prices of residential land in suburban areas of Curitiba and Recife are in the 30–40 reais per square meter range. For plots of 400 square meters, this works out to between 12,000–16,000 reais (US\$4,000–US\$5,300). In the case of Brasília, significant land market distortions were identified. Population is forced to commute longer distances and land prices are about 5 times higher in suburban areas than in Curitiba and Recife. Plots in suburban areas of Brasília range from 150–200 reais per square meter. For 400 square meter plots, prices average 60,000–80,000 reais (US\$20,000 to US\$26,700).

With respect to infrastructure provision and its effects on land prices, the results indicate that infrastructure investment have significant positive effects on land values. The results in the three cities indicate that infrastructure provision can increase land prices by 89%–179%. This suggests that there is ample scope for financing infrastructure provision through property taxation, land value capture or other fiscal mechanisms.

With respect to provision of title, the evidence is less compelling. In the case of Recife, the analysis consistently identified statistically significant positive effects generated by titling. There, the provision of infrastructure

increased land prices by approximately 20%. In the case of Curitiba, the joint provision of infrastructure and title increased prices by nearly 50%. Again, this suggests that there is scope for financing titling projects through some form of property taxation or value capture.

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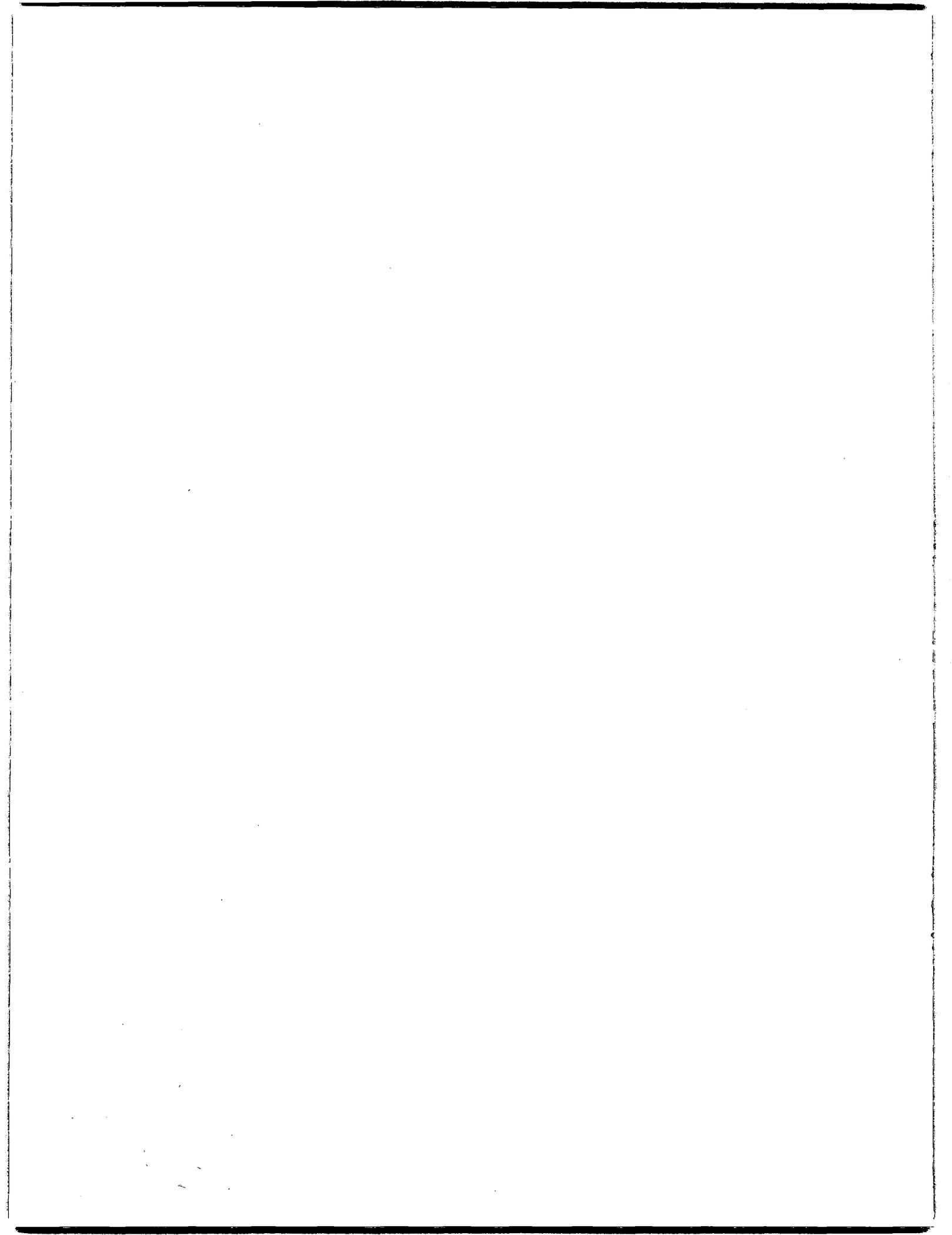
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AGGLOMERATION AND URBAN PRODUCTIVITY: IMPLICATIONS FOR THE APPRAISAL OF TRANSPORT INVESTMENT¹

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Abstract

This paper is concerned with the links between city size, productivity and infrastructure provision. The role of transport infrastructure in sustaining productivity is notoriously hard to isolate empirically due to the inter-dependent nature of the relationship, which creates problems of simultaneity bias. In this paper we show that transport investment can have an important influence on productivity by increasing the effective density of jobs within a given distance. We estimate elasticities of productivity with respect to city size for different industrial sectors of the economy using data on UK firms. The results show evidence of positive agglomeration externalities across a range of industries.

Introduction

This paper is concerned with the link between city size and productivity. It provides a quantitative assessment of this relationship for different sectors of the UK economy. The motivation for exploring this theme is to identify if there might be any external benefits that arise from the provision of transport infrastructure that are not included in standard transport appraisals. Specifically, we investigate whether there is an association between the density of economic activity and levels of productivity. This theme is important in assessing the benefits of transport investment for two reasons. First, because ultimately transport investment is crucial in sustaining cities and supporting urban agglomerations and these in turn may provide external benefits to the economy. Second, because it is clear that a change in the level of transport infrastructure in any area will typically change the effective density of economic activity that is accessible to that area with associated implications for productivity and efficiency.

Venables (2003) has shown that estimates of the elasticity of productivity with respect to city size can be used to shed light on the external benefits of transport improvements. He develops a computational model of an urban economy that links productivity to transport investment via effects on city size. His objective is to distinguish the real income changes that result from transport investment due to a productivity-city size effect, from those economic benefits that are captured in standard transport appraisal and which arise from resources saved in commuting and from an increase in urban output.

An outline of Venables' model is given in figures 1 to 3. Figure 1 shows an urban equilibrium in which the size of the city is determined at point E, where the wage gap between city workers and non-city workers is entirely dissipated in the travel costs of the city worker who is most distant from the CBD.

¹ This paper was given at a World Bank Urban Research Symposium held in April 2005. It presents initial results from research commissioned by the UK Department for Transport into the link between agglomeration and productivity. Results from latter stages of this research obtained using more extensive data, and details concerning the data sources and methodology, are given in Graham (2005, 2006a, forthcoming).

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Figure 2 shows that when a transport improvement is made commuting costs are shifted downwards and consequently the city expands to point E^* . The increase in the output of the urban economy is area $\beta + \gamma$. Note that since productivity is higher in the city by an amount equal to the height of the wage gap (WW), if workers transfer from outside the city to inside they are more productive. The total change in the resources used in commuting is $\gamma - \alpha$, which combined with the change in output ($\beta + \gamma$), yields a benefit (real income gain) from the transport improvement of $\alpha + \beta$.

In figure 3 Venables considers the implications of the existence of a city size - productivity gradient. If, as the literature suggests, larger cities have higher productivity the productivity gap is now expressed as a concave curve that increases with city size. Equilibrium is found at the intersection of the commuting cost and wage gap curves. The fact that productivity is non-constant with respect to city size means that the real income gain from a transport improvement is $\alpha + \beta + \delta$, where δ measures the increase in productivity experienced by city workers and is akin to a measure of the elasticity of productivity with respect to city size.

As Venables points out, the additional benefit δ is the effect that would be missed by a standard transport appraisal. Estimates of δ do exist, but they tend to be exclusively for manufacturing industries. The purpose of this paper is to quantify δ for detailed sectors of the economy to show the extent to which the city size productivity effect is prevalent. Specifically, we estimate elasticities of productivity with respect to a measure of the effective density of jobs. We estimate the magnitude of these values for different industrial sectors.

The paper is structured as follows. Section two discusses the literature on agglomeration productivity and transport investment. Sources of data used in the analysis are described in section three. The estimation model is next discussed in section 4. Estimation results are presented in section five. Conclusions are drawn in the final section.

Agglomeration productivity and transport investment

Agglomeration and productivity

The tendency towards concentration or agglomeration is perhaps the most widely observed feature of the spatial organisation of economic activity. It can be discerned across the Globe at a variety of different geographical levels. Agglomeration is evident, for instance, in the existence and growth of cities, in the formation of industrial regions and districts, and in the clustering of like activities within the same neighbourhood of a town or city. The theory of agglomeration economies is based on the premise that the tendency towards spatial concentration is caused by the existence of positive externalities that are generated through close spatial proximity and that serve to raise the efficiency of firms.

The externalities generated through agglomeration are traditionally categorised under three headings.

Internal scale economies describe efficiency gains that occur as the overall scale of production is increased. With respect to agglomeration, the crucial assumption regarding internal scale economies is that they are internal at the plant level and therefore imply production at a single location rather than being spread across a number of locations.

Localization economies describe efficiency gains generated through the increased scale of a particular industry operating in close spatial proximity. Benefits are thought to be generated in three ways: through 'technological spillovers' between firms within the same industry, through the efficient provision of intermediate inputs to

firms in greater variety and at lower cost due to the growth of subsidiary trades, and through labour market pooling. Localization economies are intra-industry; they are external to firms but internal to the industry.

Urbanization economies describe the productive advantages that accrue to firms through location in large population centres such as cities. Firms derive benefits from the scale of markets, from the proximity of market areas for inputs and outputs, and from good infrastructure and public service provision. These spatial external economies are cross-industry; they are external to the firm and the industry but internal to cities.

The empirical literature on the link between agglomeration and productivity has been comprehensively reviewed in previous surveys by Rosenthal and Strange (2004), Eberts and McMillen (1999), Henderson (1988), Gerking (1994), and Moomaw (1983a). Here we briefly summarise some of the main results on the magnitude of estimated values of the effects of agglomerate economies on productivity

Econometric studies of the effects of agglomeration on productivity have been conducted almost exclusively for manufacturing industries. Table 1 provides a summary of results from the literature relating to the effects of agglomeration on productivity. We summarise here those studies that have produced an actual elasticity estimate of the effects of agglomeration rather than those that have detected agglomeration effects through the use of dummy variables or other limited variable methods.

Table 1: Estimates of agglomeration economies from production function analyses.

AUTHOR	UNIT OF ANALYSIS	DEPENDENT VARIABLE	INDEPENDENT VARIABLE	ELASTICITY
Aaberg (1973)	Swedish cities	productivity	city size (population)	0.02
Shefer (1973)	US MSAs	productivity	RTS at MSA aggregation	0.20
Sveikauskas (1975)	US MSAs	productivity	city size (population)	0.06
Kawashima (1975)	US MSAs	productivity	city size (population)	0.20
Fogarty and Garofalo (1978)	US MSAs	productivity	city size (population)	0.10
Moomaw (1981)	US MSAs	productivity	city size (population)	0.03
Moomaw (1985)	US MSAs	productivity	city size (population)	0.07
Nakamura (1985)	Japanese Cities	productivity	city size (population)	0.03a
Tabuchi (1986)	Japanese Cities	productivity	city size (population)	0.04
Louri (1988)	Greek Regions	productivity	city size (population)	0.05
Sveikauskas et al (1988)	US MSAs	productivity	city size (population)	0.01b
Nakamura (1985)	Japanese Cities	productivity	industry size (employment)	0.05
Henderson (1986)	Brazilian Cities	productivity	industry size (employment)	0.11c
Henderson (1986)	US MSAs	productivity	industry size (employment)	0.19d
Henderson (2003)	US MSAs	plant output	industry size (no. of plants)	0.03e
Ciccone and Hall (1996)	US States	productivity	employment density	0.06
Ciccone (2002)	EU regions	productivity	employment density	0.05

Notes: a - mean value for 14 industries, b - mean value from 5 model specifications, c - mean value for ten industries, d - mean value for 9 industries, e - mean value for 4 model specifications.

With the exception of Shefer (1973) regressions use metropolitan population as a proxy for city size within a basic production function framework. The availability of capital stock data at the metropolitan level has exerted a big influence on the functional form used for estimation¹.

Early studies were typically based on either the Constant Elasticity of Substitution (CES) function (e.g. Shefer 1973, Sveikauskas 1975, Moomaw 1981) or the Cobb-Douglas (CD) (e.g. Aaberg 1973, Kawashima 1975, Fogarty and Garofalo 1978). More recent estimates are based on flexible functional forms such as the translog (e.g. Nakamura 1985, Henderson 1986, Tabuchi 1986, Louri 1988, Sveikauskas et al 1988).

The estimates of urbanization economies range from 0.01 to 0.20, but the majority of values are under 0.10. This indicates that a doubling of city size is typically associated with an increase in productivity of somewhere between 1% and 10%. The estimates given in the table above are all positive although Henderson (1986, 2003a) does report difficulties in identifying urbanization effects on productivity.

It is worth pointing out that of the studies shown in table 1 only those by Henderson (1986, 2003a) and Nakamura (1985) treat urbanization and localization economies within the same estimating equation. They are able to do this by estimating an industry level production function for some particular industrial sector in contrast to the other studies of urbanization where estimation is based on an aggregate function for all manufacturing.

Table 1 shows four estimates of localization economies. Nakamura (1985) estimates the effect of localization economies on the productivity of 20 manufacturing industries. He quotes an unweighted average elasticity of productivity with respect to industry size of 0.05. This compares to an average city size elasticity of 0.03 and thus Nakamura concludes that the effects of localization tend to be more significant than those of urbanization.

Henderson (1986) also finds weak evidence of urbanization economies using industry level data for US MSAs and Brazilian cities but does find substantial evidence of localization economies. His estimates of localization economies for Brazil vary by industry, with a maximum elasticity estimate of 0.20 and a minimum of 0.03, the mean value over 10 industries is 0.11. For US MSAs Henderson (1986) again finds substantial evidence of localization with a range in estimated elasticities of 0.09 to 0.45 for selected industries and a mean value of 0.19. He concludes that economies of agglomeration tend to be ones of localization not urbanization and that localization economies tended to be strongest in the sectors in which cities specialise but that they diminish as city size increases. Henderson (2003a) finds similar results. He estimates plant level production functions for high-tech and machinery industries in the US using a variable recording the number of own industry plants to test for localization economies. He finds that localization effects are strong for high tech industries but not for machinery.

In addition to studies using MSA population and employment to construct variables representing city and industry size there are those that have incorporated some measures of distance or density into the specification of agglomeration effects. Two recent papers are particularly interesting in this respect.

First, is the study of state level labour productivity and the density of economic activity by Ciccone and Hall (1996). They develop two spatial economic models; one based on the neo-classical conception that density can affect productivity through local geographical externalities, another which emphasises diversity of

¹ The studies by Aaberg (1973), Kawashima (1975), and Moomaw (1981) proxy capital using measure of non-labour income, those by Fogarty and Garofalo (1978) and Sveikauskas et al (1988) create capital data through the perpetual inventory method, while those by Sveikauskas (1975), Moomaw (1985) and Louri (1988) derive estimating equations which avoid the need for capital data altogether.

intermediate services where spatial density gives rise to aggregate increasing returns. From these models they derive an equation to estimate the effects of county-level employment density on aggregate state productivity. They find that over 50% of the variance in aggregate labour productivity across states can be explained by variance in the density of employment and that a doubling of employment density is associated with a 6% increase in average labour productivity. Ciccone (2002) extends the analysis to European data and estimates an elasticity of labour productivity with respect to employment density of 0.045.

Second, is the paper by Rosenthal and Strange (2003) which used distance based measures at the establishment level to test for the extent of geographical externalities. Using the zipcode of the establishment as a centroid they construct distance rings at 1 mile, 5 miles, 10 miles and 15 miles. For the six industries they study that find that localization economies are present but that the strength of these decreases rapidly across space and substantially even within a five mile radius of the plant. Regarding urbanization economies they identify relatively small and inconsistent effects.

Density and distance based measures have been used by other researchers. Fogarty and Garofalo (1988) estimate a production function with a vector of agglomeration effects that includes manufacturing employment density. They show that density has a strong positive non linear effect on productivity and that a change in spatial distribution of the density of industry may affect productivity substantially. Henderson et al (1995) estimate a growth model which finds externalities positively associated with own industry employment concentration. Hansen (1990) estimates a production function with distance based agglomeration measures to explore the trade off between factor costs and productivity in the Sao Paulo region of Brazil. He finds that productivity is enhanced by agglomeration as represented by distance to the centre of Sao Paulo but that there is a trade off because costs diminish with distance. Hanson (1996a, 1996b, 1997) explores relationships between agglomeration, productivity and wages for the garment sector of Mexico City. His data support the existence of localization economies and show that regional wages decrease by distance from the centre of Mexico City. Duranton and Overman (2002) develop distance based tests of localization for the UK. They find that 51% of 4 digit industries are genuinely localised at an acceptable statistical level and that localization takes place at small scales, mostly below 50 kilometres.

The role of transport investment

In terms of agglomeration public infrastructure can be treated as an unpaid factor of production. Positive spatial externalities exist when an urban area provides an input that lowers costs for firms. If costs are lowered for only one industry we have localization economies. If costs are lowered for all firms we have urbanization economies.

Eberts and McMillen (1999) cite two bodies of literature; one that is concerned with the impact of agglomeration on productivity, and one that is concerned with the impact of infrastructure provision on productivity. Analytically these two topics have remained largely distinct, due in part to difficulties in constructing adequate data on public infrastructure at the metropolitan level.

A number of studies have estimated the impact of infrastructure investment on productivity at the national or state levels. (see Gramlich 1994, Holtz-Eakin 1994, Fernald 1999, Rovolis and Spence 2002 for reviews of this literature). Some authors have found positive effects on productivity from public infrastructure provision (e.g. Aschauer 1987, 1988, 1989, 1990, Munnell 1990a, 1990b, Lynde and Richmond 1992, 1993a, 1993b,

In addition to the firm level commercial data we make use of official government data to represent agglomeration. The Annual Business Inquiry (ABI) provides information on the number of jobs by industry for a variety of geographical bases including wards. These data can be used to represent city size and industry scale. The ABI data are the most detailed industrial and geographical economic data available for Britain. These data give the number of employees in employment broken down by the 1992 SIC (defining up to 504 industrial sectors).

The model

The translog production function

We model the effects of agglomeration economies within the framework of a production function. Let the production function for the firm be

$$Y = g(z) f(X), \quad (1)$$

where Y is the output level of the firm, X is a vector of factor inputs with elements X_i ($i = 1, \dots, n$), and $g(z)$ is a vector of influences on production which are Hicks' neutral in nature including those that arise from the firm's 'environment' such as agglomeration economies.

If inputs are rented in competitive markets the first-order conditions for output maximisation subject to an expenditure constraint are

$$\frac{\partial Y}{\partial X} = \lambda W_i, \quad (2)$$

where W_i is the price of the i th input, and λ is a Lagrange multiplier which is the reciprocal of marginal cost "C/Y". The expenditure constraint is given by,

$$\sum_i W_i X_i = C, \quad (3)$$

where C is total cost.

From (2) and (3)

$$\lambda = \frac{\sum_i (\partial Y / \partial X_i) X_i}{C} \quad (4)$$

and substituting (4) back into (2) after rearrangement yields the inverse input demand equations

$$\frac{W_i}{C} = \frac{\partial Y / \partial X_i}{\sum_i (\partial Y / \partial X_i) X_i} \equiv g(X) \quad (8)$$

Note that these inverse input demand functions determine prices as functions of quantities as opposed to ordinary demand functions which determine quantities in terms of prices.

Equation (5) can be written in cost share form (s_i^c) as

$$S_i^C = \frac{W_i X_i}{C} = \frac{\partial \ln Y / \partial \ln X_i}{\sum_i \partial \ln Y / \partial \ln X_i} \quad (6)$$

The production function described in equation (1) can be represented by the translog approximation.

$$\ln Y = \alpha_0 + g(z) + \sum_{i=1}^i \alpha_i \ln X_i + \frac{1}{2} \sum_{i=1}^i \sum_{j=1}^i \gamma_{ij} \ln X_i \ln X_j \quad (7)$$

Given (6) appropriate differentiation of (7) yields the cost share equations.

$$S_i^C = \frac{\alpha_i + \sum_j \gamma_{ij} \ln X_j}{\sum_i \alpha_i + \sum_i \sum_j \gamma_{ij} \ln X_j} \quad (8)$$

The translog parameters can be efficiently estimated by simultaneously estimating (7) and (8) as a nonlinear multivariate regression system.

The specification of agglomeration economies

From the literature review given above we know that previous research has typically used total metropolitan population or employment to provide an empirical measure of city size and total metropolitan employment in some industry i to represent the size of that industry.

Such simple measures of agglomeration are not available for Britain. There are no good sources of data for British metropolitan areas and the aggregate data that do exist are for administrative areas that do not readily correspond to 'cities'. Perhaps more importantly it could be argued that in a small island country such as Britain it is hard to define distinct metropolitan areas. For instance, while Greater Manchester and Liverpool are nominally two separate cities, there is interaction between the two over relatively small distances that arguably prevents them from being truly distinct. Likewise it is conceivable that a firm located outside the London conurbation can still enjoy agglomeration benefits through proximity that arise from the scale of London and its industries. The point is that in a small country like Britain we can legitimately ask where the actual influences from urban centres ends.

For this reason we model agglomeration economies using a measure that incorporate both proximity and the scale of economic activity and that can be calculated for very small areas throughout the country. Specifically, we use ward level employment data to construct a measure of accessibility experienced by each firm in the FAME data.

The density of economic activity, or agglomeration, experienced by any firm in industry o located in ward is given by

$$U_{io} = \frac{E_i}{[\sqrt{(A_i/\pi)}]^{\alpha_o}} + \sum_{j \neq i} (E_j d_{ij}^{-\alpha_o}) \quad (9)$$

where E_i is total employment in ward i , A_i is the area of ward i , E_j is total employment in ward j , and d_{ij} is the distance between i and j . The value of α_o determines the effect of distance on the strength of externalities for each industry o .

Results

The translog estimations are conducted for 20 industry groups consisting of 8 service activities and 12 manufacturing activities. The service activities investigated are.

1. Finance & insurance (SICs 65, 66 and 67)
2. Real estate activities (SIC 70)
3. Computer and related activities (SIC 72)
4. Business and management consultancy activities (SIC 7414)
5. Architecture and engineering activities (SIC 742)
6. Advertising (SIC 744)
7. Labour recruitment and provision of personnel (SIC 745)
8. Motion picture and video activities, radio and television (SICs 921 and 922).

The manufacturing industries are.

1. Manufacture of food products and beverages (SIC 15)
2. Manufacture of textiles, wearing apparel, dyeing and dressing of fur (SICs 17 and 18)
3. Manufacture of wood and wood products (SIC 20)
4. Manufacture of pulp, paper and paper products (SIC 21)
5. Publishing, printing and reproduction of recorded media (SIC 22)
6. Manufacture of chemical and chemical products (SIC 24)
7. Manufacture of rubber and plastic products (SIC 25)
8. Manufacture of basic metals and fabricated metal products (SICs 27 and 28)
9. Manufacture of office machinery and computers (SIC 30)
10. Manufacture of radio, television and communication equipment (SIC 32)
11. Manufacture of medical, precision and optical instruments, watches and clocks (SIC 33)
12. Manufacture of motor vehicles and transport equipment (SICs 34 and 35)

The choice of manufacturing industries has been made largely on the basis of data availability; we have excluded industries for which we have an insufficient number of firms for estimation. For services, we have excluded sectors such as retail, education, health, and public administration which are less interesting from the point of view of agglomeration.

Results for service industries are shown in table 1 below. For brevity we here present only the elasticity results relating to the agglomeration term which we denote β_a . Full translog results can be found in Graham (2005).

Table 1: Estimates of the elasticity of output with respect to agglomeration externalities for service sectors from translog functions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
β_a	0.116**	0.130**	0.072**	0.176**	0.061**	0.101**	0.000*	0.256**
	(0.015)	(0.025)	(0.023)	(0.033)	(0.021)	(0.011)	(0.000)	(0.067)

Standard errors in parentheses

The estimates shown in table 1 indicate strongly that there is a positive association between agglomeration and higher productivity. Estimates range from 0.072 to 0.256. The strongest effects are found in motion picture video & TV activities (8), business and management consultancy services (4), finance and insurance (1), and real estate activities (2). Weaker, but still positive and significant effects are found in advertising (6), computer activities (3), architecture and engineering (5) and labour recruitment (7).

For the manufacturing industries we found that the translog regressions performed poorly. For many sectors samples are relatively small yielding inadequate variance to implement the full translog model, including quadratic and interactive terms. For this reason, we decide to pool the industry data and estimate a Cobb-Douglas equation using dummy variables to distinguish our separate industry groups. We hypothesise that these dummy variables will capture a variety of industry specific differences that give rise to variation in productivity including differences in RTS. We use the Cobb-Douglas form here because for some sectors we have insufficient cost data to estimate the full translog system. The estimating equation is

$$\ln \frac{Y}{L} = \alpha + g(\cdot) + \beta_K \ln \left(\frac{K}{L} \right) + (\beta_K + \beta_L - 1) \ln L + \varepsilon, \quad (10)$$

where in addition to variables already defined D is a matrix of dummy variables that differentiates by industry type, K is capital input and L is labour input.

Results are presented in table 2 below.

Table 2: Cobb-Douglas estimates for manufacturing firms with a single accessibility measure of agglomeration.

<i>SIC15</i>	3.960**	(0.360)
<i>SIC1718</i>	3.636**	(0.367)
<i>SIC20</i>	3.825**	(0.363)
<i>SIC21</i>	3.552**	(0.365)
<i>SIC22</i>	3.549**	(0.370)
<i>SIC24</i>	3.719**	(0.365)
<i>SIC25</i>	3.511**	(0.365)
<i>SIC2728</i>	3.511**	(0.361)
<i>SIC30</i>	3.627**	(0.367)
<i>SIC32</i>	3.662**	(0.367)
<i>SIC33</i>	3.409**	(0.364)
<i>SIC3435</i>	3.734**	(0.363)
β_k	0.608**	(0.011)
$(\beta_k + \beta_L - 1)$	-0.005	(0.011)
β_E	0.094**	(0.027)
R_2	0.581	
n	2331	

Standard errors in parentheses

The dummy variables for industry group are all significant at 1% confirming the need to differentiate the data in this way. The estimate of $(\beta_k + \beta_L - 1)$ is statistically insignificant indicating that we cannot reject the hypothesis that there are CRS. Thus, the elasticity of output with respect to capital is 0.608 and the elasticity of output with respect to labour is 0.392. The coefficient associated with the accessibility agglomeration variable is positive and significant at the 1% level. Across our sample, holding factor inputs and industry specific effects constant, we find that a 10% increase in the effective density of jobs available to the firm is associated with a 0.94% increase in productivity. Thus, even for the manufacturing sectors, using a single accessibility measure, we find evidence of agglomeration or density externalities.

We have seen from estimates based on our single accessibility measures that there appear to be positive agglomeration, or density, externalities for service sector and manufacturing firms. One important issue is that we have not able to control for the particular function of firms or for the skill characteristics of the labour inputs of firms. We have classified our firms according to the SIC, but yet we know that data classified by industry may not contain homogenous activities. Firms differ in the functions they perform, even within the same detailed SIC, and there is evidence to show that this 'functional specialisation' is related to city size. For instance, Duranton and Puga (forthcoming), show that while the largest cities tend to specialise in functions related to business services and management, smaller cities tend to specialise in production based activities. Rice and Venables (2004), analysing earnings in relation to productivity at the NUTS3 level, find that

occupational structure is positively correlated with productivity and therefore that areas with higher productivity also tend to have employment structures in high paying occupations².

Therefore, it is legitimate to ask whether we have identified real productivity differences between homogenous firms due to agglomeration externalities, or whether instead we have found a kind of 'functional gradient' with firms in the most urbanised locations performing different and more productive types of activities. This is, however, a very difficult question to address empirically. We do not have information on the functions our firms perform or on the occupational structure of their workforces. What we do know is that if there is a 'functional gradient' it is likely to be at a maximum in London. It may therefore be informative to extract London firms from our sample and see how estimates change with London excluded.

Tables 3 and 4 show results for service and manufacturing firms, excluding those with a London location based on the single accessibility measure of agglomeration (equation 9).

Table 3: Estimates of the elasticity of output with respect to agglomeration externalities for service sector firms outside London from translog functions with a single accessibility measure of agglomeration.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
β_a	0.284**	0.136*	0.094**	0.252**	0.094**	0.274**	0.047	0.261
	(0.469)	(0.059)	(0.036)	(0.062)	(0.040)	(0.070)	(0.121)	(0.181)

Standard errors in parentheses

For six of our eight service sectors we are still able to identify a positive density externality in the data having excluded London from the sample. Furthermore, for each of these industries we find that we actually obtain higher estimates using the sample that excludes London.

Table 4 presents the estimates for manufacturing firms based outside London

² Rice and Venables (2004) go on to analyse relationships between proximity to economic mass and the productivity and occupational components of variation in average earnings. Interestingly they find a robust relationship between productivity and proximity to economic mass but not between occupational composition and proximity to economic mass.

Table 4: Cobb-Douglas estimates for manufacturing firms outside London with a single accessibility measure of agglomeration.

SIC15	3.870**	(0.560)
SIC1718	3.426 **	(0.570)
SIC20	3.690 **	(0.563)
SIC21	3.422 **	(0.569)
SIC22	3.448 **	(0.566)
SIC24	3.605 **	(0.568)
SIC25	3.458 **	(0.569)
SIC2728	3.385 **	(0.568)
SIC30	3.478 **	(0.569)
SIC32	3.544 **	(0.570)
SIC33	3.405 **	(0.568)
SIC3435	3.599 **	(0.568)
β_k	0.608 **	(0.011)
$(\beta_k + \beta_l - 1)$	-0.017	(0.010)
β_a	0.099**	(0.041)
R_2	0.632	
n	1986	

Standard errors in parentheses

The estimate of the elasticity of output with respect our accessibility index is almost identical for manufacturing firms using either the sample including or excluding London, approximately 0.1. Thus, for manufacturing firms outside London we still find evidence of positive agglomeration or density externalities.

Of most interest from the results given above is that for some service sectors we find the magnitude of the agglomeration estimates to be consistently higher when London is excluded. For Advertising (744) and finance and insurance (SICs 65 to 67) the estimates are over two times as large with London firms excluded. Similarly, real estate activities (SIC 70), computer services (SIC 72), architecture and engineering (SIC 742), and business and management consultancy services (SIC 7414) all have higher estimates based on the sample that excludes London firms.

Why might we find these increases in the magnitude of estimates when using samples that excludes London firms?

One possible explanation could relate to the sort of decomposition that Venables and Rice (2004) make regarding productivity and occupation. If it is the case that the occupational (rather than productivity) contribution to wages is particularly high in London, and that elsewhere in the country productivity plays a larger role, then the exclusion of London could lead to a more pronounced productivity-proximity relationship. This is because the exclusion of London firms reduces the 'explanation' for productivity differences that are based on occupational mix.

A second more straightforward possibility for the increased magnitude of effective density estimates in the sample excluding London is the existence of some diseconomies of city size in the capital. We know, for instance, that congestion is much worse in London than in other British towns and cities and this could impact upon the efficiency of firms. In particular, the effect of congestion is such that it increases the generalised cost of travelling some distance. This means that our measure of effective density, which is based on distance and not generalised cost, in reality, contains measurement error because it does not account for congestion. Distance travelled in London costs more than in other cities or towns of the UK. Thus, it is possible that we are overestimating the effective density of high density locations by not accounting for the fact that their transport networks are often more congested. As a result the elasticities may be biased downwards when London is included.

The third possibility is simply that diminishing returns to density set in at some stage such that on the margin the effect of productivity by increasing density is lower in London than elsewhere.

It is hard to reach any firm conclusions comparing estimates obtained using the full sample of firms to those based on data that excludes London firms. The evidence is mixed and in many cases the substantial drop in the number of observations poses problems in drawing any meaningful comparisons between the two samples. What we can say, however, is that for many of our sectors positive density externalities can still be identified when London is excluded and that there does therefore appear to be a strong productivity-density gradient for the rest of the country.

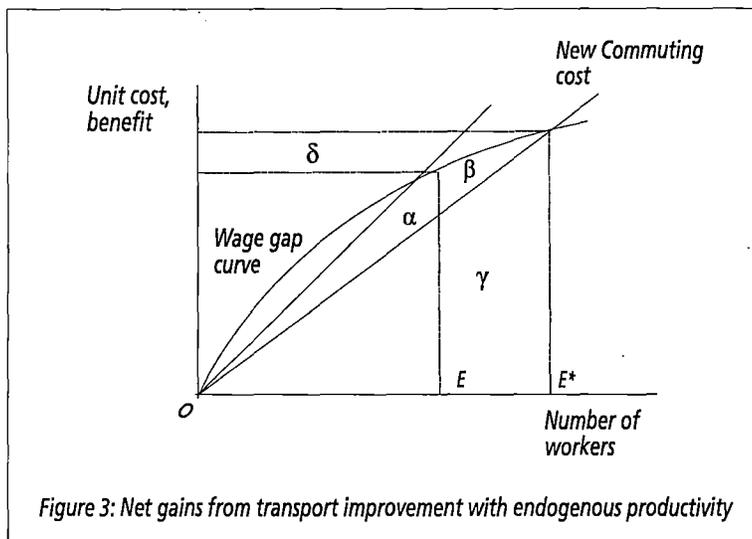
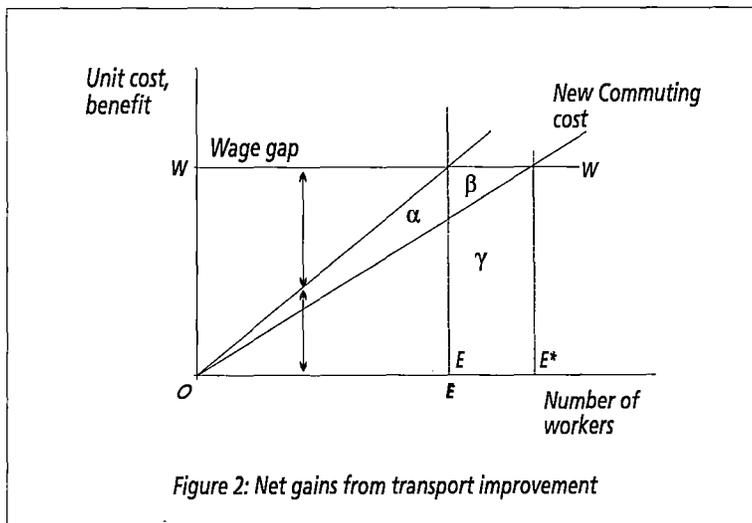
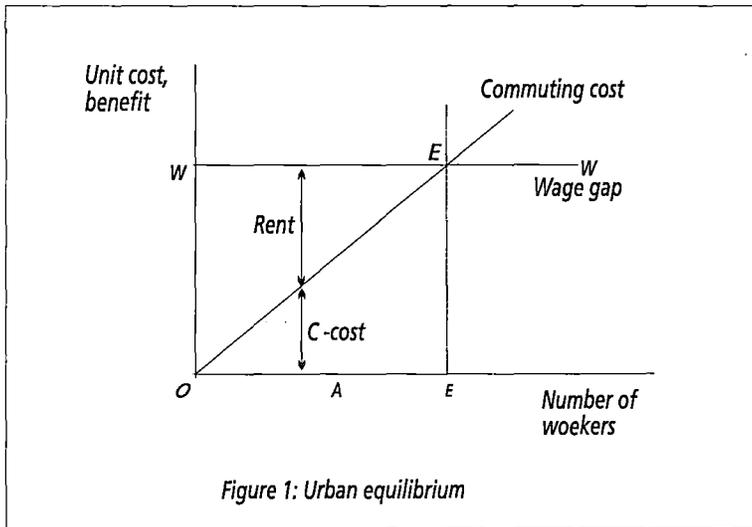
Conclusions

In this paper we have estimated the effects of 'city size' on productivity for different sectors of the UK economy. Our specification of 'city size' is based on a measure of accessibility which recognises the importance of both the scale and proximity of economic activity. It is a measure that contains an implicit transport dimension by capturing the effective density that is available to firms. Our results provide compelling evidence of a strong association between our measure of city size and productivity for both service and manufacturing sectors of the UK economy. Thus, if transport investment increases the effective density of locations there could be an effect on productivity which can be quantified for economic appraisal in the way suggested by Venables (2003).

On the other hand, our results also indicate that there may be a gradient of functional specialisation at work in creating productivity differentials and that this gradient may be correlated with city size. If so, we have to caution a simplistic view which would imagine productivity differences amongst homogenous activities distributed across the urban hierarchy with those in the largest cities being the most efficient. Unfortunately, the limitations of the SIC do not allow us to analyse this issue in great depth. What we can say, is that even if the productivity differences are based on functional specialisation, we may still expect external benefits from transport improvements if they assist the process of functional.

For nations in the process of rapid urbanization one implication is that urban growth may offer opportunities to capture the benefits of externalities in the form of productivity gains. Transport investments can help to foster the conditions for city size to make an impact on the efficiency of firms. Understanding the relationships between city size, transport improvements and productivity can also be helpful in making the economic case for transport investment.

Annex:

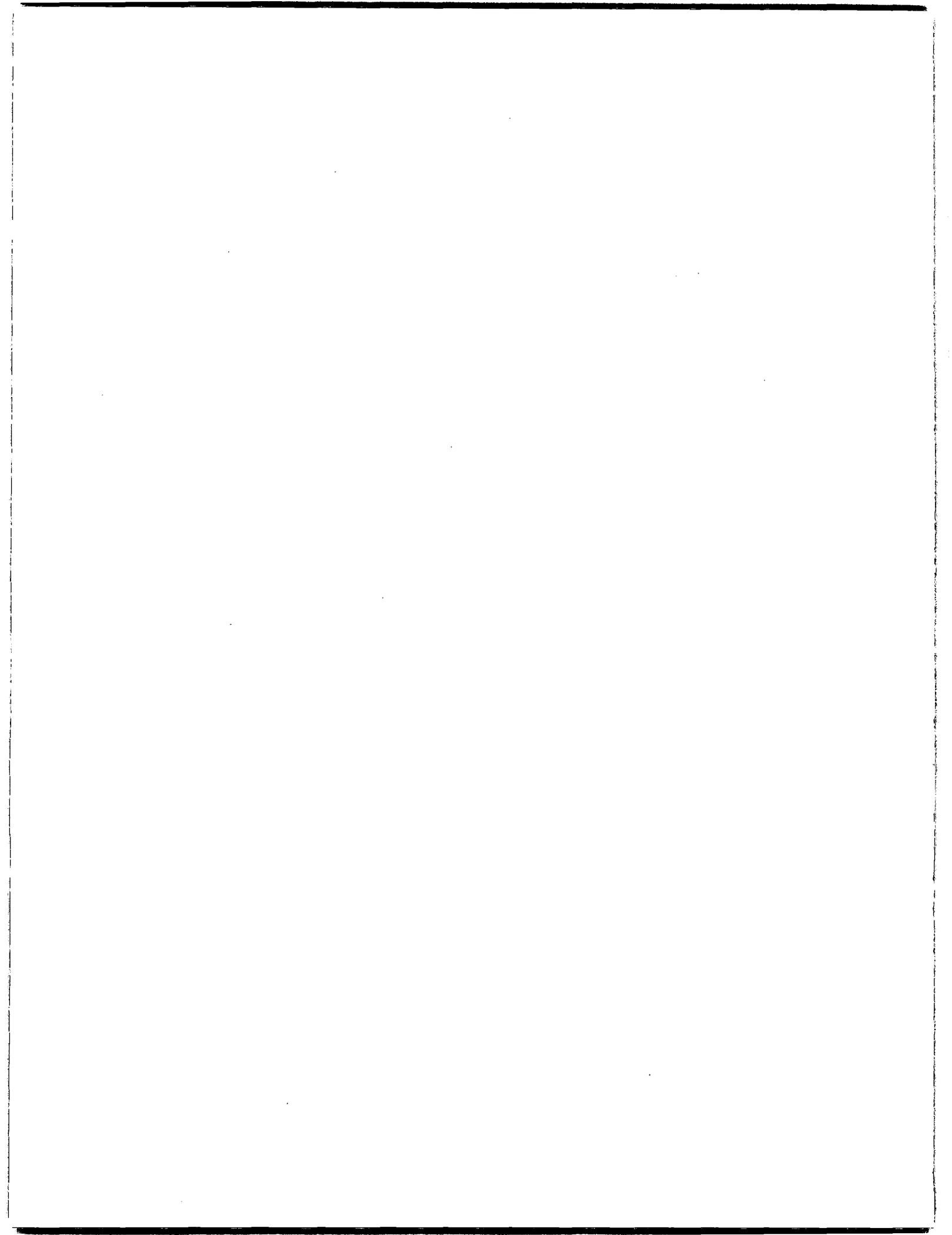


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IMPACT OF TRANSPORT INFRASTRUCTURE & SERVICES ON URBAN POVERTY AND LAND DEVELOPMENT: A CASE STUDY - COLOMBO, SRI LANKA

*Amal S. Kumarage**

Abstract

Colombo is a relatively small city with a resident population of 700,000 with a day time inflow of a million persons. Its area is 3,730 hectares. The Colombo Metropolitan Region (CMR) which serves as the suburban feeder area for Colombo city has a population of over 4.6 million with a gross population density of 13 persons per hectare. In the City of Colombo the density is 188 persons per hectare.

The land use distribution in City of Colombo shows that residential use takes up 40%, of the available land, while transport & communications takes up 13%, with a further 30% presently developed for commercial and administrative purposes, with around 17% land bare or still under non-urban use. The residential densities within the city range from between 165 to 1,537 persons per hectare. The highest densities are accompanied by concentrations of people living in illegal squatter settlements that are badly over crowded with respect to facilities available within them. These have however become popular forms of settlements for the poor in the absence of affordable public or private sector housing programs. It is estimated that at present about 35% of the city's population lives in these settlements, which have semi permanent houses, shared toilets and poor sanitation conditions. This shortage of housing for the poorest sections of the city is commonly attributed to economic indicators particularly affordability to the low income consumer to purchase or rent, scarcity of land and high land prices and high construction costs.

The paper examines a factor that is usually overlooked -, i.e. transport -and how inappropriate transport facilities contribute to the demand for these central-city informal settlements rather than those of suburban areas where better services are available. The paper is based on two sources of data and their respective analysis. In the first instance, the paper examines briefly the development of the form of the city and the growth in commuter traffic. It traces the legacy of urbanization dating back to the 16th century centered on the development of the Port of Colombo under Portuguese occupation. Under British occupation in 1871, the City had an extent of 2,449 hectares with a population of 98,847 persons. The density doubled by 1931 by which time the city had grown to 3,368 hectares with a population of 284,155, largely due to annexation of surrounding areas. This density doubled by 1981, by which time the land area had reached a near maximum of 3,711 hectares. The most recent land-use strategic plan has proposed to reduce the extent of residential land use from 1,401 hectares to 691 hectares by 2010 to provide for more commercial development

At the same time, traffic flows crossing the city boundary increased at the rate of 2.8% per annum during the period 1961 to 1979. However it has increased at a much higher rate of 5.4% per annum over the last two decades. The passenger growth observed during the period 1985-95 was 4.7%, with bus transport growth at

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4%, private vehicles growing at 11.8% and railways at 2.8%. It analyses the fact that these growth rates are inversely proportional to the cost of travel. In other words, the cheapest forms have had the lowest growth. In all, there are presently an estimated 2 million passenger crossings (both directions) per day in 315,504 vehicles of which 80% are private vehicles.

The second source of data is from a survey of the reasons why the poor continue to live in these illegal squatter settlements. The ability to access work is given as a major reason for putting up with such an environment. The paper also compares the quality of life of people who are engaged in the same occupation but live within and outside the city. The comparison is based on the relative costs of transport, time of travel, availability of late night travel and social parameters such as type of housing, status of children's education, etc. The survey also investigates the impact of transport provision as a means of livelihood of the urban poor. This is particularly significant with respect to three-wheeler (auto-taxi) drivers who are residents in these settlements and prefer to live close to the city centre which is a focal point of their work and cannot drive their vehicles long distances for the night.

It is estimated that around 25,000 to 30,000 new houses would be required to house these low income families. The land that is presently occupied by these settlements can be used partially for this purpose. However, most resettlements would have to take place outside the city. The land values in Colombo City during the period 1985 to 1998 have increased at the rate of 16.5% per annum (p.a.) in nominal terms and adjusted for inflation this is approximately 5% p.a. while that of the suburban areas in the ranges of between 10 to 20 kms from the centre has also increased by around 18% p.a. so that the real increase adjusted for inflation is around 6.5% p.a. This makes purchase of land nearly impossible for poor people. The alternative areas for relocation identified as Kesbewa, Maharagama, Kaduwela, Gampaha and Panadura, which are all suburban centers, are located at distances of between 20 to 30 kms from the city centre. The relocation of the poor to these locations will make accessing jobs in the city more difficult for them. It is most unlikely that they will move since it adversely affects their livelihood.

The survey by tracing the location of work, alternative housing locations, access and cost of transport etc finds that land prices in suburban areas which are alternative locations for the urban poor to be relocated are usually away from the main transport corridors and are presently poorly served by public transport. The irregular hours that the poor work are not conducive to public transport which usually operates well only during peak periods. Thus, the costs of reaching these alternative areas are high and hence, the need to reside in the city. This increases the value of land and also overcrowding in settlement areas which are the only such affordable lands for the poor.

In addition this puts pressure on services in urban areas and results in the poor not having adequate equal access to these services, which are more freely available in suburban areas. For example, the city has the most popular schools, but the ones attended by the children of the poor are neglected when compared to similar schools in suburban areas. Similarly, incidences of health and safety are higher; the involvement in crime and other related activities is also higher in these squatter settlements.

The research concludes that developing transport infrastructure and services to enable the poor to access employment available within the city is an important aspect of dealing with the quality of life of the urban poor. It also establishes a link between transport development and land development especially with respect to prices and affordability of urban housing. In order to ensure that the quality of life of the poor is improved,

the paper proceeds to give a checklist of questions that should be considered in the development of a city which will address the transport related problems faced by the low income households. Furthermore the paper concludes with options for integrating transport as a means of land development in urban centers taking Colombo as a case study.

Introduction

The City of Colombo serves as the 'Primate City' in modern Sri Lanka. Colombo and its metropolitan area—referred to as the Colombo Metropolitan Region (CMR)—fall within the Western Province, which is the most densely populated and economically active region within the country Table 1. Transportation activity within this region is also the densest in Sri Lanka.

Table 1: Summary of Vital Statistics of Colombo Metropolitan Region

	CMR	Sri Lanka	Percentage (%)
Land Area (sq. km.)	3,593	62,705	5.8
Population (2001- Mn)	5,361	18,732	28.6
GDP (1994 – Rs. Mn) ¹	22,582	51,227	44.1
Vehicle Licenses (2001)	456,164	955,238	47.7
Sea Freight (2001) TEU	1,726,605	N/A	
Air Traffic (Pax. Movements-2001)	2,916,407	2,916,407	100.0

History: From ancient times, Sri Lanka has been largely an agricultural economy. In recent history, particularly under colonial rule, the development of the Port of Colombo and the availability of suitable human resources led to the majority of industries locating within one hour travel distance from the port. The growth of industries and the development of Colombo as the administrative capital and primary commercial center of the country have formed the basis of the physical expansion of Colombo and its environs.

The legacy of urbanization dating back to the 16th century centered on the development of the Port of Colombo under Portuguese occupation. Under British occupation in 1871, the City had an extent of 2,449 hectares with a population of 98,847 persons. The density doubled by 1931 by which time the city grew to 3,368 hectares with population growing to 284,155 largely due to annexation of surrounding areas. This density doubled by 1981, by which time the land area had reached a near maximum of 3,711 hectares. The most recent land use strategic plan has proposed to reduce the extent of residential land use from 1,401 hectares to 691 hectares by 2010 in order to provide for more commercial development (UDA, 1998).

Geographic: Colombo is a relatively small city with a resident population of around 700,000 with a day time inflow of a million persons. Its area is 3,730 hectares. The Colombo Metropolitan Region (CMR) which serves as the suburban feeder area for Colombo city has a population of over 5.3 million with a gross population density of 15 persons per hectare. In the City of Colombo itself the density is 188 persons per hectare.

¹ In 1994, 1 US \$ was Rs 60, while it is Rs 100 in 2005.

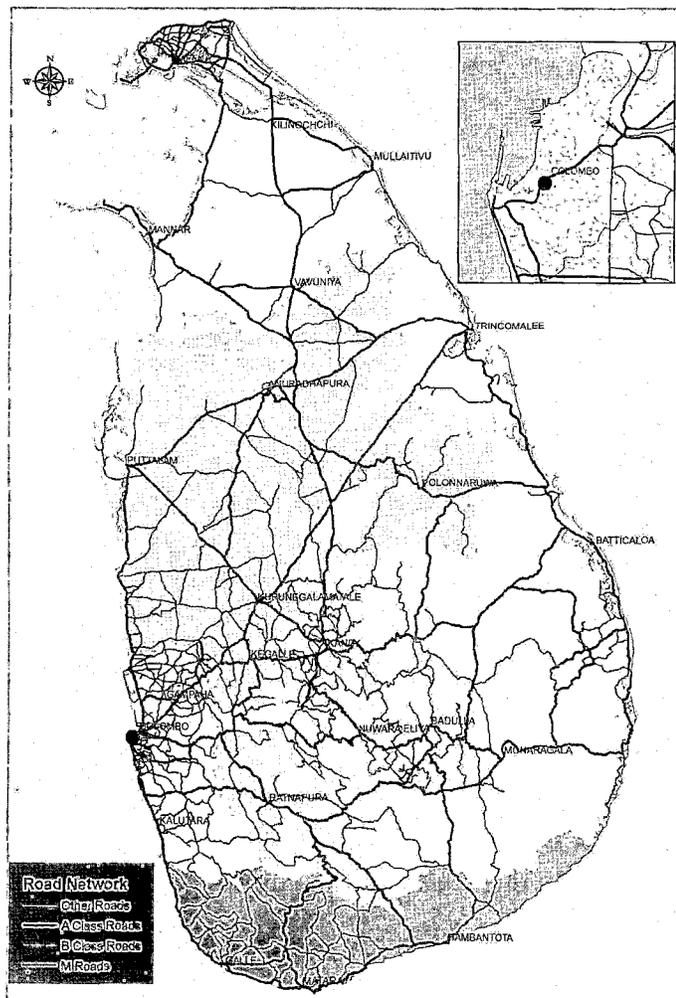
Table 2: Population (2001)

Area	Population 2001
Colombo Municipal Area	697,396
Colombo District	2,234,289
Colombo Metropolitan Region	5,361,185
Sri Lanka	18,732,255

Demographic: The land use distribution in City of Colombo shows that residential use takes up 40% of the available land, while transport & communications takes up 13%, with a further 30% presently developed for commercial and administrative purposes, with around 17% land bare or still under non-urban use. The residential densities within the city range from between 165 to 1,537 persons per hectare (UDA, 1998). The highest densities are accompanied by concentrations of people living in illegal squatter settlements that are badly over crowded with respect to facilities available within them. These have, however, become popular forms of settlements for the poor in the absence of affordable public or private sector housing programs. It is estimated that at present about 35% of the city's population lives in these settlements, which have semi permanent houses, shared toilets and poor sanitation conditions. This shortage of housing for the poorest sections of the city is commonly

attributed to economic indicators particularly affordability to the low income consumer to purchase or rent, scarcity of land and high land prices and high construction costs.

Figure 1: Sri Lanka



Transport: During the period 1961 to 1979, the traffic flows crossing the city boundary increased at the rate of 2.8% per annum. However it has increased at a much higher rate of 5.4% per annum over the last two decades. The passenger growth observed during the period 1985-95 was 4.7%, with bus transport growth at 4%, private vehicles growing at 11.8% and railways at 2.8%. It analyses the fact that these growth rates are inversely proportional to the cost of travel. In other words, the cheapest forms have had the lowest growth. In all, there are presently an estimated 2 million passenger crossings (both directions) per day in 315,504 vehicles of which 80% are private vehicles (Kumarage, 2000). The desire lines which indicate the direction, distance and volume of flow arriving at the centre, for the commuting trips to Colombo City can be illustrated as in Figure 2. This shows that commuting trips are rather short distances, with a few exceptions, where low cost railway travel is available.

Housing: It is estimated that around 25,000 to 30,000 new houses would be required to house these low income families adequately. The land that is presently occupied by these settlements can be used partially for this purpose. However, most resettlements would have to take place outside the city. The land values in Colombo City during the period 1985 to 1998 have increased at the rate of 16.5% per annum (p.a.) in nominal terms and adjusted for inflation this is approximately 5% p.a. (UDA, 1998) while that of the suburban areas has also increased by around 18% p.a where the real rate was around 6.5% p.a. This makes purchase of land nearly impossible for poor people. The alternative areas for relocation are located at distances between 20 to 30 kms from the city centre. The relocation of the poor to these locations will make accessing jobs in the city more difficult for them. It is most unlikely that they will move since it adversely affects their livelihood.

Income: Income Distribution for the Western Province, as calculated from the Sri Lanka Integrated Study (1999/2000) data, is given in Table 3. This reinforces the position that two-thirds of the population is not engaged in income receiving occupations. It seems that a significant proportion of income receiving (34%) fall within the lower half of income range of up to Rs 3,000/= per month (US\$ 430), while 11% falls in the income range of over Rs. 10,000/= (US\$ 1,430) per month.

Figure 2: Commuting Desire Lines by Public Transport to City of Colombo



Table 3: Income Distribution (1999/2000)²

Income Range	Western Province	Sri Lanka
Not employed/student/sick	66.1	64.9
Up to Rs 1,000/=	1.0	4.3
Rs 1,001 to Rs 2,000/=	4.2	6.2
Rs 2,001 to Rs 3,000/=	6.4	7.2
Rs 3,001 to Rs 5,000/=	9.8	8.6
Rs 5,001 to Rs 10,000/=	8.9	6.2
Rs 10,001 to Rs 25,000/=	2.4	1.8
More than Rs. 25,000/=	1.2	0.7
Total	100.0	100.0

² In 1999/2000, the average conversion rate was 1 US \$ = 70 Rs.

Objective & Scope of Paper

The Sri Lanka Transport Sector Strategy Study (World Bank, 1997) notes that poverty alleviation requires a transport policy that is focused on the poor. The lack of such a policy and of relevant information has made it difficult to analyze how the transport sector is serving and helping the poor. It has been assumed that the mobility needs of the poor could be resolved by improving transport networks and public transport services in both rural and urban areas.

Policies should address, among other things, the best ways to provide adequate and affordable access for the poor to get to work, particularly in rural and marginal urban areas, opportunities for generating employment through the transport sector, and the strategic use of transport to reduce regional disparities. There are no studies where the transport needs of the poor have been studied specifically.

This paper examines the relationship between employment of the low income earners, their places of residence, and the transport linkages that are made available.

Analysis of Income and Transport in Western Province

This analysis is undertaken from aggregate socioeconomic data collected through Census and other household surveys and published from time to time. This data is not available for the City of Colombo. It does however exist for the Western Province. The objective of this analysis is to identify the patterns of (a) expenditure on transport and (b) of income of those living in the Western Province.

Individual Income and Distance of Travel to Work

Data from the Sri Lanka Integrated Survey (1999/2000) have been used to analyze the relationship between place of work and place of residence. Table 4 shows results for the Western Province (WP) compared to the rest of the country where over half of people working, do so within their own community. This could be interpreted in several ways. First, it might suggest that population is so distributed that the majority of the employment opportunities are located outside the communities they live in. Second, it might suggest a higher mobility for finding employment outside the local community, due to existence of acceptable transport services.

Table 4: Relationship between Place of Work and Place of Residence

	Western Province	Sri Lanka
Same Community	51.2	66.0
Other Urban Community	37.3	23.9
Other Rural Community	0.6	0.8
Other	10.9	9.3
Total	100.0	100.0

Table 5 gives the cross-relationship between income and place of work/place of residence for the Western Province. These two tables show that there is a direct correlation between individual incomes and the propensity to seek employment in other communities. This is an interesting phenomenon that could be due to the fact:

- (a) That those who are able to commute outside their communities can get better incomes.
- (b) That those who have higher incomes tend to seek employment away from their own communities.

Table 5: Individual Income and Place of Work with Respect to Place of Residence – WP

	Same Community	Other Urban Community	Other Rural Community	Other ¹⁹
Not employed/student/sick	71.4	7.1	0	21.4
Rs 0 to Rs 1,000/=	76.2	9.5	4.8	9.5
Rs 1,001 to Rs 2,000/=	56.6	31.3	0	12.0
Rs 2,001 to Rs. 3,000/=	51.2	40.0	0	8.8
Rs 3,001 to Rs 5,000/=	44.9	45.9	0.5	8.7
Rs 5,001 to Rs 10,000/=	38.9	53.3	1.7	6.1
Rs 10,001 to Rs 25,000/=	54.2	35.4	0	10.4
More than Rs. 25,000/=	48.0	36.0	0	16.0
Total	50.6	38.3	0.6	10.4

In the case of (a) it relates to the availability and affordability of transport. This implies that poor transport will make people immobile and captive to their own communities, thus preventing them from accessing and holding employment that is higher paying. Both Tables 4 and 5 indicate that only those with incomes less than 1000/= per month appear to show a marked difference to other income categories with respect to the percentage of persons working within the same community. The amount of income that falls within this category in all probability refers to part time employment which cannot be compared with the full time employment as the commuting distances would be very much less in the case of the former.

In the case of (b) above, it is a known social factor that higher paid employment is generally concentrated in centers (usually urban) and thus the average commuting distances would increase as people seek higher paying employment. This argument also can be used to explain why the percentage working in other urban areas increases with income and then begins to decrease when monthly incomes increase beyond Rs. 10,000/=. This could possibly mean that relocation becomes more affordable when incomes are in that magnitude. The reverse inference of this observation is that when incomes are less than Rs 10,000/= per month, people are more likely to be constrained by the availability of transport facilities in seeking employment away from their community of residence.

A comparison of the two tables indicates that in the Western Province, there is higher mobility between residence and employment communities for the same income groups. This means that people have to commute further as residential and employment areas tend to be more separated in urban and suburban areas.

Occupation and Travel to Work

Table 7 gives the cross-relationship between type of occupation and place of work/place of residence for the Western Province. There is relatively little mobility among those engaged in agriculture, as many people in this category are farming their own land or fishing, both activities generally being located close to residences.

Those in business, trade, and manufacturing activities also appear to be, in general, residing close to their places of employment - for example, family-based businesses where home and shop or home and trade are located within the same premises. On the other hand, casual labour shows a somewhat higher propensity to seek employment in urban centers. These might be persons who are engaged in construction or similar work and who might not actually be commuting on a daily basis - more because of distance than transport fare. Salaried employees mostly travel outside their communities to urban communities for employment and show the highest degree of mobility.

Table 7: Type of Occupation and Place of Work with Respect to Place of Residence - WP

	Same Community	Other Urban Community	Other Rural Community	Other
Casual Labour	55.1	23.2	1.7	19.8
Salaried Employees	29.3	63.4	0.3	7.0
Business/Trade/Manufacturing	76.1	15.0	0.0	8.8
Personal Services	50.0	6.3	0.0	43.8
Agricultural	92.8	6.3	0.0	0.9

Income and Ownership of Vehicles

Ownership of all types of vehicles in Western Province increases with income, as shown in Table 8. All income groups own bicycles in significant numbers and bicycles are the most common vehicle owned. Motorcycles are also used by all income groups, although their ownership levels become significant only when household incomes rise above Rs 5,000 per month. In the case of cars and vans, ownership is recorded even at low-income levels, but becomes significant only when household incomes reach Rs 25,000 or more.

Table 8: Vehicle Ownership per 100 Households by Income (Rs/month) - WP

	0- 1000	1001- 2000	2001- 3000	3001- 5000	5001- 10000	10001- 25000	Over 25000	Total
Bicycles	34	15	17	28	38	41	34	33
Motor Cycles	07	04	02	14	11	24	21	14
Cars & Vans	00	01	02	01	04	15	52	09

Percentage of Income Spent on Transport

The analysis of expenditure on public transport as a percent of expenditure on transport incurred by three different income groups is given in Table 9. This clearly confirms the earlier trend but also provides information that the income group with less than Rs 3,500/= for monthly incomes are clearly captive to public transport, while this figure falls to around 50% to 60% percent of households when incomes are between Rs 3,500/= to Rs 10,000/=.

Analysis of the Travel Patterns of the Working Poor in Colombo City

The second source of data is from a survey of those identified as the working poor that studies the ability to access work and their residential features such as distance and type of house. The paper also compares the potential to work with the commuting distances. The comparison is based on the relative costs of transport, time of travel, availability of late night travel and social parameters such as type of housing, status of children's education, etc. The survey also investigates the impact on those employed in transport services. The results are particularly significant with respect to three-wheeler (auto-taxi) drivers who are resident in urban settlements and prefer to live close to the city centre which is a focal point of their work and cannot drive their vehicles long distances for the night. They are different for bus crews who usually live a fair distance away from the city centre as they can ride their own bus home for the night.

Survey: A total of 164 personal interviews were made of people who were working within the Colombo Municipal City Limits. The questionnaire used for these surveys is given in Annex 1. The survey included location of employment and residence, mode(s) of travel, travel cost and time by each mode, nature of employment, work hours, nature of residence, if transport curtails longer work hours, monthly expenditure, income and household vehicle ownership.

The breakdown by employment type is given as follows:

- Security Guards: Mostly earning the minimum legal monthly pay often working double shifts
- Parking Wardens: Mostly permanent employees of local government
- Cleaning Personnel: Government and private sector contracted staff
- Labourers: Working on daily wage basis
- Traders at Wayside Stalls: Working in fixed areas but self employed.

These five groups represent the lowest earning employees in the city. In addition two other groups representing transport-sector workers were also interviewed. These are identified as:

- Three Wheeler Drivers: Mostly self-employed auto-rickshaws drivers
- Bus Crews: Crews mostly working on daily pay basis for buses owned by private individuals.

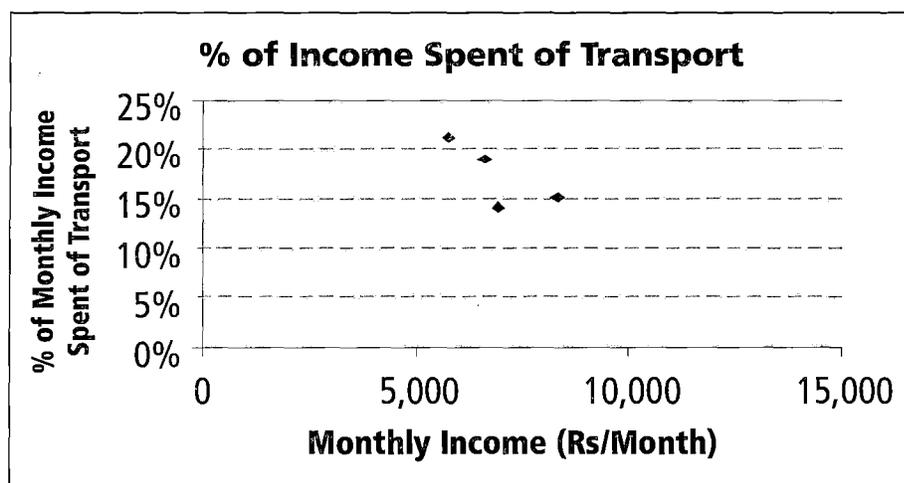
Distance of Travel & Generalised Cost

The mean travel distance and the Generalised Cost of Travel by each group of employees are given in Table 11. The distance is taken as the minimum road based distance for travel computed by the TransPlan traffic model (University of Moratuwa, 2003). Generalised Cost is computed to represent in addition to the fare or cost of transport, the cost of time, which is calculated at 20% of the income rate. The income rate is calculated by dividing the monthly income stated in the survey form and dividing by the total working hours reported for the month.

Table 11: Travel Characteristics of Employees

	General Employment					Transport Sector Employment	
	Security Guards	Parking Attendants	Cleaning Personnel	Labourers	Wayside Traders	3 Wheeler Drivers	Bus Crew
Distance to Work place (km)	7.3	9.2	12.6	8.1	8.6	7.9	14.1
Cost of Travel (Rs/one-way)	10.3	10.5	9.3	11.2	9.1	35.1	4.0
Travel Time (mts/one way)	46.3	52.1	40.9	42.0	33.4	31.1	38.5
Total Generalised Cost/day	31.3	31.2	24.4	30.4	19.0	85.2	18.1
Monthly Income Rs/Month	8,318	6,584	6,914	5,750	10,111	10,285	12,384
% of Income for Transport	15.1%	9.0%	14.1%	21.1%	7.5%	33.1%	5.8%

It is seen from Table 11 that average travel distances between different employment categories vary between 7.3 kms and 14.1 kms. The travel time varies between 31 minutes and 52 minutes. The travel cost varies between Rs 4.00 for bus crews- who travel for free along with the bus most of the distance and a high of Rs 85.2 for three wheeler operators who have to ride their vehicles to the place of operation. Apart from these extremes demonstrated in the transport sector employment, other employment demonstrates fairly uniform costs and travel times.

Figure 3: Variation of % of Income Spent on Commuting to Work and Income

Interestingly, however, the relationship between expenditure for transport as a percentage of total income appears to have an inverse relationship with income. As indicated in Table 11, the lowest average income earners who are labourers spend 21.1% of their incomes on generalized costs for travel, while the highest income earners who are the wayside traders spend only 7.5% of their incomes on transport. Figure 3 shows

this relationship where the lower the average income, the higher is the percentage of their income that is spent on transport. While the bus was the predominate mode of travel for all categories, the higher income earners spent less time to travel to the same distances as they tended to live closer to the main bus routes and the travel times were less. This is intuitively plausible since the higher income groups could afford to live in lands closer to the main roads. Thus the distance from the main bus routes appear to be the primary reason for increase in total travel costs.

Land Ownership, Land Prices & Distance to Work

The survey by tracing the location of work, alternative housing locations, access and cost of transport etc finds that land prices in suburban areas which are alternative locations for the urban poor to be relocated are usually away from the main transport corridors and are presently poorly served by public transport. The irregular hours that the poor work are not conducive to public transport which usually operates well only during peak periods. The costs of travel to these alternative sites are high - hence, the need to reside in the city. This increases the value of land and also overcrowding in settlement areas which are the only such affordable lands for the poor.

In addition this puts pressure on services in urban areas and results in the poor not having adequate equal access to these services which are more freely available in suburban areas. For example, the city has the most popular schools, but the ones attended by the children of the poor are neglected when compared to similar schools in suburban areas. Similarly, the incidence of health and safety problems is higher, as is that for crime and other related activities in these squatter settlements.

The house & land ownership of the residences occupied by the interviewees is given in Table 12. It is seen that only 22% of the people were on rented land. While 42.1% stated that they were occupying legally owned land, 26.8% stated it was government land. The latter are to be considered mostly as squatters on state lands, usually marginal lands in the periphery of the city. The fact that nearly 70% of the people claimed a fixed abode makes them less mobile to seek accommodations closer to their places of residence. This also adds to increased commuting distances and increased transport costs.

Table 12: Breakdown of Land & House Ownership

	Percentage
Own Land	42.1%
Government	26.8%
Rented House & Property	22.0%
Other	9.1%

This is further reinforced by the evidence that percentage of those who own their own house and property decreases as the distances between residence and work place decreases. This is shown in Table 13, which shows that only 31% of those living within 5 kms from their places of employment occupy their own houses. This increases sharply to 64.5% when the distance increases to over 10 kms.

Table 13: Percentage of Employees who live in Own house & Property with respect to Distance from Work Place

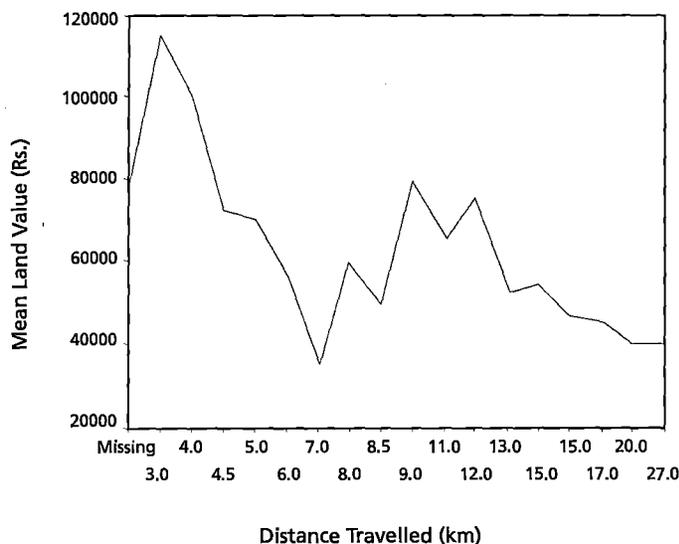
	Percentage
Less than 5 kms	31.0%
5 to 10 kms	50.0%
Over 10 kms	64.5%

However, the quality of housing appears to fall when employees get closer to their workplaces- i.e. to the centre of the city. As shown in Table 14, those living less than 5 kms from their work places do so in Housing Settlements which have only shared amenities, as opposed to Separate House & Property or Flats (Apartments). Thus it is clear that while going further away from the city centre has an added advantage, as the quality of housing that can be afforded improves.

Table 14: Percentage of Employees who live in Settlements with respect to Distance from Work Place

	Percentage
Less than 5 kms	31.0%
5 to 10 kms	11.1%
Over 10 kms	6.5%

The value of land as perceived by most of the interviewees appears to be quite suspect as they seem to have no clear idea of the market value of land. Even those who stated they lived on own land had a poor idea of the actual value. This could also be due to the fact that most of the land which was considered as 'own' is also encroached and not legally owned. Hence the value of exchange of such land is only a fraction of the market price. Moreover, these lands most often located on marginal land used areas such as on canal banks, marshy areas prone to stagnating water or flooding, under developed localities etc have a depressed market value compared to the better developed and sought after land at equal distance from the city centre.

Figure 4: Land Value and Commuting Distance

However Figure 4, clearly shows that even the perceived land value has a correlation with the distance from the centre. It also shows the lower land value in the city centre itself, which due to the commercial and wholesale trade environment has lower market prices. The highest prices are distances between 2 to 4 kms from the city centre. According to Figure 4, the value of land drops to about 1/3rd the cost at distances of 20 kms.

Figure 5: Land Value and Generalised Cost of Commuting

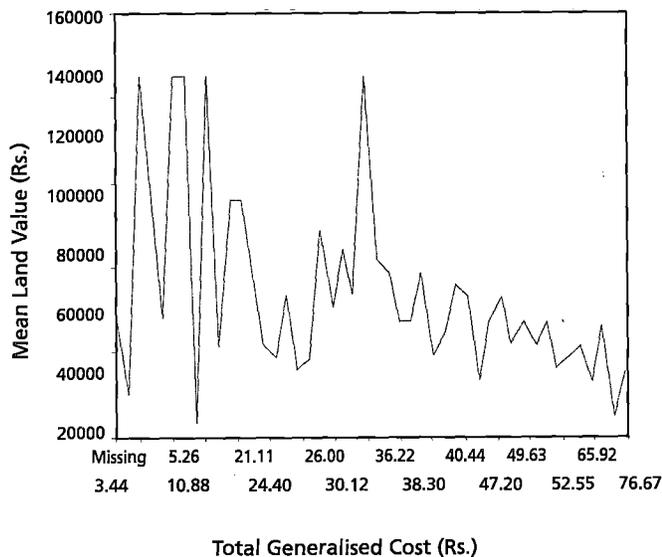


Figure 5 shows the relationship between the total one-way Generalised Cost of Transport and the value of the residential land. While sharp variations are evident especially within shorter distances, as the distance (and the cost) increase, the relationship appears more distinct. At a Generalised Cost of Rs 80, the land value is around Rs 25,000 per perch – which is 1/160th of an acre or approximately 272 sq ft in area.

When the Generalised Cost falls by half to Rs 40, the land value doubles to around Rs 50,000 per perch. Similarly, when the Generalised Cost reduces by one half again to Rs 20, the land value once again doubles to Rs 100,000 per perch. This clearly shows how, transport costs and land values are inversely related, so that an inverse linear relationship exists between the two.

Working Hours and Commuting Distances

The ability to supplement fixed incomes by working longer hours is an important means of overcoming the ever-increasing cost of living especially in urban areas. However, poor transport and increasing distances between work places and residences may limit opportunities for this. This is shown by the results displayed in Table 15 where those living within a total Generalised Cost of commuting one way of less than Rs 5 from their work places indicate they have no restrictions imposed by availability of transport to working extra hours. When the Generalised Cost increases to between Rs. 5 and Rs. 10 per one way trip, the percentage decreases to 90.9%, and to 84.4% when the Generalised Cost increases to over Rs 10 per trip.

The average working hours for these employees appear to also suffer with increasing Generalised Cost. Thus around 2 hours of potential work appears to be lost when Generalised Cost increase beyond Rs 60. When it is between Rs 30 to Rs 40, around one hour is lost. Thus longer commuting distance not only increases the

Table 15: Generalised Cost of Commuting and Average Working Hours

Generalised Cost of One Way Travel (Rs.)	Average Work Hours
Up to Rs 10/=	11.9
Between Rs 10/= and Rs 20/=	10.9
Between Rs 20/= and Rs 30/=	11.5
Between Rs 30/= and Rs 40/=	10.5
Between Rs 40/= and Rs 60/=	10.2
Over Rs 60/=	9.8

cost of transport, it reduces the potential working hours. Thus considering a mere 20% of the value of the income rate for commuting travel appears to be too conservative. It is therefore considered that the value of commuting time for low salaried employees may be significantly similar to the wage rate.

Vehicle Ownership & Income

The vehicle ownership of the working poor is also an important parameter of commuting to work. As shown in Table 16, the majority of people with monthly incomes of less than Rs 15,000/= do not have access to any vehicle, not even a bicycle. This impedes access to employment. While affordability is unlikely to be the cause, it is most likely to be lack of facilities for riding a bicycle. Bicycle Ownership increased with income up to the Rs 10,000 to Rs 15,000/- level, after which using a motor cycle or three wheelers appears to be a more likely choice of a vehicle.

Table 16: Vehicle Ownership as a Function of Monthly Income

Monthly Income of Interviewee (Rs)	Vehicle Ownership				Total
	No Vehicle	Only Bicycle	Having a Motorcycle or 3 Wheeler	Having a Motorcycle or 3 Wheeler	
Less than Rs 5000/=	72.0%	18.7%	9.3%	9.3%	100%
Between Rs 5,000 to Rs 10,000	62.5%	26.8%	8.9%	8.9%	100%
Between Rs 10,000 to Rs 15,000	53.8%	30.8%	7.7%	7.7%	100%

Conclusions

The research concludes that

- (a) In urban areas, more people work outside their local communities when compared to rural or agriculturally based communities. It is also shown that those who are employed outside their communities enjoy higher incomes. However, for incomes groups below Rs 10,000/= there is a lack of adequate and affordable transport facilities and therefore it can be concluded that for those with lower incomes a greater value addition for their output can be obtained if they can commute to urban centres where employment opportunities are greater. This is further confirmed

when daily paid casual labour show a significantly lower propensity to seek work in outside communities when compared to salaried (monthly paid) employees. This may be mostly due to the fact that those with steady jobs can get discounted bus and rail passes, while those seeking casual labour and work in different places are unlikely to obtain convenient and cheap transport facilities and thus consequently have to bear the full cost of travel.

- (b) The ownership of bicycles is relatively high for all income groups. This level of affordability makes the bicycle a vehicle to access work for the poor. This may be in fact one reason why the poor appear to be constrained to work in local communities, since this relatively inexpensive form of non-motorized transport is available.
- (c) With respect to expenditure on transport it appears that the urban poor spend proportionately more on public transport than the rural poor do. This could be due to difficulties in using alternative modes of transport in urban areas, particularly bicycles; or else it could also be due to longer distances to work and school.
- (d) The analysis of the data from survey of the working poor shows that the lower the average income, higher is the cost of transport for commuting. This includes time costs. It is also indicative that lower the income, the greater appears to be the access distances to the main bus and train corridors. The access costs - namely the time costs - appear to be the significant contributor to increasing the cost of transport of the lower income earners.
- (e) The analysis also provides evidence that land prices decrease sharply with the increasing cost of commuting from the place of work. Doubling of transport costs indicates a halving of land prices and vice-versa. This results in more people who live in distance areas being able to afford their own house as opposed to those who live closer to the city who live in rented or illegal squatter lands. Thus there is clear evidence that poor transport forces the working poor to seek residence within the city, where the only 'affordable' land is the illegal squatter type or low-amenity government flats within the city.
- (f) The survey also reveals that the average working hours also decreases proportionately with the cost of commuting to work. The average cost of time appears to be valued at around Rs 30 to Rs 40 per hour. This works out to a daily wage rate of between Rs 250 and Rs 400, which is close to the market rates.
- (g) As opposed to general vehicle ownership, it appears that the ownership of bicycles among those who commute to work in Colombo City is significantly lower. This indicates that fewer workers utilize bicycles to access work in Colombo or even to access motorized modes of transport such as buses and trains. However, this also provides an opportunity for accessing work outside own communities if park and ride facilities are provided for bicycles in small town within commuting distances. There are a few such places that have evolved- however there is now evidence that a more organized attempt could be justified.
- (h) The above clearly indicates that the relationship of transport facilities, distances between work and housing and the value of land have a close relationship. The need to provide for city centre housing for the poor increases with poor transport facilities. Thus an land use policy should take in to account the quality of transport services that are available.

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Annex: Survey Questionnaire

Survey on Transport to Work (City of Colombo)

Transportation Engineering Division

University of Moratuwa

- A.1. Where is your Place of Residence DSD.....Town.....Area.....
- A.2. Where is your Place of Work DSD.....Town.....Area.....
- A.3. What Type of House do you live in:
Settlement/Flat/Apartment/Single House
- A.4. Is the house you live in: Your Own/Family Members/On Rent
- A.5. Is the land your house is located: Your Own/Family Members/On Rent/Govt/.....
- A.6. What modes of Transport do you use to get to work (underline all modes)
Walk/Bicycle/M'Cycle /Three Wheeler/Bus/Train/Van/Car
- A.7. How long does it take to walk to your house from a main bus route Mts.....
- A.8. What is the cost of Transport to work (one way) Rs
- A.9. How much time does it take to travel to work (one way)
Hours.....Mts.....
- A.10. Describe the nature of your work
- A.11. What are your Official Working Hrs StartEnd.....
- A.12. Do you usually work extra hours Yes/No
- A.13. If Yes, What are the usual extra work hours StartEnd.....
- A.14. Is your work period curtailed by the time of the Last Bus/Train Yes/No
- A.15. What is the approximate Land Value where you live Rs per perch
- A.16. How many members are there in your household.....
- A.17. Is there a vehicle for the use of any member in your household Yes/No

INTERPRETATION OF POPULATION DENSITY GRADIENTS: A BRAZILIAN PERSPECTIVE

Paulo Coelho Avila
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Interpretation of Population Density Gradients: A Brazilian Perspective

Abstract

One thread of quantitative (and graphic) studies of the spatial form of metropolitan areas seeks to relate the variation of urban form in time and space to its determinants, outstandingly, physical topography, large-scale transportation investments, income distribution, stage of urban development and regulatory regime. A principal and traditional variant of this line of research traces population density gradients and interprets their variation in cross-section and time series samples according to theorems and hypotheses suggested by urban economic theory.

Using censuses data from 1991 and 2000 we present estimation results of the population density gradient for ten of the largest Brazilian cities: Fortaleza, Recife, Salvador, Curitiba, Porto Alegre, São Paulo, Rio de Janeiro, Belo Horizonte, Goiânia and Brasília. These cities are good examples of Brazilian cities that faced fast urban growth during the second half of the 20th Century, but that had different origins and processes of development. Our study compares some aspects of the spatial population distribution in those cities and dedicates special attention to Brasília, a city that has experienced a strong control on urban development where land available for urbanization has been supplied by the government, following planning enforcements driven by the preservation of the central area, assigned as cultural heritage site by UNESCO. Brasília shows, as one of its distinguished features, an inverted pattern of population density gradient vis-à-vis the other cities. Such pattern of population distribution combined with a high centralization of job opportunities perhaps is costly for the whole city, affecting mainly the poorest people that live at the outskirts.

In addition, by using census data from 2000 we calculated two results for the population density gradient in Brasília, one considering only the official settlements, that is, those produced by the government action and another one considering the whole city, including the urban settlements produced by informal and unregulated land markets. We found that the first set of areas, called "Formal City", resulted in a positive population density gradient, that is, a pattern that is characterized by lower densities in central areas while the most of people, especially the poorest, lives at great distances from the city center. On the other hand, the second set, called "Appropriated City", resulted in a weakly negatively sloped density gradient indicating that informal land markets in Brasília have approximated people to the central areas, reverting official planning strategies of putting people away from the central areas.

Introduction

One thread of quantitative (and graphic) studies of the spatial form of metropolitan areas seeks to relate the variation of metropolitan urban form in time and space to its determinants, particularly, physical topography, large-scale transportation investments, income distribution, stage of urban development and regulatory regime. An important and traditional variant of this line of research traces metropolitan density gradients and interprets their variation in cross-section and time series samples according to theorems and hypotheses suggested by urban economic theory¹. Dependent variables of the urban gradients studied include population, employment (total and sectoral), built density, income, land-value, and building height.

Among the instruments developed by the urban economics theory, the negative exponential function of the Population Density Gradient – PDG has proved to be useful in measuring the form of the distribution of population in urban areas. This instrument was originally proposed by Colin Clark's "Urban Population Densities", *Journal of the Royal Statistical Society*, 1951, cited by Mills as "the first extensive study of demographic density functions". A large number of studies have been produced by using the PDG to measure the degree of decentralization of population in cities worldwide as well as the evolution of urban sprawl in individual cities. Although largely applied in academic spheres, the density gradient function is not commonly used to support the formulation of public policies, particularly in Brazil.

As demonstrated by literature, the common (but not exclusive) pattern of the PDG in cities is its negative slope with distance from the city center. Central areas are densely populated while in the peripheries the density reaches low values. In this paper we present estimation results of the Population Density Gradient for ten of the largest Brazilian cities: Fortaleza, Recife, Salvador, São Paulo, Rio de Janeiro, Curitiba, Porto Alegre, Belo Horizonte, Goiânia and Brasília².

All these Brazilian cities experienced fast urban growth during the 20th century. They are State capitals and urban centers of important metropolitan areas which experienced different paces of urban growth. São Paulo and Rio de Janeiro had their spatial structure defined by the decentralized mechanisms of choice. This is a characteristic of open economies due to the absence of strong land use regulation, at least until its basic structure is defined. In fact, São Paulo and Rio de Janeiro are particularly important because they are the largest cities in Brazil as well as central cities of the main metropolitan areas of the country.

Fortaleza, Recife, Salvador, Curitiba and Porto Alegre are examples of large regional centers developed during the period of urbanization of the second half of the 20th century. Fortaleza and Recife are important cities of the northeast, the poorest region of Brazil. Their economy traditionally relies on agriculture, but not exclusively so. Salvador, also in the northeast, has a set of industries linked to the petroleum industry which was developed in the last 20 years. Curitiba and Porto Alegre are important regional centers of the southern region which is richer and more industrialized than the northeast.

Located in the central-west, Belo Horizonte was built to be the new capital of the state of Minas Gerais in 1897, following an urban plan that pre-defined the land use of its areas. Similarly Goiânia, inaugurated in

¹ The original works of Alonso, Muth and Mills and recent extensions of that body of analysis, for example, by Glaeser and Malpezzi-Bertaud.

² Even though some people admit the use of the term 'Brasília' only to designate the Plano Piloto (Master Plan), that is, the area originated from the Lucio Costa's original plan, here Brasília is used to represent the set of urban areas within the Federal District since they form one city, despite its fragmented spatial organization.

1942, also located in the central-west, was planned as the capital of Goiás. Brasília, yet another planned city, was inaugurated in 1960 to be the capitol of Brazil followed a master plan which applied the principles of the functional city as advocated by the modern movement of architecture. Since its inauguration, the city administration adopted regulatory instruments that imposed strong constraints on land use in order to achieve environmental and urban preservation aims.

This study investigates the spatial pattern of population distribution in the cities mentioned and the effect of regulation and regulatory regimes on urban spatial form. We use Brasília as an example of a city with strong land-use regulation and compare its structural distribution of population with the patterns found in the other cities. We found that, with the exception of Brasília, the other nine cities of our sample presented a similar urban distribution of population despite their different origins and urban growth processes. Population Density Gradient of those cities is negatively sloped, as predicted by the urban economy theory and generally found in most cities worldwide. Brasília, on the other hand has a Density Gradient that is slightly negatively sloped or practically flat.

When considering only the formal city of Brasília, that is, the city formed with the settlements promoted by administrative decisions, the density gradient is positively sloped. In Brasília, the densest areas are located far from the city center, resulting in a median distance per person to the city center of about 20 kilometers, the longest average found in our sample.

This is a result of strong restrictions on urban development in Brasília due to preservation issues. The central area of Brasília, the *Plano Piloto*, is designated by UNESCO as a Cultural Heritage Site of the World. Due this fact and due to environmental issues as well, planning strategies in Brasília were designed to preserve the central areas from changes and densification, resulting in strong limitations on land development in central areas. The strict control on land use in Brasília has been greatly facilitated since majority of land available for urbanization is public.

On the other hand, when population density gradient is calculated including the settlements produced by informal land markets, it becomes negatively sloped, although almost flat. Albeit the costs of informality cannot be neglected, especially for poor people, the change on the PDG slope shows that informal land markets have been a way to access the city by people set apart from central areas. Thus, public landownership is not per se a guarantee of equitable urbanization, mainly when land allocation is decided without taking into account market forces and following only technocratic and elitist planning strategies.

The Urbanization of Brazilian cities

The urbanization process in Brazil is quite recent, occurring mainly during the second half of the 20th century. While in 1950 about 64% of the people in Brazil were living in the rural areas, in 2000 this pattern reversed and 81% of the Brazilian population was living in urban areas. During these fifty years, the urbanization of the country can be divided basically into two periods. The first, marked by the industrialization of the country, starts in the thirties and extends to the seventies and is characterized by the concentration of population in the main State's capitals located in the southeast region.

This process created great metropolitan areas surrounding cities such as São Paulo, Rio de Janeiro and Belo Horizonte that polarized the migration flows from the whole country. The second period goes from the

seventies to the present days and is characterized by the generalization of the urbanization process overall country. During this period many cities became important regional centers, mainly in the capitals of the west-central, south and northeast regions.

Historically, the development of Brazil was concentrated in the coast, leaving the countryside scarcely populated. Although most of the country population lived in the hinterland, its vast interior maintained gross densities low and showed large and virtually uninhabited areas. As a consequence, the major cities of Brazil and the denser areas are still located along the coast, mainly in the southeast, south and northeast regions. Between 1940 and 1980 the urban population of Brazil grew at a rate of 4.8% by year, while the urban population in those regions grew at rates of 4.7%, 5.2% and 4.2%, respectively. Even the central-west region, which had 2.1% of the urban population of Brazil in 1940, saw its urban population grow 7.6% by year in the same period.

In this the period, Brazil changed from a rural to an urban country, and the main metropolitan areas of São Paulo, Rio de Janeiro and Belo Horizonte grew supported by the industrialization of their economies. By 1970, more than half of the country's population (55.9%) was living in urban areas, a share that was captured by the census data shown in Table 1. In that year the southeast region was the only one that had more people in cities (72.7%) than in the countryside.

Table 1: Urbanization rates for Brazil and its regions, 1940-2000

Brazil and regions	1940	1950	1960	1970	1980	1991	1996	2000
Brazil	31.2%	36.2%	44.7%	55.9%	67.6%	75.6%	78.4%	81.2%
North	27.7%	31.5%	37.4%	45.1%	51.6%	59.0%	62.4%	69.9%
Northeast	23.4%	26.4%	33.9%	41.8%	50.5%	60.7%	65.2%	69.1%
Southeast	39.4%	47.5%	57.0%	72.7%	82.8%	88.0%	89.3%	90.5%
South	27.7%	29.5%	37.1%	44.3%	62.4%	74.1%	77.2%	80.9%
Central-West	21.5%	24.4%	34.2%	48.1%	67.8%	81.3%	84.4%	86.7%

Source: Demographic Census, IBGE.

The industrialization was intense in some of the major cities of Brazil, particularly São Paulo. This process was partly supported by government incentives such as the policy of import substitution and the protection of the domestic market from international competition. São Paulo and Rio de Janeiro had the primacy in attracting industries, not only due to political interests but also due to the early industrial infra-structure and significant labor and consumer markets that these cities provided. In addition, the growth of urban labor markets in these cities encouraged mass migration from near states and distant northeastern rural areas where the climate and the low productivity made life virtually unsustainable.

As shown in Table 2, the relative participation of the southeast region in the urban population in Brazil is above 50% until 1980 and decreases to 49.8% in 1991, and 47.8% in 2000, as result of the generalized urban growth in cities located in other regions. Nevertheless, the southeast region still concentrates most Brazilian urban population.

Table 2: Relative participation of the regions in the Brazilian urban population 1940-2000

Region	1940	1950	1960	1970	1980	1991	1996	2000
North	3.2%	3.1%	3.1%	3.1%	3.8%	5.3%	5.7%	6.5%
Northeast	26.3%	25.3%	24.0%	22.6%	21.8%	23.2%	23.7%	23.9%
Southeast	56.1%	57.1%	55.8%	55.6%	53.3%	49.8%	48.6%	47.5%
South	12.3%	12.3%	13.9%	14.0%	14.8%	14.8%	14.8%	14.7%
Central-West	2.1%	2.3%	3.2%	4.7%	6.4%	6.9%	7.2%	7.3%

Source: Demographic Census, IBGE.

Cities in other regions also grew significantly. In the period from 1940 to 1970 the regions northeast and south, for example, showed urban growth rates of 4.2% and 5.2% per year, respectively, affecting particularly capital cities such as Salvador (Bahia) and Recife (Pernambuco) in the northeast and Porto Alegre (Rio Grande do Sul) and Curitiba (Paraná) in the south, for example.

The share in the Brazilian urban population of the central-west region also increased in the same period, rising from 2.1% in 1940 to 4.7% in 1970. The central-west was the region that showed the highest urban growth rates, 7.6% per year between 1940 and 1970, despite its small share in the total urban population of Brazil. Here it is important to distinguish the role that the new cities like Belo Horizonte, Goiânia and Brasília represented in the urbanization of the interior. Belo Horizonte was built to be the capital of the State of Minas Gerais. Later Goiânia was built to be the capital of the State of Goiás. Finally Brasília was built to be the capital of the country. These three cities, especially Belo Horizonte and Brasília, played an important role in increasing occupation of the hinterland of the country.

The trend of concentration of urbanization in the cities located on the coast starts to change from the 1970s. The process of urbanization becomes more generalized and the number of cities increased suggesting changes in the Brazilian urban network. In that decade the urban network of Brazil becomes more complex with the consolidation of the metropolitan areas around the main cities of the earlier period as well as the development of some urban centers in the hinterland that acquired regional and local importance. Nowadays, the growth of the metropolitan nuclear cities is still positive, but at declining rates.

One aspect of the declining growth of metropolitan areas is related to the cities that became important regional centers, such as the cities of the central-west, north and the northeast regions. Salvador, Goiânia, Manaus and Fortaleza are examples of cities that have presented high urban growth rates in the last 20 years, attracting the migration flow that traditionally would have been driven toward the great cities of the southeast.

One of the reasons for this change was the decentralization of urban employment. For the last 20 years many industries have left the large urban centers of the southeast because of high production costs due to diseconomies that generally affect great metropolitan areas. Many times the transference of the industries was stimulated by incentives offered by other states, in the shape of lower tax policies (known as the "Fiscal War") and cheaper labor force.

The development of many urban centers forming new consumer markets encouraged some industries located in great metropolitan areas to move to cities that offered easier access to major regional market shares. New

urban nodes of goods and services distribution developed, linking the metropolitan areas to the cities that played a regional role. Within the national market these cities fulfill more traditional urban functions, while the metropolitan areas become more specialized.

The urban scenario in Brazil at the end of the century presented 81% of its population living in cities. In terms of the regions, the southeast had in 2000 a share of 90.5% of its population living in cities, followed by the central-west where 86.7% of its population lived in urban areas. The north and northeast are the regions that have the smallest proportion of its population living in cities, both with less than 70% in 2000.

Despite the generalized urbanization process experienced by Brazil for the last thirty years, the urban population of the country is still predominantly distributed along the coastline, even though a large number of cities located in the hinterland are now playing an important regional and local role. At the same time some metropolitan areas have reduced their influence over space and some, such as Rio de Janeiro, are losing their force at the national level. In contrast Belo Horizonte continues to enlarge its influence while new cities, such as Goiânia, acquire regional importance.

The panorama presented in this section offers a macro view of the development of Brazilian cities during the second half of the 20th century. In general, the internal spatial organization of cities reflects some of the circumstances of this process, which combined with some particular conditions, yield different spatial arrangements. One of the features shared by these cities is the pattern of distribution of population in urban areas. Generally, big cities in Brazil present a pattern of population density that decreases from their central areas toward the outskirts. In addition, the rapid growth experienced by the Brazilian cities was absorbed in their peripheral areas, reflected in the declining population density gradient measured along time.

Population Density Gradients for 10 Brazilian cities

Generally, Brazilian cities present a pattern of growth that is similar to many cities worldwide. As such, with rare exceptions, they grew around a single center where most of commerce and employment is concentrated. This pattern, which one might call "monocentric polarization", fits most models presented by scholars to explain the way that cities grow and form. Best known is that model developed by Alonso (1964), Muth (1969) and Mills (1972) that analyzes urban form combining micro-economics principles in a Von-Thünen spatial arrangement. This model is characterized by central polarization and considers urban land value and commuting costs as a function of the distance to the city center.

This model and the variants derived from it – like the models that analyze subcenters formation in metropolitan areas –, assume decentralized decision processes where the location choices are taken by private agents – developers, firms and dwellers – that compete and bid for urban locations. In equilibrium the land is allocated to whoever is willing to pay more for the most profitable sites of the city. In this process, land prices exert pressure on the whole city and tend to be higher in the more accessible sites of the urban area, like the city center and along the main transport corridors. At the farthest areas from the city center land prices tend to be lower. Basically, when agents bid for the best urban locations they trade-off land price and commuting costs across the whole city, in order to choose between the many possible locations for their activities. That process is the principle of the efficient allocation of land in cities within a free land market.

High land prices at the more accessible sites induce factor substitution that decreases the quantity of land employed per unit of floor built area. In other words, the high land prices in central areas and along the transport corridors encourage developers to substitute non-land inputs (capital, labor, construction materials) for land. As such, in the case of housing production, developers will use less land per unit of housing where the land price is higher.

Such substitution effects induce the rise in the ratio of total housing floor area to total land area (called floor area ratio, FAR) and produce higher densities where land prices are higher. That is how central locations generate higher densities while lower densities occur on the fringes of the city. The decrease of density with distance from the city center produces a pattern found in many cities worldwide, nowadays and over the course of urban history.

By using this theoretical approach (developed by Alonso, Muth, Mills – AMM) it is possible to interpret the variation of population density with distance from the city center by estimating the parameters of the negative exponential function shown below, using simple regression methods.

$$D(\mu) = d_0 e^{-\gamma\mu} \quad (1)$$

The dependent variable of the model is a vector formed by all densities D observed at the many city locations as function of distance to the city center (μ), and the estimated parameter ($-\gamma$) is called Population Density Gradient. The parameter d_0 is the constant estimated in the regression calculation and represents the density estimated for the center of the city. The Density Gradient is useful not only to measure the distribution of the population across the urban area, but also to measure the increase or decrease of urban sprawl over time.

We used this model to estimate the Population Density Gradient for ten of the largest capitals of Brazil. The chosen cities are located in four most urbanized regions of Brazil, the northeast, southeast, south and central-west and represent the urbanization processes described in the prior section of this paper.

Brazilian cities and their urban density pattern

Ten Brazilian cities were chosen for this study and, with the exception of Brasília, all of them present similar spatial patterns in spite of the different circumstances of their origin and development. The chosen cities are Rio de Janeiro, São Paulo and Belo Horizonte, located in the southeast region, the most urbanized and industrialized region in the country; Porto Alegre and Curitiba, located in the south; Fortaleza, Recife and Salvador, located in the northeast, the poorest region of the country, and Goiânia and Brasília, located in the central west. Brasília will be analyzed separately due to some specific details of its urban structure and development that make it of special interest to our study. Table 3 shows the population of these cities in the years of 1940, 1970 and 2000, and the respective annual growth rates for the periods between these years.

Rio de Janeiro and São Paulo are the largest Brazilian cities, as well as the most industrialized. Their growth during the 20th century, especially in its first half, was supported by intense industrialization concentrated in their urban core and surrounding metropolitan area. Together, these two cities had almost 20% of the whole urban population of Brazil in 1970. This degree of urban concentration declined to a little more than 11% by the end of century. The development of their urban areas took place in the presence of private land markets, generally unconstrained by strong land use regulations.

Their spatial structure was formed by the addition of new developed rings around their central areas, following the classic pattern of a concentric growth. Even Rio de Janeiro, where the amenities of the coast-line can weaken the attractiveness of the central area further in land and where topography offers some geographic constraints, its spatial structure follows the predictions of the theory.

Despite some urban projects, such as the Avenue Plan of Prestes Maia for São Paulo in 1930 and some plans for the Rio de Janeiro, such as the *Plano Agache* in the 1920s as well as others, in the period of intense urbanization of these cities there were practically no effective controls on urban growth. The plans implemented, with rare exceptions, were mainly concerned with remodeling and embellishing of the central areas of the cities. Hence, not only Rio de Janeiro and São Paulo, but most Brazilian cities grew in a relatively permissive environment. Zoning and other tools used to control urban development were more widely adopted in the sixties and seventies when SERFHAU (the Federal Service of Housing and Urbanism) was created and structured to deal with urban planning in the overall country. SERFHAU was not only concerned with physical aspects of planning but searched to integrate social and economic aspects into it as well.

Table 3: Total Population and Growth Rates for 10 Brazilian Cities

City		Year		
		1940	1970	2000
São Paulo	Population	1,326,261	5,924,612	10,434,252
	Annual Growth Rates		5.12%	1.90%
Rio de Janeiro	Population	1,764,141	4,251,918	5,857,904
	Annual Growth Rates		2.98%	1.07%
Fortaleza	Population	180,185	857,980	2,141,402
	Annual Growth Rates		5.34%	3.10%
Recife	Population	348,424	1,060,701	1,422,905
	Annual Growth Rates		3.78%	0.98%
Salvador	Population	290,443	1,007,195	2,442,107
	Annual Growth Rates		4.23%	3.00%
Curitiba	Population	140,656	609,026	1,587,315
	Annual Growth Rates		5.01%	3.24%
Porto Alegre	Population	272,232	885,545	1,360,590
	Annual Growth Rates		4.01%	1.44%
Belo Horizonte	Population	211,377	1,235,030	2,238,526
	Annual Growth Rates		6.06%	2.00%
Goiânia	Population	48,166	380,773	1,093,007
	Annual Growth Rates		7.13%	3.58%
Brasília	Population		537,492	2,051,146
	Annual Growth Rates			4.57%

Source: Authors calculations using the 1991 and 2000 Census data, IBGE.

The cities of Salvador, Recife and Fortaleza, in the northeast, and Porto Alegre and Curitiba, in the south, are example of cities that also experienced intense urban growth, with few restrictions on land market operations. Recife and Porto Alegre experienced high growth rates, between 3.8% and 4% per year, respectively until the 1970s. These rates declined to 1.44% and 0.98%, respectively, between 1970 and the end of last century. Salvador, Fortaleza and Curitiba maintained high growth rates, above 3% per year until the end of last century. Generally, the spatial structure of these cities follows the classic model that predicts high densities in the central

areas and low densities at the outer limits of the city. The geography of Recife, characterized by canals that divide its territory, especially near the city center, tends to reduce central densities and flatten the Density Gradient.

The cities of Belo Horizonte and Goiânia share a singular characteristic: they were designed and built to be the State capitols, the first in 1897 and the second in 1942. The numbers in Table 3 show that Belo Horizonte and Goiânia were the cities that had the most intense growth until 1970, while Brasília's growth was outstanding in the second period. Indeed, currently Belo Horizonte is the fourth largest city in Brazil and the most industrialized city in the interior. Goiânia and Brasília are the largest cities in the central west, indicating that the project of stimulating the occupation of the hinterland by building cities was successful. Furthermore, Brasília is the sixth city of Brazil which, in spite of its age, has overtaken older and more industrialized cities as Recife, Curitiba and Porto Alegre.

Differently than other cities, Belo Horizonte, Goiânia and Brasília were built in response to political objectives and did not owe their initial appearance to comparative advantage, as commercial cities. They were originally built to be administrative centers, even though Belo Horizonte developed a significant industrial base. The economy of Goiânia and Brasília is supported by commerce and services, but Brasília's economy relies mainly on government services.

The spatial arrangement of these cities were determined before their birth and was reenforced by land markets. In other words, the spatial structure and distribution of economic activities and population in these cities had already been decided before land market mechanisms established land values. That is in itself neither good nor bad, but the specific institutional and urban context created in the city can establish special conditions for the land market. In unregulated markets any misallocation of land due to any failure of the project or unexpected transformation of the general conditions of the society can be adjusted through the decentralized mechanism of land market. But strong and rigorously implemented urban regulations that constrain land use can obstruct the recycling of older areas and perpetuate inefficient land allocation occasionally yielding greater costs than benefits.

Table 4 presents the results of estimated Population Density Gradients for the ten cities analyzed in two moments: 1991 and 2000, except for Brasília that we obtained data only for 2000. The regressions employ IBGE census data for 1991 and 2000 for all the cities. The territorial unit considered for data aggregation was the neighborhoods for most cities, while we used districts for the city of São Paulo and information zones for Salvador. Brasília was a special case since its urban structure is extremely fragmented and there is no district or neighborhood subdivision. We selected areas where land use and occupation were homogeneous according to data from its several census sectors. While Brasília was divided in 19 Administrative Regions in 2000, including urban and rural areas in each region, we selected 62 areas where urban occupation is predominant, purging rural areas.

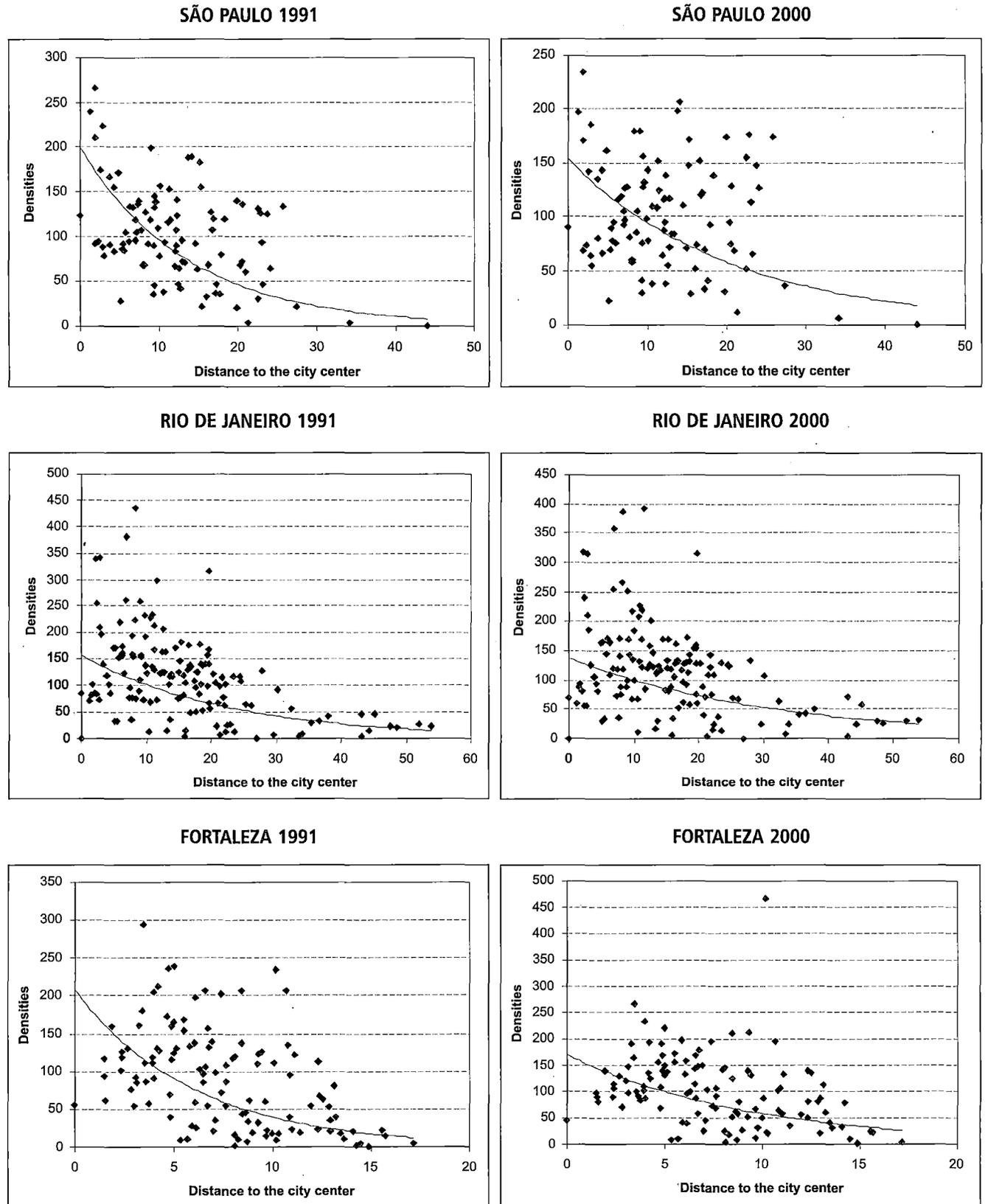
All ten cities presented negative density gradients representing decreasing densities when approaching the outer limits of the cities. In addition, for nine cities we had data for 1991 and 2000 that showed the value of the Density Gradients decrease in the period. This indicated that urban growth was decentralized and tended to be concentrated in peripheral areas during the last decade of last century. This decentralization of population was also tied to a decrease in population density in the central areas (except in Fortaleza and Curitiba). This is supported by cumulative population within a 3 km radius around the Central Business District (CBD) as well as the decrease of the regressions constants during the period studied. Indeed, the reduction of estimated regression constants for density in all of the cities studied reflected a population reduction within the city center ($d0$ in equation 1). Figure 1 shows the plots of the Population Density Gradients for the ten cities analyzed.

Table 4: Densities and Population Density Gradients for 10 Brazilian Cities in 1991 and 2000

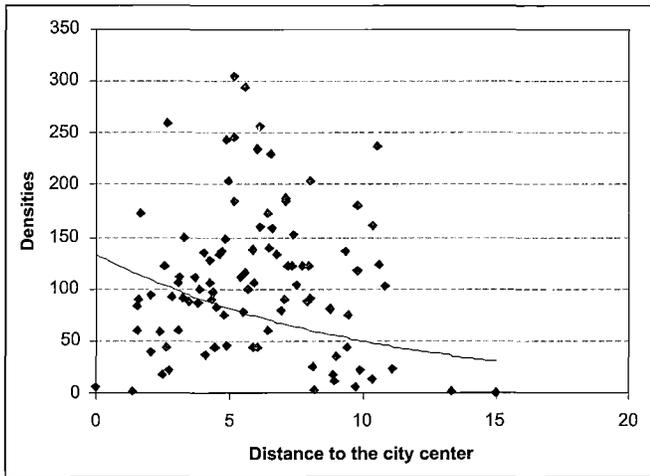
City	Area (km ²)	Gross Density 2000 (people/ha)	Population 2000	Average distance per person to city center (km)	Population Density Gradient 1991			Population Density Gradient 2000		
					Constant	Density Gradient	Adjusted R ²	Constant	Density Gradient	Adjusted R ²
São Paulo (Prob T > t)	1,525	68.4	10,434,252	14.1	5.30 (0,0000)	-0.073 (0,0000)	35.7	5.04 (0,0000)	-0.049 (0,0000)	19.8
Rio de Janeiro (Prob T > t)	1,225	78.0	5,857,904	19.9	5.13 (0,0000)	-0.040 (0,0000)	24.5	5.00 (0,0000)	-0.029 (0,0000)	15.5
Fortaleza (Prob T > t)	330	64.9	2,141,402	8.0	5.33 (0,0000)	-0.166 (0,0000)	4.8	5.14 (0,0000)	-0.108 (0,0000)	17.9
Recife (Prob T > t)	218	65.3	1,422,905	6.8	4.89 (0,0000)	-0.098 (0,0196)	26.7	4.80 (0,0000)	-0.071 (0,0767)	2.3
Salvador (Prob T > t)	279	87.4	2,436,390	8.1	5.39 (0,0000)	-0.146 (0,0000)	40.7	5.29 (0,0000)	-0.100 (0,0000)	19.4
Curitiba (Prob T > t)	435	36.5	1,587,315	7.6	4.52 (0,0000)	-0.191 (0,0000)	12.0	4.32 (0,0000)	-0.134 (0,0000)	34.7
Porto Alegre (Prob T > t)	375	28.8	1,360,590	7.7	5.11 (0,0000)	-0.187 (0,0000)		5.06 (0,0000)	-0.168 (0,0000)	42.0
Belo Horizonte (Prob T > t)	331	67.6	2,238,526	7.2	4.80 (0,0000)	-0.082 (0,0017)		4.73 (0,0000)	-0.052 (0,0211)	6.0
Goiânia (Prob T > t)	385	28.6	1,093,007	6.7	4.39 (0,0000)	-0.203 (0,0000)		3.97 (0,0000)	-0.150 (0,0013)	11.8
Brasília (Prob T > t)	5,822	3.5	2,051,146	20.1				3.09 (0,0000)	-0.003 (0,0000)	(R ² = 0.0)

Source: Census data and the authors' calculations.

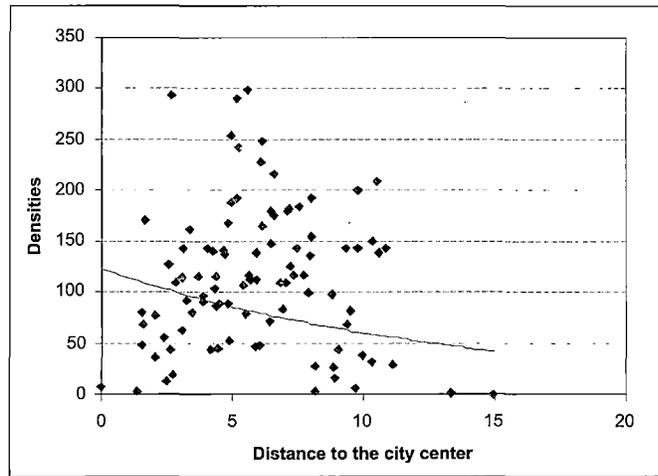
Figure 1: Population Density Gradients.



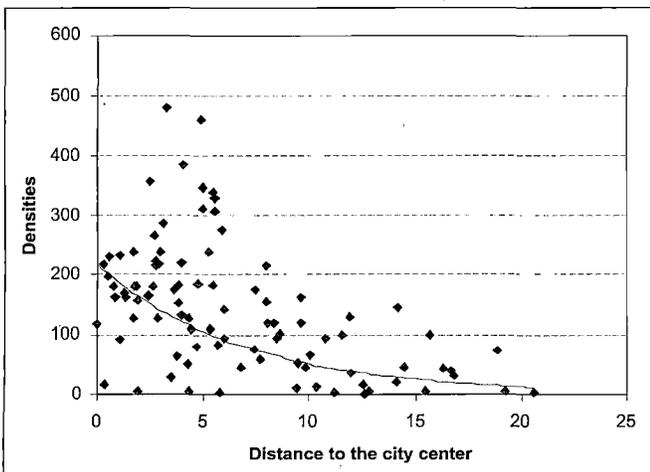
RECIFE 1991



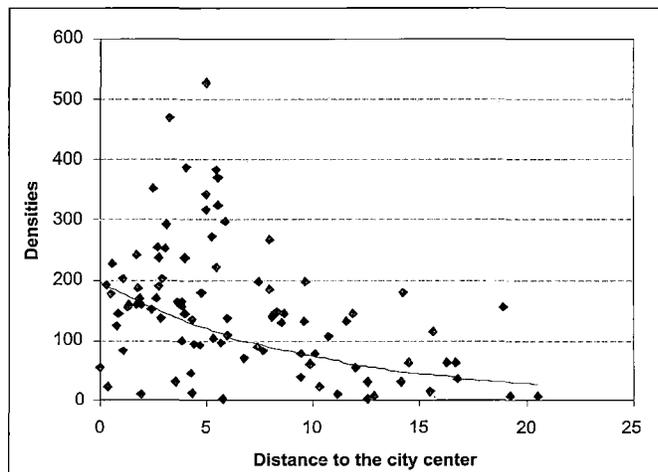
RECIFE 2000



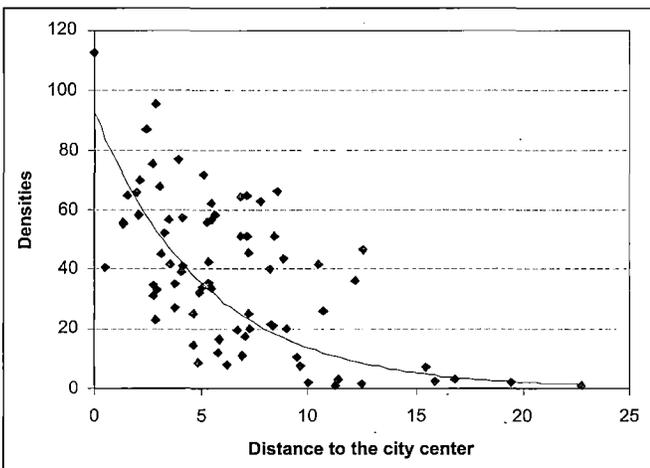
SALVADOR 1991



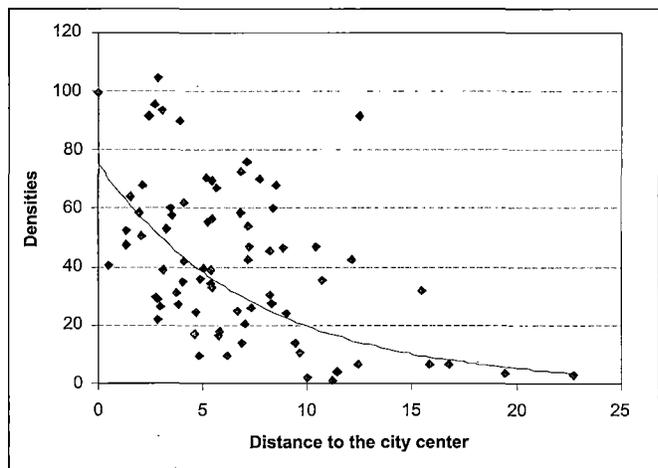
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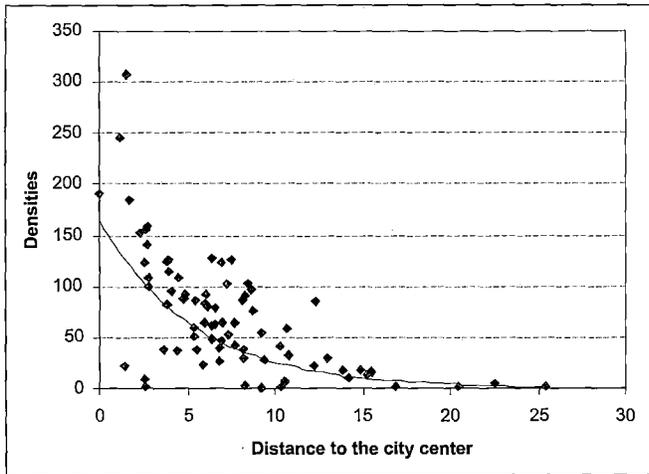
CURITIBA 1991



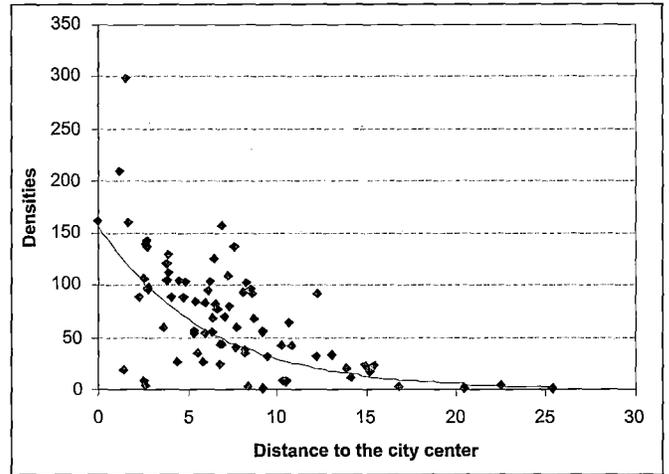
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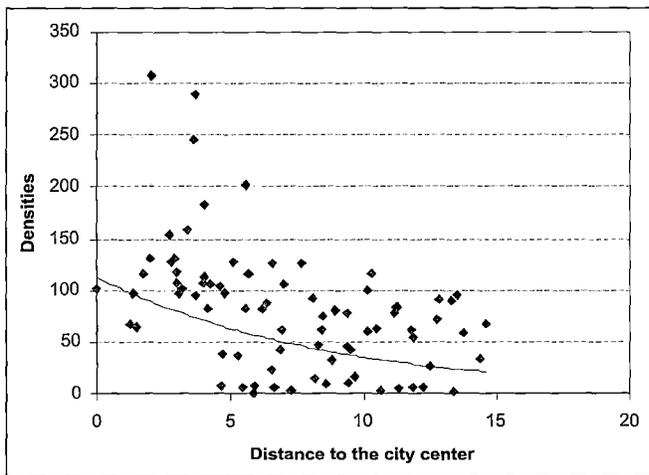
PORTO ALEGRE 1991



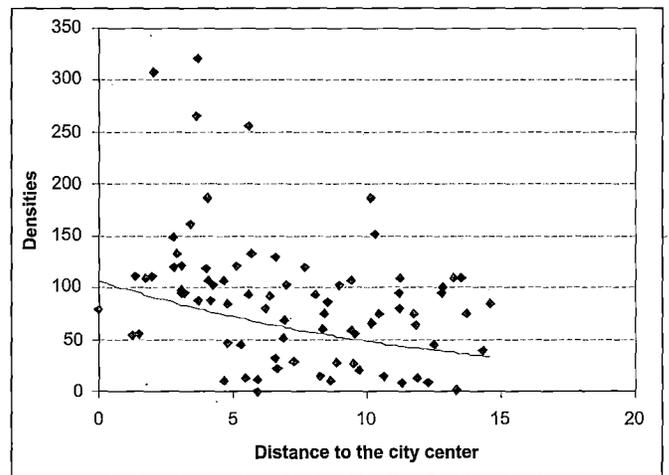
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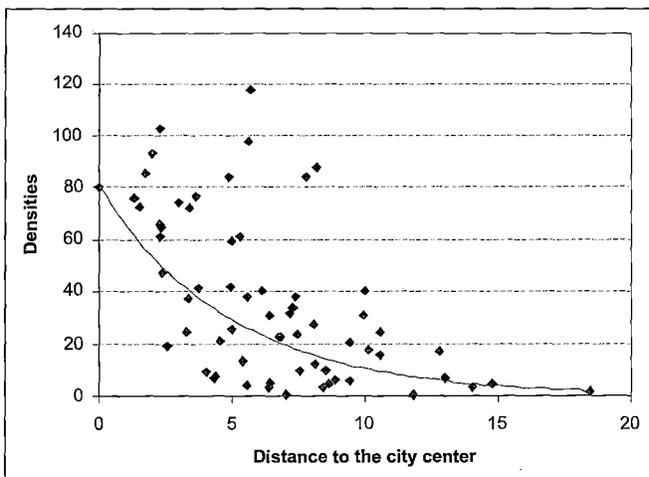
BELO HORIZONTE 1991



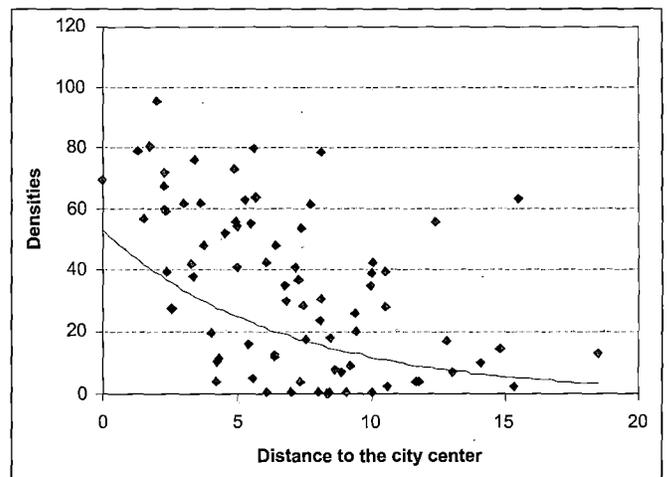
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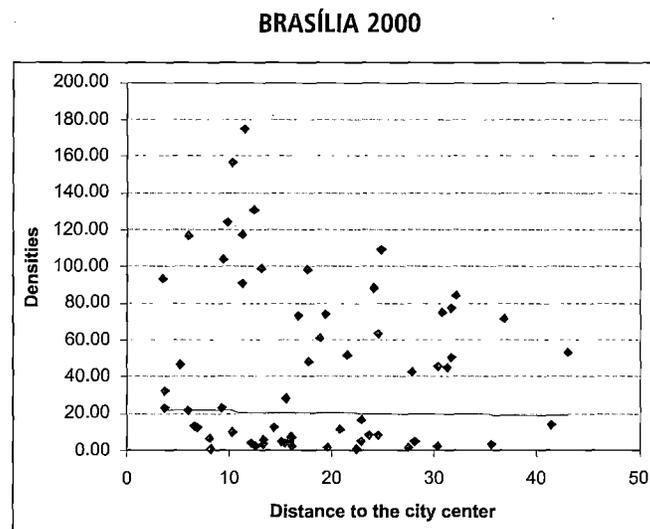


GOIÂNIA 1991



GOIÂNIA 2000





Actually, the pattern of decreasing density with distance from the CBD found in the Brazilian cities of our sample is similar to what researchers have observed in most cities in the world. We note that in 2000 the most centralized cities were Porto Alegre and Goiânia, in effect, they presented the highest density gradients among the cities analyzed. These cities have similar area – around 380 km² – and a population between 1 and 1.4 million. The city of Recife is comparatively smaller than the former cities in terms of its area, but presented a more decentralized distribution of its population since its population density gradient is smaller. This is probably due to the geography of the city, cut by the canals of the Capibaribe River near the center of the city, increasing the occupation of areas further from the city center.

Note that the gross density of Recife's area is greater than the densities of Porto Alegre and Goiânia, reaching a value more than twice the gross densities of both those cities. This is to be expected since the Recife's area is smaller than the others. However, though smaller size and larger population can mean a more compact city, the Density Gradient found for these three cities shows that Recife, comparatively, has a more dispersed distribution of its population across its area. Despite this, Recife is the city that has the lowest average distance per person to the city center, of about 6.8 km.

Curitiba is the third most centralized city in our sample, having a few more than 1.5 million people distributed in 434 km² area and gross density is of about 36.5 persons per hectare. This is nearly half the density of Fortaleza, a city that has 2.1 million people distributed in a smaller area, about 330 km². Although Fortaleza is a more compact city, with smaller area and bigger population, Curitiba is more centralized than Fortaleza, as shown by its higher density gradient.

The examples of Curitiba and Recife are important points because they indicate that density gradient does not depend on city size or population, but on the pattern of the population distribution in the city area. In general terms, the pattern of population distribution in Curitiba results in a lower average distance per person from the city center than in Fortaleza, which results in lower transport costs and higher efficiency in urban services supply. Indeed, the average distance per person in Curitiba is 7.6 km, while in Fortaleza it is 8.0 km per person. Rio de Janeiro and São Paulo, the largest cities of our sample, presented high average distances per person to

the city center, of 19.9 km and 14.1 km, respectively. However, Brasília presented the highest value of our sample, of 20.1 km per person reflecting the dispersion of its urban areas across the territory of Federal District (DF).

In 2000, the most decentralized cities of this group were Brasília, Rio de Janeiro, Belo Horizonte and São Paulo, the largest cities in our sample, except Brasília. Despite the reliance of the density gradient on the distribution pattern of the population in the built-up area, big cities, in general, tend to be more decentralized than the small ones. This can be attributed to the rise of agglomerative economies in new areas of the city and subcenters formation that share with the CBD the power to polarize occupation. This reason cannot be attributed to Brasília's case, since its poly-nuclear spatial arrangement has no relationship with subcenter formation, as we will see later.

São Paulo, the largest city in Brazil is more centralized than Rio de Janeiro, a smaller and denser city. This reflects the specific topographic conditions of Rio de Janeiro's site and the attractiveness of the sea coast as a desirable location for housing, retail and services, a factor that reduces the attractiveness of central areas. Both cities have several subcenters, but the special conditions of the Rio's site yield a more decentralized city.

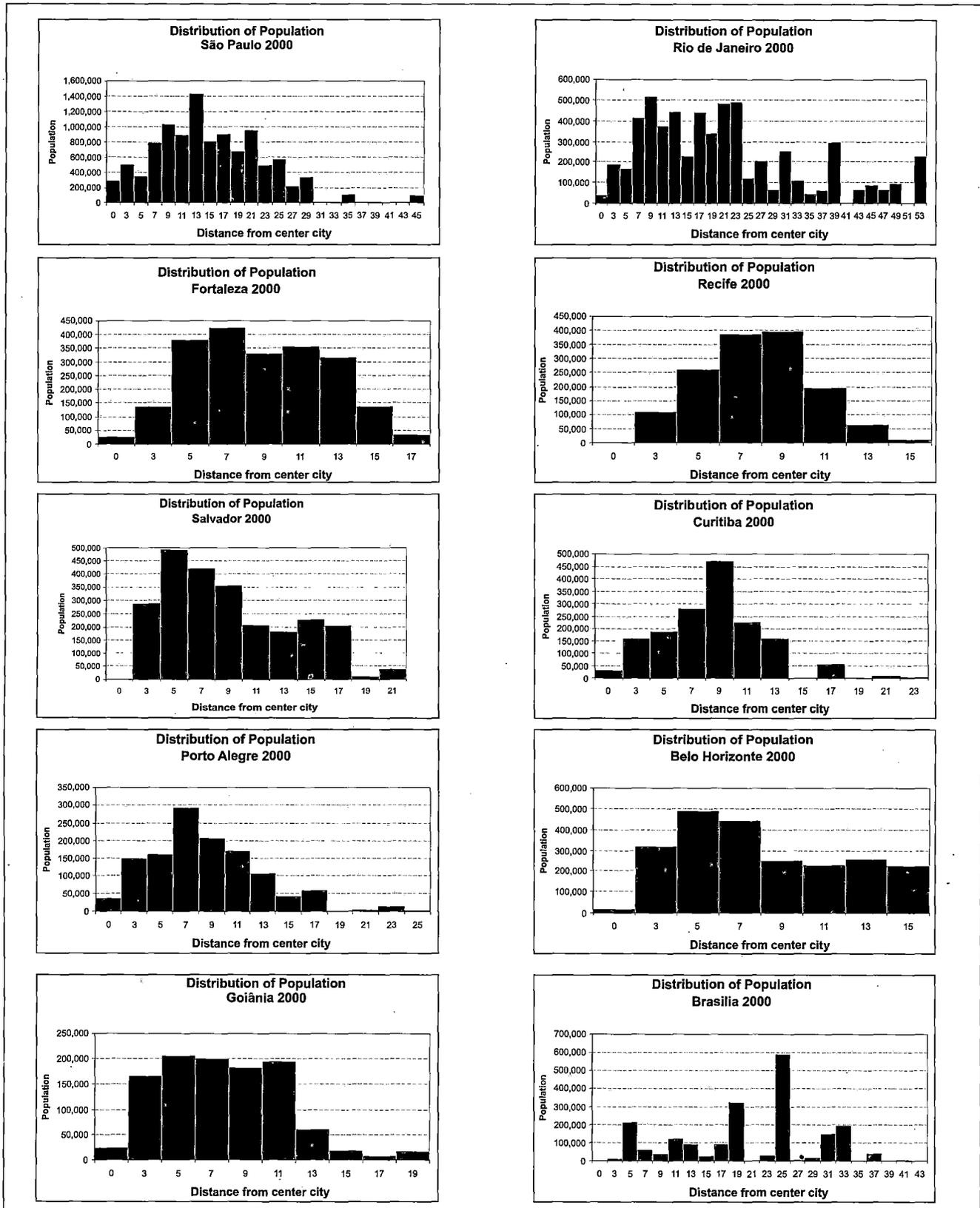
Belo Horizonte, in spite of its rough topography, similar to the Rio de Janeiro's, although slightly less dramatic, is more centralized. The decentralization of the population in Belo Horizonte between 1991 and 2000 was stronger than the decentralization in larger cities such as São Paulo and Rio de Janeiro. The higher population growth rate of Belo Horizonte in the period can explain this fact. Note that the urban growth in Brazilian cities is more intensively absorbed by peripheral areas.

Brasília, which will be analyzed separately, presents a density gradient curve practically flat, with a slight negative slope. But if some aspects of its spatial structure are considered separately its density gradient inverts showing a positive slope. The results shown in Table 4 reveal that while the estimated density gradient found for Brasília is negatively sloped it has no statistical significance. The R^2 also demonstrates that the endogenous variable deployed to explain the density distribution of the city, e.g., the distance to the central areas, does not effectively explain the pattern of population distribution across the city. This pattern is a product of the state land market arbitrage combined with strong land use controls, which yield high densities far from the central area of the city, while the city center presents low densities.

Table 4 shows that most of the cities analyzed present an average distance to the city center per person around 7.5 km, except for the largest cities of our sample and Brasília. This value is about the same of the median distance per person found in cities in other countries. For example, in 1993 Paris had a median distance per person of 7 km and Moscow had a median distance of about 10 km (Bertaud and Renaud, 1997). The larger median found for Moscow reflects some specific features of its spatial structure, as the misallocation of land near the central areas that exacerbate the increase of the median distance per person to the city center.

Figure 2 shows that within 5 to 9 km radius from the city center most Brazilian cities accumulate the major share of their population. This explains average distance per person to the city center of about 7.5 km, in median, found in seven cities of our sample. The exceptions, São Paulo, Rio de Janeiro and Brasília presented different pattern of cumulative population across their urban areas: Brasília, due to its spatial dispersion and the others due to the scale of their urban areas.

Figure 2: Population in the built-up areas of 10 Brazilian cities.



Indeed, the share of the population that lives within a 5 to 9 kilometers radius from the city center ranges from 52% to 55% of the total in Salvador, Belo Horizonte, Fortaleza, Porto Alegre and Goiânia. In Recife the share of the population that lives at that area corresponds to 73% of the total. In São Paulo and Rio de Janeiro, that population is about 20% of the total, while in Brasília the population that lives at the same distance from the city center is only 15% of its total. In general, all values measured for Brasília are close to the values reached by the cities that are the core of the largest cities of Brazil, despite the fact that it has only one fifth of the population of São Paulo and less than half of the population of Rio de Janeiro.

Brasília and its spatial pattern of population distribution – Is the Functional City an efficient city?

Brasília is a *sui generis* city. Its original urban plan, the *Plano Piloto* (Master Plan), was chosen in a public contest in 1957 and its construction took only three years, being inaugurated in 1960. Its plan, designed by the architect Lucio Costa, is tied to the principles of modernism, an architectural movement that preached a particular formal model to conceive cities. Among these principles was the idea that cities of the modern industrial age should be organized according to functional areas, connected by transportation axes that would allow fast linkage among them. The principles to design the “Functional City” were compiled during the IV International Congress of Modern Architecture (CIAM), held in 1933, in the document named Athens Charter. This document pointed out the four functions that were considered the key issues for the Functional City: to reside, to work, to recreate and to circulate.

In order to build the new capital, the government dispossessed great extensions of farm land, placing in state's hands most of the land in the Federal District. Thus, public administration has been the main agent allocating land for housing, agricultural, industrial and commercial activities. In addition, land use within the *Plano Piloto* must obey the guidelines traced by Lucio Costa's project and does not allow for changes.

Since its inauguration Brasília attracted an intense migratory flow of people from the States of Goiás and Minas Gerais, and from the poorest areas of the north and northeast regions of Brazil. Even though government owned most land, it was unable to respond effectively to the housing demand growth, especially from the poorest groups. Between 1960 and 1980, for example, Brasília presented a population growth rate of about 11.2% per year, passing from 130,796 inhabitants to more than 1.17 million in 1980. As a result, a great number of irregular settlements formed near the *Plano Piloto*, even though some of them started from construction camps that were not removed after construction works had ended.

In order to respond to the increase of housing demand, the government constructed several residential settlements at the periphery of the *Plano Piloto* to provide low cost housing not only for the people that inhabited the slums, but also for its administrative workers. Often, the addition of new residential areas, especially those not anticipated by the original plan, was placed far from the *Plano Piloto*. The locations assigned to settle the new urban areas were determined by the several territorial plans formulated over the years to control urban occupation within the Federal District. These plans responded to 2 main objectives: protect the *Plano Piloto* from changes caused by market constraints and preserve the basin of the Paranoá Lake in which the *Plano Piloto* is located from densification.

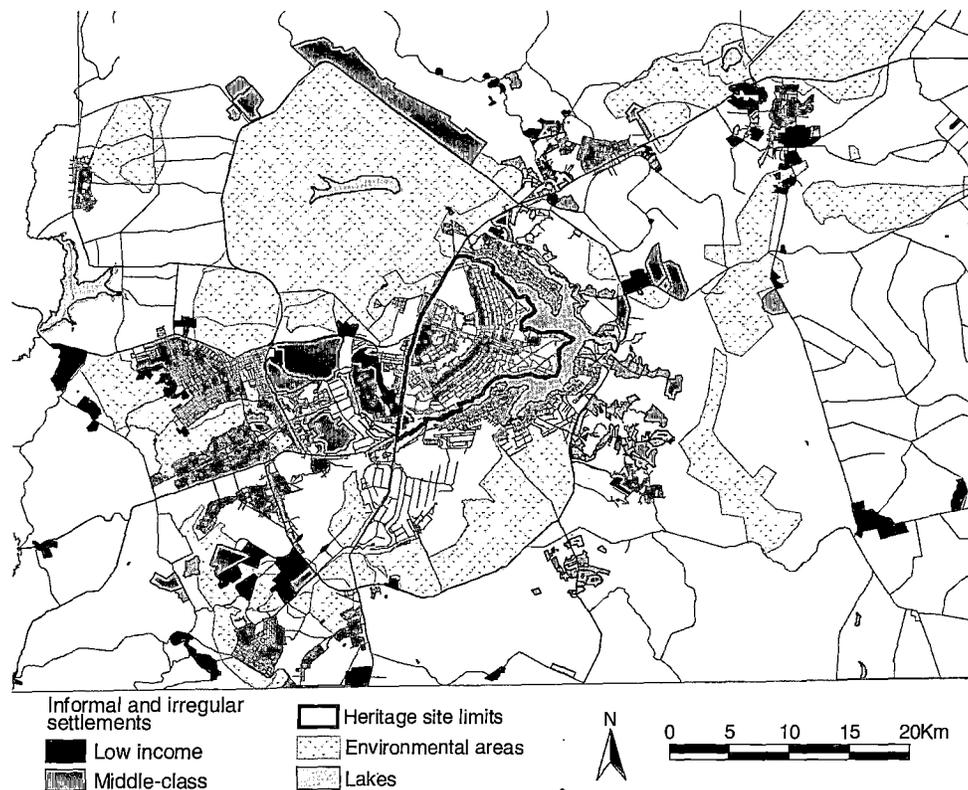
The efforts to preserve Brasília's *Plano Piloto* culminated in 1987 when it was assigned as World Cultural Heritage Site by UNESCO. With little more than 37 years of existence Brasília had its principles of spatial

organization preserved as an important cultural site, the only contemporary city to receive this title. As such, the principles of conception of Brasilia were preserved according to the 4 scales on the basis of in which the city organization was conceived: the Bucolic Scale, formed by the green and empty spaces that surround functional areas; the Gregarious Scale, formed by the spaces that are set to work activities; the Monumental Scale, the spaces that form the administrative core of the city, and the Residential Scale, the housing areas of the *Plano Piloto*. According to these guidelines, the relationship between built and empty spaces should be protected from using opened spaces for new developments. In addition, the original height of the buildings must be kept unchanged, and land recycling via demolition and re-building of new and higher structures in response to the increase of land price is not allowed.

During the 1980's and 1990's, Brazil's economic outlook changed. Due to accelerating inflation, rising internal and external deficits and economic recession, easy public financing for housing ended. This conjuncture paired with rigid regulation of land use decreased the supply of housing in Brasilia, for low income and for the middle classes as well. The robust demand for housing in Brasilia has stimulated the emergence of a private land market that trades the undeveloped private land not yet expropriated. In addition, an illegal land market was encouraged on public land.

Since then, many developments of detached houses in private and public land have occurred in the irregular and illegal land market not only for low-income people, but also for middle-income families. This so-called "horizontal condominiums" problem has been the subject of extensive discussion, several studies and an evolving set of policies.

Figure 3: Urban structure of Brasilia.



Source: State Secretary of Urban Development and Housing of Federal District (SEDUH-DF), 2004.

The sketch presented above summarizes the historic background of the spatial formation of Brasilia, that is shown in Figure 3. Note how the spatial structure of Brasília is fragmented, reflecting, among other things, the official control of land supply. In addition, very often the spaces between the urban agglomerations that form the urban mosaic of Brasilia have environmental restriction against occupation. Nonetheless,, , these areas have constituted a stock of undeveloped serviced land that distorts land prices in the overall city and are, in addition, targets of informal occupation.

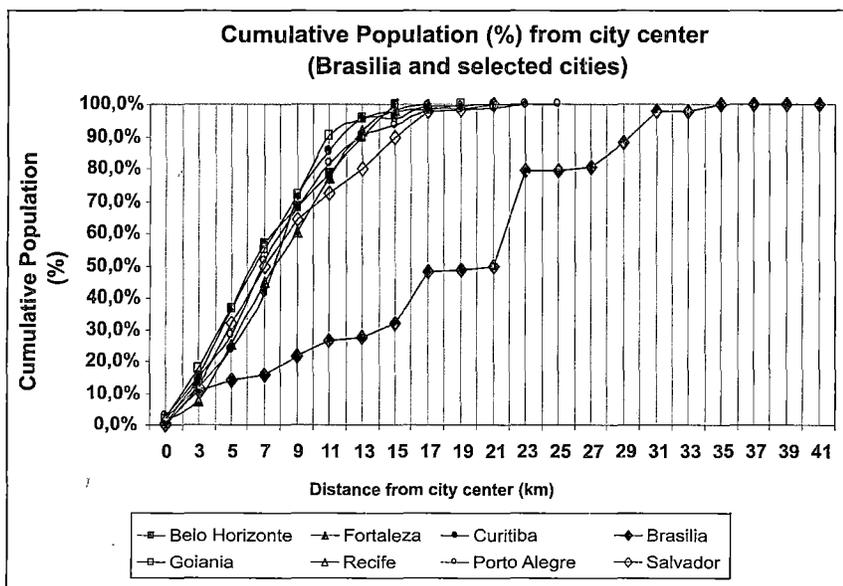
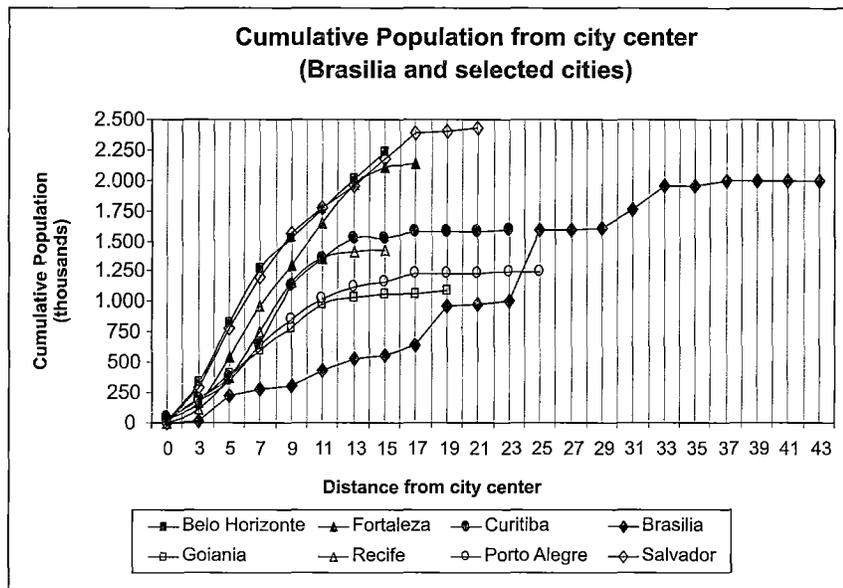
The urban areas of Brasilia fall within a 43 kilometers radius but the built area corresponds only to 598 km², of about 10% of the area defined by that radius. Hence, if we consider only the built-up area, the effective density rises from 3.5 to 33.5 persons per hectare. The low density and great distances found in the Federal District result in large urban services delivery costs that are paid by the whole society. Nevertheless, these costs are disproportionately borne by the poor people who live in the most distant areas of the city.

While the population of Brasília sprawls over a 43 kilometers radius, job opportunities are heavily concentrated in the central areas. Accordingly to Ministry of Labor (MTE) data, about 70% of the formal jobs in Brasilia are concentrated within the heritage perimeter. Hence, daily commuting distances and costs are quite significant, since most of the population lives far from the city center. As a consequence, public transportation in Brasília is one of the most inefficient in Brazil. While the median of passenger transported by public transportation is between 1.8 and 2.5 per kilometer in cities such as Recife, Curitiba and Porto Alegre, in Brasilia it is less than one, reaching only 0.82, according to Transportation Ministry data.

This indicates that the system in Brasilia is more costly to operate, reflecting the high public transportation fares. In addition, with an average distance per person of about 20.1 kilometers, the opportunity cost of the time involved in commuting is very high, even for poor people. Perhaps, this may stimulate the use of cars. In Brasília there are 3.4 people per vehicle, an automobile-intensive ratio that, even though higher than other cities, such as Porto Alegre (3.0), Curitiba (2.4) or Goiânia (2.4) is lower than Brazilian median rate, of about 5.8.

Histograms derived from Figure 2 show that in Brasília most of the population is located between 19 and 25 kilometers from the city center, while in the others cities in our sample most people are between 5 and 9 kilometers from central areas. In fact, the plots shown in Figure 4 present the cumulative population across the urban area in those cities. They show that, while Brasília contains 278,364 people within a 7 km radius of the city center, cities such as Belo Horizonte, Salvador and Fortaleza, also with a total population above 2 million, aggregate 1.2 million people in the first two cities and 0.9 million in the last, at the same distance. The 7 km radius in Brasilia includes the residential areas within the heritage limits. If the radius broadens to 9 km, Brasilia presents a cumulative population of 312,487, what corresponds only to 15.6% of its total, while most of the other cities present cumulative population that varies from 60.5% in Fortaleza, with 1.2 million people, to 81% in Recife, with 1.15 million people.

Figure 4: Cumulative population from the city center in 2000.



Distances in Brasilia are only comparable to those in Rio de Janeiro and São Paulo, even though having much less people. Figure 5 shows that within the same radius 9 km from the center formerly mentioned, while Brasilia has 312,487 people, São Paulo has 2.9 million and Rio de Janeiro 1.3 million people. Comparing Brasilia with these cities is important to demonstrate how the spatial model of Brasilia increases land consumption; in a country with serious limitations on access to serviced land by poor people this spatial pattern decreases access of low-income groups to the benefits of urbanization. On the other hand, it is not true that cities that use more intensively and efficiently their urban land yield necessarily a more equitable urbanization. In general, it is not true and the spatial segregation of low-income population occurs in the Brazilian urbanization model, in one way or another.

Figure 5: Cumulative population from the city center in 2000.

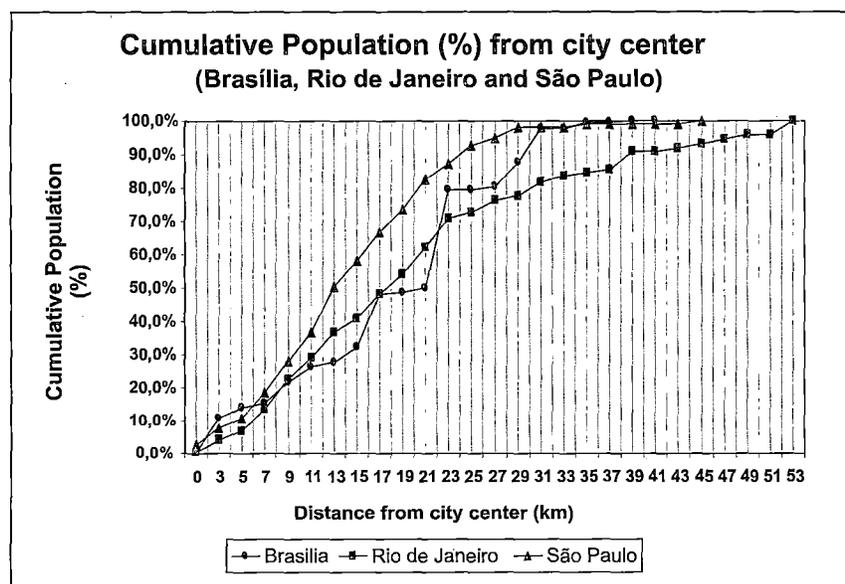
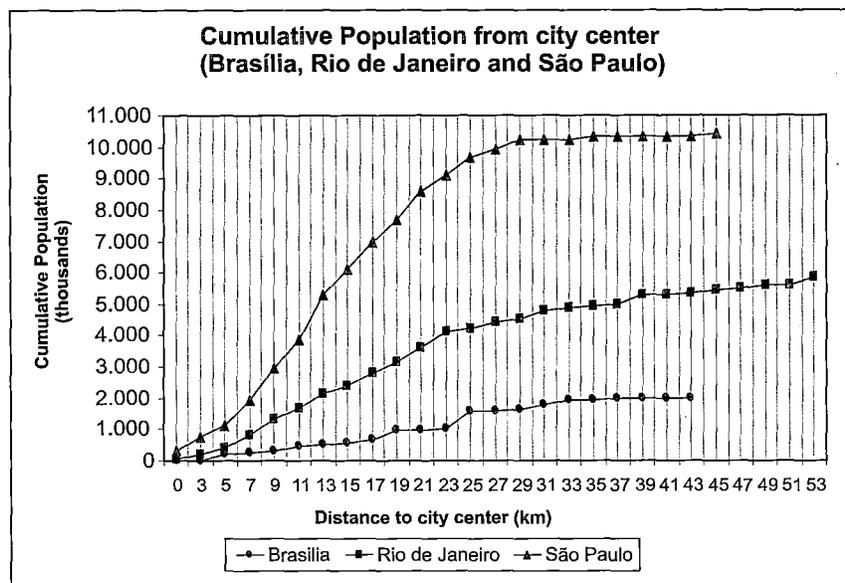
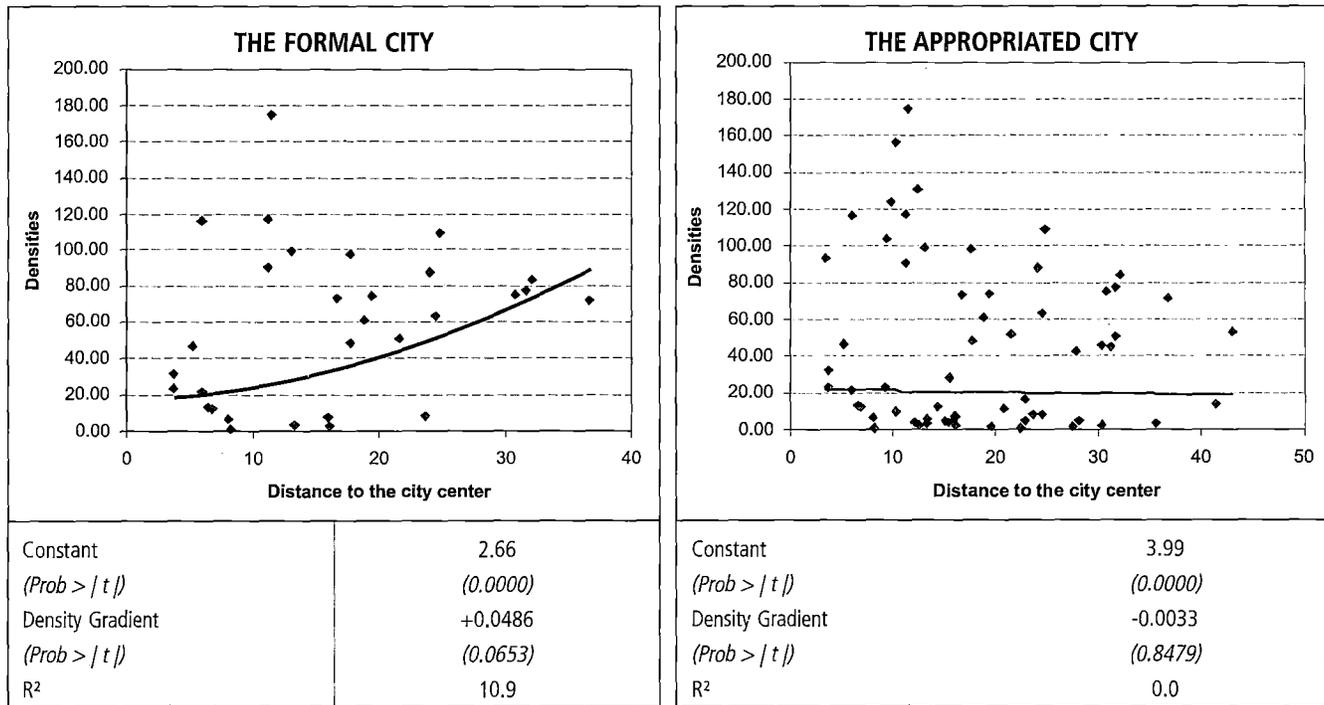


Figure 1 showed that the Density Gradient of Brasília is negatively sloped, as predicted by the theory, but practically flat. To deepen our analysis, we made an additional set of estimates of the Population Density Gradient for Brasília considering what we called as “Formal City” and “Appropriated City”. In the first we considered 32 areas that form the regular and official city. In these areas we included the *Plano Piloto* and the settlements that were developed by local authorities. The second set of regression calculations considered all the areas of the city, including those developed by informal land markets. The areas originating from informal land markets included low-income and middle-class settlements that were developed in private and public land, near the main transportation corridors and near some consolidated urban areas. The results are shown in Figure 6 and respective Tables.

Figure 6: Population Density Gradients for Brasília in 2000.

Note that in the first regression, e.g., the Formal City, the Density Gradient curve does not fit the data very well, since the R² shows that only 10.9% of the total variation in density is accounted by variation in the distance from the city center. In the Formal City, the spatial distribution of population was not driven by the proximity to the jobs location. On the contrary, the strategy adopted by the authorities of Brasília was to settle people far from the *Plano Piloto*, according to planning guidelines concerned with environmental and urban preservation.

Hence, the positively sloped density gradient curve reveals the pattern of population distribution promoted by the technocratic and, some would say, elitist planning practice underlying the housing policies implemented over the course of time.

Nevertheless, distance to the city center is not a good predictor of population density. In order to correct the model specification it should incorporate other variables, such as proximity to other employment areas, some amenities and, in special way, the rigor of land-use controls. This is clear when we observe the outcome of the second regression, for the Appropriated City, where the Density Gradient curve has a slight negative slope. In this case the R² is zero, which signifies that the distance to the city center cannot explain the variation in the dependent variable, the population density. In other words, even though the pattern found corresponds to theoretical predictions of decreasing population density with distance from the city center, the regression line is practically horizontal. In this case, the coefficient of the regression is zero and the values of the densities can not be predicted by variations in distance to the CBD. Hence, in any case the variation in distance was not a good predictor of densities across urban area of Brasília.

However, the reversion of the slope of the density gradient when informal settlements are included in the regression calculations demonstrates that these settlements soften the trend of isolating people from the

central areas. This suggests that land allocated by informal markets gets people closer to central areas, compared with command-and-control land allocation. The bad news is that, even considering informal settlements, poor people continue to live far from the main job locations, as shown in Figure 3.

Generally, the maintenance of low densities in the central areas is costly and inefficient from the economic land allocation point of view. The opportunity cost involved in maintaining the well-located land undeveloped instead of allocating it for alternative and more efficient use has pushed housing prices higher across the whole city. The increase of the land and housing prices is noted not only in the central areas, but also in areas far from the central areas developed to respond to the housing demand. Aguas Claras, for example, located distant 20 km from the city center, has experienced a fast rise in its housing prices that has reached 40% during 2004. Moreover, the high housing prices are responsible for pushing the poor population further away from the center of the city. It seems unlikely that the green-space and amenity benefits of the vast undeveloped areas could offset the opportunity cost derived from its fragmented spatial structure.

The high land prices found in Brasilia suggest that the city, in comparison with others, probably employs capital inputs intensively, perhaps excessively so, in housing production. This reflects the high price per unit of floor area found in Brasilia, higher than in other cities. It is interesting to note that the high land prices that trigger construction of vertical structures, i.e., causing higher densities within the central areas in other cities, in Brasilia operates within structures. Since the height of buildings is limited due to constraints imposed by land-use controls, developers have produced more and smaller housing units per block and per unit of land. One cost of constraining housing supply in central areas is that households live in increasingly smaller spaces not only in apartment blocks, but also in commercial buildings, where offices are used as housing.

Different spatial arrangements impose different patterns of costs and benefits on the city as a whole. The maintenance of undeveloped land nearby and within the central areas via strong land regulations should be evaluated according to cost and benefit considerations and not only according to formal aspects. While it is unquestionably true that green spaces in the core of the urban area are positive for quality of life, due consideration should be given to its cost, since this quality of life is disproportionately appropriated by a small segment of the population.

These costs are paid by everyone, including low-income families that live on the fringe of the city. However, these people do not take advantage of the possible benefits of living at great distances from the city center, such as larger houses and a better environment, a normal compensation for the greater costs involving long commuting distances.

Conclusion

Even though the differences that distinguish the birth and the growth of cities located in different regions of Brazil, including the country's present great regional disparities, the population distribution across their urban areas is similar to cities worldwide. According to theory, urban population densities decline from the city center toward the outer limits of the city due to high land prices at more accessible sites that trigger the increase of built floor area per land area. By estimating the population density gradients for ten Brazilian cities this pattern was found for nine of them, except for Brasilia, which the expected pattern was inverted. The results for the population density gradient found for Brasilia, positively sloped when considered only the "Formal City" and slightly negative if formal and informal settlements are considered, are emblematic of the

effects of land allocation commanded by bureaucratic decision and assisted via strong controls over land use. It is worthy noting that Brasilia shares a positive sloped PDG with other cities where land allocation is assigned via administrative processes and assisted by strong land-use controls, such as cities from transition countries such as Moscow (Bertaud, A. and Renaud, B. 1997) or cities where government has implemented apartheid policies in the past such as Johannesburg or Capetown (Bertaud, A. and Malpezzi, S., 2003).

Behind the Population Density Gradients found for Brasilia there is a city whose population is dispersed in an area approximately twice that of cities with approximately the same total population. The median distance per person of above 20 kilometers found in Brasilia, for example, shows the dramatic distribution of much of its population at the outer limits of the city.

The outstanding urban design of *Plano Piloto* and the spatial arrangement of the city as a whole have resulted in high land prices and high intra-urban, out-of-pocket and time travel costs. The supply of primary infrastructure also involves high costs due to large distances involved, exacerbated by extensive empty spaces between urban areas. Probably, the costs derived from that spatial arrangement hinder the competitiveness of the city, private investments and development in general.

The importance of the study of density gradient patterns lies in the help it provides in formulating efficient public policies in urban areas. In sprawling cities characterized by low densities, exclusionary land uses and bedroom peripheral areas, the supply of services and infrastructure is costly compared to more compact cities. In addition, it generates long commutes that, in turn, increase air pollution and traffic jams. On the other hand, too dense cities may constrain infrastructure systems exposing them to diseconomies entailed by externalities like air pollution and traffic jams. Nevertheless, it is possible to have denser areas that balance a mix of land uses in places accessible by foot and where open spaces have interesting qualities that stimulate social interaction.

In addition, the long-term study of densities, combined with the study of land use, can provide elements for understanding land market dynamics and the development of urban land-value, which in turn is tied to the social stratification of the city space.

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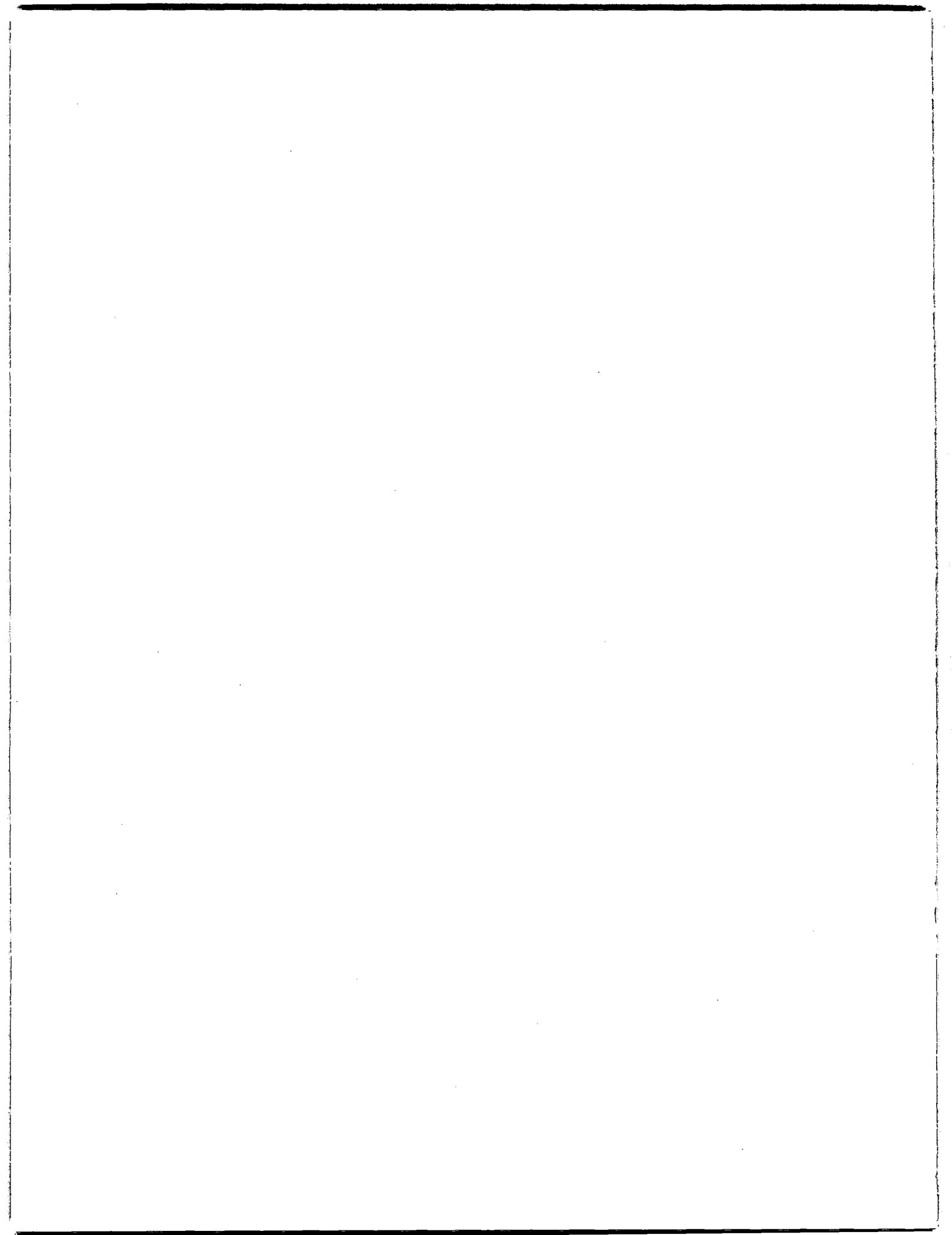
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IN SAN JOSÉ, COSTA RICA, EFFECTIVE METROPOLITAN PLANNING AND SELECTIVE INFRASTRUCTURE INVESTMENT CAN IMPROVE THE QUALITY OF LIFE FOR THE POOR

*Rosendo Pujol**

Abstract

The development process of Costa Rica is somewhat atypical. The country can be characterized by: a very open economy, with full democracy and small but growing inequalities. The quality of public services is good, in some cases excellent and reaches most of the country. The State has a much bigger role than the "optimum" according to the international development institutions.

Costa Rican urban growth can be characterized by low densities, residential developments too homogeneous at the micro and meso scale. The new developments are mostly along the roads. The road system has a very deficient spatial pattern, with many bottlenecks and lack of redundant links.

The planning process in the Great Metropolitan Region of San José is weak or almost non-existent. As a consequence, the city is expanding over very valuable areas of fertile and permeable land in which excellent aquifers get recharged. The low densities of the development creates strong pressure for higher motorization, longer trips, higher fuels consumption and more emissions of pollutants.

Potential solutions are: (a) increase densities in every new development; (b) create infill projects; (c) recycle urban areas close to the transportation corridors at higher densities with mixed land uses; (d) develop the small cities close to the Metropolitan region; and (e) promote de creation of jobs clusters in areas potentially well served by public transportation. The infrastructure investments should improve the public transportation system and help to rebuild the water and sewage infrastructure to allow higher land use intensities.

This paper presents some of the physical planning challenges facing the Metropolitan Region of San José, the main metropolis of Costa Rica. Emphasis is given to the needs and solutions for a better quality of life for the poor.

Costa Rica is an outlier in the conceptual space of the most used dimensions for development: social, economic, political, environmental and institutional. Costa Rica is difficult to classify by reductionists because it does not fit their assumptions well. The country has been successful in (a) effective democracy; (b) social development (health, education), (c) infrastructure provision (electricity, water, telephone lines), (d) steady but moderately fast economic growth process during almost sixty years, and (d) protection of the environment. The Costa Rican State is still powerful and influences significantly Costa Rican society and economy.

However, there are major failures in the Costa Rican development path. Relevant to this work there are six very significant weaknesses: (a) very weak local governments, (b) lack of public investment due to low tax revenues for its level of development; (c) very inefficient and relative ineffective use of the territory, that is low

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densities, many land use conflicts, lack of minimum urban infrastructure (d) significant deficits of urban infrastructure, in particular transportation and sewage, (e) growing social inequities and (f) lack of adequate urban and regional planning.

At this point in Costa Rica, many people would agree that the quality of urban life has decreased compared with 30 years ago. There are many subjective and objective factors that motivate those feelings. The first is the transformation of the city from a set of small towns and cities with personal contacts into a set of suburban development, much more segregated socially. Second, the transportation time has increased enormously for many people, the poorest in particular. Third, the feeling of insecurity has increased along with relatively smaller increments of thefts and some aggressions.

Of course, probably the newcomers or the movers from the central areas to the new neighborhoods in the surrounding municipalities feel better now. In consequence, the real net changes are difficult to compute.

Costa Rica is confronting many difficult issues, that could change it forever, and maybe not for the better. Among them are the need to transform its tax structure, and the Free Trade Agreement of Central America with the United States (CAFTA in the USA), which implies big changes in the way the country has structured its social and economic institutions.

This paper provides results of a disaggregated analysis at the census tract level of the social, economic and demographic characteristics of the population. The analysis includes data on densities, land values, transportation travel times and social characteristics of different areas for the Metropolitan Region of San José (GAM) and some of the cities and towns located less than one hour from at least one of the four more important urban centers: San José, Alajuela, Heredia y Cartago.

This paper's next section is a brief description of the Metropolitan Region of San José (GAM). The patterns of development of the metropolis are presented later, followed by a discussion of social segregation, densities, transportation infrastructure and land values. There is a section integrating these factors in a conceptual argument about the importance and potential for good physical planning. Conclusions and recommendations are presented.

Conceptual framework

The issues of land availability and equity impacts are much more complex than that of excessive or inadequate regulation. The optimum set of urban policies depend very strongly on the specific contexts in every country and metropolitan region. In this regard, important contextual realities include the distribution and average personal income; the development of the legal system and level of compliance; the degree of technological development and the fragility and value of the environmental systems supporting the urban areas.

There is no magic bullet for urban improvement applicable to every developing country. One of the critical issues is how much "cheap and flexible solutions" can block future development and generate large costs in the future. This has to be solved based on the current and expected wealth in the future, and on the vulnerability of natural systems on the urban fringe. In any case, the rapid growth of the area of a city will mean longer journeys for the people forced to live in the border areas. Their real integration into the urban markets for labor and goods will typically require heavy investment in transportation infrastructure.

An effective analytical and practical strategy is to insist that land is the scarcest resource in many urban areas and that its intensive use is important for the current and future vitality of the city. (Jenks et al, 1996) The effectiveness in the use of urban land is a critical criterion for urban sustainability. In the cities of Central America, there are many opportunities for increasing land use intensity. However, a more intense land use requires simultaneously a better infrastructure, paid usually with higher total public investment, even though they would be lower per inhabitant. In addition, this process cannot simply mean the destruction of poor neighborhoods to build flats for the higher income groups.

A broader regional urban system perspective can also improve, in some circumstances, the analysis and design of adequate metropolitan policies for land use. (Bernick and Cervero, 1997) It is especially important to include the city above in the urban hierarchy above the one under analysis, and the nearby towns immediately below. Many of the paradoxes about urban land provision, transportation accessibility, urban growth, land regulations, and job opportunities can be partially solved with a broader territorial perspective.

Brief introduction to Costa Rica

Costa Rica is a centralized country politically and economically. The city of San José and in particular its Metropolitan Region (GAM) dominate the country from their strategic location in the Central Valley. (see Map 1)

There are accepted explanations for the causes of the differences between Costa Rica and many other developing countries. It is possible to present a summary of key facts about its society and its economy.

Known factors on Costa Rican level of development

- No military expenditures.
- Working democracy
- Relatively effective judicial institutions.
- High levels of social investment and good quality of public services. The 2006 *Estado de la Nación* indicates that 98,1% of the Costa Rican housing units have access to the national grid, universal access to the health system, around 90% of the population has access to running water of relative good quality
- Good social indicators: mortality rate 9,78 per 10 000, life expectancy for men 76,9 and for women 81,4, open unemployment was 6,6% in July of 2005 and decreased to 6,0% in July 2006
- The Human Development Index (HDI) of Costa Rica has been oscillating from a maximum of 0,889 in 1998, to a minimum of 0,797 in 2000, the last available of 2005 is 0,838 for the 47th place in the ranking. In 2000 for Panamá the HDI was 0,707 and 0,632 for Guatemala and for El Salvador in 1999 the HDI was 0,714 (PNUD, 2003).
- Good environmental behavior in comparison with the rest of the developing world.
- Very open economy (exports plus imports are close to the value of the national product).

With respect to the Latin American region

- High levels of Foreign Direct Investments per capita. US \$1200 millions for 4,3 million people in 2006, and US \$861 million in 2005 (Procomer)
- Very open economy and high levels of exports in relation to the domestic product. Latin Business indicates that Costa Rica is the second country more economically open in Latin America after Panamá. The exports of goods will surpass US \$8000 million in 2006.
- Significant attraction of foreign tourism especially in the ecotourism market segment in which Costa Rica is highly competitive, product of preservation of extraordinary resources, accessibility and innovation in the product development.
- Low rates of crime, per example, in the period 2000 to 2003, the annual rate of homicides was 6.54 per 100 000 people for Costa Rica and a similar value for the GAM. In the county of San Jose, with more than 330 thousand people, the rate is close to 14,6.

Costa Rica Hidden treasures that influence the Metropolitan Region of San José.

- Steady, although moderate economic growth around 4,4% from 1992 to 2002.
- Rapid transformation of the Costa Rican economy with great diversification of exports products and services but not yet in foreign markets.
- Good air transport connections that provide superior accessibility to incoming tourists, visiting businesspeople and cargo exports.
- Competitive price of electricity produced mostly from renewable sources such as hydro, geothermal and wind.
- Very low local telephone fares.
- Rapid reduction of very high rate of population growth. Costa Rica is the second country in Latin America, after Cuba, in which the birth rate has fallen to the replacement rate, i.e., constant population in the long run. Immigration – particularly from neighboring Nicaragua - could significantly change this reality.
- Many old small towns which allow organic urban growth using the existing infrastructure
- Many small landowners that provide directly urban lots for residential development
- For decades relatively small migration to the Metropolitan Region of San José – Gran Area Metropolitana (GAM).
- Costa Rica does not “export citizens” in search of a livelihood to other countries in Central America, Ecuador, Bolivia or Colombia. It attracts foreigners from Nicaragua, but also from Colombia, Venezuela and other countries.
- Abundant underground water reserves charged at extremely low prices.

Problems of Costa Rica relevant to urban growth

- The best urban land has been misused through development at relatively low densities. Costa Ricans pay lower taxes, less than 12% of the national product to the central government, due partly to evasion, but also to legal exemptions for certain economic sectors (INTEL, tourism, export oriented industries located in the Zonas Francas). Countries like Mexico have currently similar effective tax rate but they have oil that can pay for essential investments. That is not the case in Costa Rica. Corruption in the public and private sectors. Transparency international ranks Costa Rica in the 51st place in 2005, and the 55th place with 4,1 in 2006. There are significant income differentials and the inequality in the distribution of income is growing. The Gini Coefficient reached its best value 0,377 in 1995, the worst in the last decade was 0,433 in 2001, in 2005 the Gini Coefficient was 0,405 (*Estado de la Nación*, 2006). Other sources (PNUD, 2003) indicate that Costa Rica in 2001 had a Gini Coefficient of 0,473 which can be compared with 0,518 in El Salvador, 0,582 in Guatemala, or 0,584 in Nicaragua. However the Gini coefficient for developed countries in particular the Scandinavian countries and The Netherlands are much better.
- The adaptation to the growing globalization has created tensions within the country. Partly as a result, the country is in a state of political paralysis created in part by political extremists at both ends of the spectrum.
- The recent prosecution against three former presidents for corruption, which have placed two of in jail, have increased the political crisis, in particular within the traditional two parties: the Christian Democrats (Social Cristiano or PUSC) and the Social Democrats (Liberación Nacional or PLN).
- There are many immigrants entering Costa Rica to stay or in transit toward the United States of America. Most of the modern export agriculture depends on Nicaraguan labor. They are also essential in the construction industry, private security firms and domestic services. Many of them live in very harsh housing conditions both in the cities and in the countryside. They present challenges due to extra demand to the social security system (health) and also in some cases the educational system at the primary level.

Patterns of urban development of the San Jose metropolitan region

The Metropolitan Region has grown from the spatial integration along several decades of four provincial capitals (San José, Alajuela, Heredia and Cartago) and dozens of towns into almost a continuous urban space in the Central Valley of Costa Rica at approximately 1100 meters of altitude. The first three are located in the Río Grande de Tárcoles watershed that drains into the Pacific Ocean, and Cartago is part of the Reventazón Watershed that drains into the Caribbean. (See Map 1, Pujol, 2003c) In the last sixty years of the nineteenth-century the economy of the region and of the country was based in the production and export of coffee, much of it produced in small farms (Hall, 1976). After independence from Spain in 1821, San José soon became the most powerful and dynamic city, relegating the former colonial capital Cartago to a secondary position.

In the last half century the growth of the city changed slowly toward the infilling of the areas between San José and the towns surrounding it using the main roads as the axis of development and, later, with big

housing projects. (Pujol,1988) The process destroyed thousands of hectares of fertile land, ideal for the cultivation of coffee.

The original commercial center of the city expanded in every direction but mostly toward the east and west, creating an elongated commercial area close to which many of the high income neighborhoods were created.

The poor were relegated to the borders of the rivers and later into the foothills of the southern and eastern border of San José. Eventually they took over centrally located but relatively isolated areas, located close to the main river canyons of the region (La Carpio in the La Uruca district, and the eastern tip of the Pavas district). Most of the housing construction for the poor has been contracted by the national State to private firms through formal channels.

The Costa Rican housing program was for several years one of the biggest in the developing world, relative to the existing housing stock. It reached a big proportion of the population with housing solutions, but it also had negative consequences. Since 1986, when it started, has used almost exclusively the same one story prefabricated housing technological package which is extremely non effective in urban areas that require higher densities due to high land values and also in areas prone to flooding.

Several governments concentrated in providing the higher number of solutions in the short term, without taking into account the great environmental differences within the country and in particular the urban context in which those housing solutions were being located. As a consequence, in many cases the required investment in complementary urban infrastructure was higher and the transportation costs for the inhabitants much higher due to big separations between jobs and housing units.

On the other hand, in the last six years very few additional housing units have been built within the GAM. There is no more unexpensive land available with no environmental restrictions to locate one-story housing projects.

The current patterns of urban growth have serious Environmental Impacts

Among the most important ones are:

- Urbanization of fertile soils especially in the north of the region.
- Transformation of moderate hydrologic hazards into relatively serious urban risks.
- Congestion and increasing travel times to work, universities, business and social activities.
- Increased risk of aquifer contamination in the northern part of the region due to septic tanks and the lack of treatment of sewage, which goes into the rivers.
- Insufficient opportunities for open space for recreation for most people in the region.
- Lack of recreational opportunities for young people, especially for the poor and in particular for the ones that live in the nucleus with many poor people.

Additionally it is very hard to find land for critical projects such as sanitary landfills, because the unplanned and disperse pattern of development shown by the Costa Rican human settlements.

Urban spatial realities: social and economic factors

The Metropolitan Region of San José still has its main commercial areas in the centers of the four cities, especially San José, and the other towns of the 31 counties included. However the main radial roads from San José have attracted great numbers of commercial uses in a relatively unplanned form; hotels and industry are located side by side, as are hospitals and commercial areas, and many more odd combinations. The original Master Plan for the region from 1982 reserved areas for industrial development. Some of them were built, others had other uses. The solution was to allow the private sector to create their own industrial parks in certain areas of the metropolitan region, for example close to the international airport and the roads going to it.

In the last 15 years big shopping malls have been built, not only in the metropolitan area of San José but also in the outskirts of Cartago, Alajuela and Heredia. They are oriented to the automobile, even though most of them have relatively good access by transit. In the last decade several office parks have been built. Simultaneously significant commercial activity by both the private and the public sector has moved out of the center of San José (Pujol, 2003b).

Most of the residential areas of the Metropolitan Region are socially quite mixed. However, there are some areas where affluent people dominate. They are located especially in an axis east to west. The old ones are very close to the center of the city, the new ones are much farther. All of them are close to important roads (Décimo Estado de la Nación, Chapter 6th, 2004)

Social Characteristics of the Metropolitan Region of San José

Many years ago Costa Rican academics from the Institute of Economic Research of the University of Costa Rica such as Juan Diego Trejos operationalized the concept of Unsatisfied Basic Needs (Necesidades Básicas Insatisfechas, or NBI). The concept was created for different basic needs categories: housing, hygiene, knowledge and consumption. Evaluation of the spatial pattern within the metropolitan region or GAM of these four complex variables using census tracks data indicates that housing NBI and hygiene NBI have non homogenous spatial distribution, while the other two -knowledge NBI and consumption NBI - are more evenly distributed. (Pujol, 2004)

The Metropolitan Area of San José has more social segregation than the rest of the Metropolitan Region that includes the areas around Alajuela, Cartago and Heredia. But in the secondary non-metropolitan cities the social segregation in walking distance is smaller even though it is possible to distinguish poor neighborhoods, some of them squatter settlements.

Spatial Distribution of Non Satisfied Housing Basic Needs

The Spatial Distribution of Unsatisfied Housing Basic Needs, or "housing NBI" is not uniform within the metropolitan region, which has almost 51,000 of the total 136,000 deficient housing units in the country. According to a recent study (Pujol, Estado de la Nación, 2004) there are 11 concentrations of poor people, with a total of 27,460 housing units with 38% unsatisfactory. They represent approximately 5% of the housing units of the Metropolitan Region but more than 20% of the deficient ones. The worst concentration, Rincón Grande, has 86% of the housing units of unsatisfactory quality. (Estado de la Nación, 2004). All these spatial concentration of poverty, except one belong to the metropolitan area of San Jose. The exception

is Guararí just south of the city of Heredia. However, there are cases of housing non-satisfied needs in almost every census track of the city.

In these eleven concentrations of unsatisfied human needs there are large numbers of poor people with deficient housing units living in crowded area although a significant proportion have also achieved a satisfactory housing solution. On the other hand, in the dispersed human settlements on the periphery of the urban region, the proportion of inadequate housing is much higher even though the total number is smaller. This applies also to the many small rural communities with a high proportion of poor people and unsatisfactory housing units .

These concentrations also have low-quality public infrastructure. Significant improvement seems to be possible given the level of Costa Rican development.

Spatial Distribution of Non Satisfied Hygiene Basic Needs

The hygiene basic need refers mostly to the presence of adequate sewerage from the housing unit. In the Metropolitan Region a total of 23,500 housing units have this problem, compared to about 100,000 for the entire country. This reflects indirectly the economies of scale in public sanitation infrastructure in urban areas.

There were efforts in the old, consolidated areas of the city to provide for adequate sanitary infrastructure, even though it is not being properly treated. The subdivisions of the middle class have septic tanks in each house, but many of them do not operate well and the shrinking size of the lots and some very impervious soils make this method unsuitable for many areas of the city. The sanitation situation on the urban fringe is worse because of the lack of sewerage infrastructure in these more distant areas.

Tendencies and changes

There are some short-term elements that could have temporary effects, or open solutions to old problems never solved before:

- Relatively high prices for oil, in Costa Rica the price of gasoline is close to 80 cents per liter. This promotes public transportation and the densification of the center of San Jose.
- Special effort to bring again people to live in the center of San José.
- Desires, but not results of coordination between the different municipalities of the Metropolitan Region and in particular of its central core the Metropolitan area of San José.
- Lack of urban and regional planning, which. Hopefully, will be corrected in great part in the next five years with the financial support of the European Community.

It is urgent to solve one of the key obstacles: lack of adequate investment in urban infrastructure and in particular in transportation investment by the National and local government. There are expectations that additional public investment could attract matching investments from the private sector if the right planning policies are put in place.

Impacts of the current growth patterns on the quality of life of poor people living in the Metropolitan Region Jobs are being decentralized and many poor households do not have good access to them by public transportation. Minimum salaries, close to US \$200 dollars a month, are not enough to purchase a car that

would give “accessibility upgrading” in the short run. The share of the population “poor” by the official definition was 21,2% in 2005 and 20,2% in 2006. For almost 15 years has been oscillating around those levels. Even though the share of the population under very serious poverty has been decreasing slowly to around 5% of the total population.

The availability of good recreational areas is decreasing. The poor and not so poor people that live in poverty concentration areas deal with significant problems:

- Poor housing conditions for many.
- Lack of adequate public infrastructure such as streets, drainages, sidewalks, green areas in many of the poor neighborhoods.
- Relatively bad accessibility to the main concentration of jobs
- Poor quality of universal public services such as primary schools and high schools.

Transportation systems and their impacts

Transportation Connectivity

The national road network and also the metropolitan region road network have a strong radial dominance as is shown in Map 1 The Circumvallation Route that circles the center of the city except for the northern side (where eventually will be built) breaks partially and insufficiently this pattern. There are plans to build an Belt Road, which would connect the future main road to the Pacific Coast (27), with the main road (32) to the Atlantic Coast.

To cross the center of the city implies important delays because the radial roads to the center frequently have speeds below 15 kilometers per hour (Pujol, 2002a).

Metropolitan and interurban Public Transportation Characteristics

The public transportation route system is even more radial than the road network. This creates high accessibility for the center of San José, and also for the centers of the three secondary cities within the Metropolitan Region, i.e. Alajuela, Heredia and Cartago.

Anyone with a non-radial trip by transit has to go to the center of the San José Metropolitan Area first. Crossing San José involves big delays. partly because the final bus stops of the radial routes are not in the same place.

On the other hand, there are many secondary cities in the central valley at less than 90 minutes from the center of San José. Thousands of people travel every day to work in the Great Metropolitan Region but not necessarily to the center of San José. They chose jobs close to the national radial roads that connect those cities with the center of the center of the Metropolitan Region. The main sources of outside workers for jobs in the metropolitan region are Grecia, Atenas, Palmares, Naranjo and San Ramón toward the west, Puriscal in the southwest border, and Turrialba toward the east. These people can to their jobs in 40 minutes and, hence, are “closer in transportation time” to them than most of the inhabitants of the Metropolitan Region.

Urban densities

This is a critical variable in the creation of more sustainable human settlements. Densities are the combined result of land availability, land values, available technologies, existing natural hazards like earthquakes and floods, social traditions, institutional and social capital, rate of population growth and economic resources of each society.

For developing countries the challenge is to have better quality of life for all without investing enormous sums in urban infrastructure and protecting the surrounding environment. Urban infrastructure allows different density levels, but the low altitude development path of the Costa Rican urban areas has very bad consequences and should be changed in order to provide more collective open space, protect environmentally critical areas, and provide more and better housing space for the poor.

Past mistakes can become opportunities for the future, through the densification of the areas better served by public transportation. Public – private partnerships could create enough supply and demand for new types of development.

Urban Density in the Metropolitan Area of San José

In the city of San José, as in every human settlement in Costa Rica, most of the housing units are one story, even though more two-story houses are being built in the last ten years for every social class. The old cities and towns were mixed use, but since the 1960s preference was giving to “housing projects” with almost no other land use allowed. This has slowly changed.

The population densities in the San José Metropolitan Area are very variable but low on average. There are areas with gross densities of less than 20 people per hectare the commercial areas of the city specifically an east – west corridor. However, there are many neighborhoods with relatively high densities of more than 250 people per hectare. The richer neighborhoods have densities in the range between 50 and 100 people per hectare. Mixed use development predominated in the center of San José 30 years ago. Now the national and municipal government are trying to bring the people back to the center of San José with more residential development.

Urban Density in Alajuela

Population density in intermediate centers within the Great Metropolitan Region of San José (GAM) is higher than in the center of San José. The center of the city of Alajuela has population densities mostly in the range of 51 to 100 people per hectare. But there are some census tracks within the boundary of the city, and close to the center in the range of 100 to 300 people per hectare as the map shows.

Urban densities outside the Metropolitan Region of San José (GAM)

This paper includes density maps per census track of the cities of Naranjo, Palmares, San Ramón y Turrialba as shown in the collage of Map 3. The data comes as in the other cases from the 2000 Costa Rican Census.

These four cities – as more than 10 small cities surrounding the Metropolitan Region indicate – have densities in many census tracks of 21 to 50 people per hectare, many more with densities of 51 to 100, and even some

in the range of 101 to 150. In the border areas of the cities there are certain areas with densities of 151 to 200, such as the northern border of San Ramón and Naranjo, the south of Palmares. In the borders of the city of Turrialba in the northeast corner there are several census tracks with densities higher than 200 people per hectare and three over 251 people per hectare. In every one of the four cities which maps are presented in this paper, there are also densities below 20 per hectare, very close to the center of the city, opening opportunities for more in-fill residential growth.

In principle, denser in-fill development generally costs more than low density development. However, if all the environmental and social externalities are taken into account the case is not that clear in Costa Rica. The current land prices on the urban fringe are extremely high and there are very strong negative environmental externalities due to potential impact on the recharge of valuable aquifers, destruction of fertile soils and growing transportation costs. Besides the multistory construction could spread the higher cost of land among more housing units.

Lessons from the urban densities of Costa Rican cities

The city of San José is very different from the rest of the urban system

- There is almost no mixed land use
- The better served transportation corridors do not have many people living nearby
- There are areas with very high densities, which clearly are associated with crowdedness
- There are many alternatives for densification in the center of the city of San José and other counties original urban area.

There are possibilities for keeping the restrictions in the border areas of the region through planning. The future demand for land can be solved with a more intensive and effective use of existing urbanized land in the San José metropolitan region. There is always the risk of a gerentrification process. However, it always is possible to concentrate the new medium density for the poor in areas not so centrally located, along the transportation corridors. If the program is big enough the changes of a gerentrification are diminished.

A second strategy is significant infrastructure investment in the areas near the secondary cities of Alajuela, Cartago and Heredia, and Colón. Eventually, a third strategy would be more rapid growth of many cities within a 40 minute commute from the border of the metropolitan region. Among this intermediate cities are Grecia, Puriscal, Atenas and Palmares. This strategy requires of course, higher densities in the development and excellent public transportation at least to the main jobs concentrations within the region. That also would need enough investments in the road links that will connect the main urban area with the intermediate cities nearby.

Significant for this paper is that land values in the secondary cities outside of the Metropolitan Region have land values much lower than inside it. The small size of these towns, the prevalence of many small property owners, and the relative good transportation services toward the metropolitan region create automatically an alternative for many people.

Land values

The land values of the Office for Real Estate Valuations located in the Ministry of Finance (Oficina de Normalización Tributaria), a centralized valuation office for real estate are old and small compared with the current market values of urban land. Even worse, the spatial distribution of land values for 1997 is somewhat different at the current ones. New high-class subdivisions, some of them gated, have land values higher than many of the commercial areas of the region. This phenomena is related to growing inequalities of Costa Rican society (Décimo Estado de la Nación, 2004)

The land values of the national real estate assessment office indicate that San José still has higher values than most of the region. It also indicates that the centers of the old towns, which originated the metropolis, have still higher values, but at the same time new roads and commercial corridors in Escazú for example have higher values than the center of town.

Significant for this paper is that land values in the secondary cities outside of the Metropolitan Region have land values much lower than inside it. The small size of these towns, the prevalence of many small property owners, and the relative good transportation services toward the metropolitan region create automatically an alternative for many people that could travel daily to San José and the border of the region by public transportation.

Land Values in the Metropolitan Region of San José

The official 1997 land values for the county of San José, are presented in Map 4. The units are US dollars. The highest values in the center of the old commercial area of San José oscillated in the range of 1000 to 1208 US dollars per m². There was a very fast reduction toward the north and south and a much smaller decline toward the East and West with values in the range of 300 to 500 US dollars per m². The areas south of the center near the river had values below 50 US \$/m². But most of the south center had land values in the range of 50 to 100 US \$/m².

Map 5 presents official land values for the counties of Santa Ana, Escazú and Alajuelita, in the southwest corner of the San José metropolitan Area. Santa Ana and Escazú have been for many years preferred locations for high income people. Land prices in their old centers were in 1997 officially in the range of 41 to 100 US \$/m². However land prices along the route 27 and in the fashionable district of San Rafael de Escazú have reached values close to 475 US \$/m². Most of the area was in 1997 in the range of 200 to 475 US \$/m². In the last years, residential towers for very high income people, some of them immigrants from other Latin American countries such as Colombia and Venezuela, have appeared in this area.

On the other hand the values for the center of Alajuelita also range from 41 to 100 US\$/m². But most of the county, a relatively homogeneous and working class area is between 11 and 40 US \$/m² with the land values decreasing with less physical accessibility.

The Map 6 presents the officinal land values data for the city of Alajuela. The higher values are in the center of the city and the new main entrance road. They were in 1997 in the range 201 to 388 US \$/m². The rest of the original city that conserves a lot of mixed use were in the range of 41 to 150 US \$/m². The second group of high values is along the main roads crossing the county and close to the Juan Santamaría International Airport that serves almost 90% of commercial international flights entering the country. There the values were in the range of 26 to 40 US \$/m².

Land Values in urban areas outside of the metropolitan region

The land values in the small cities close to the metropolitan region are smaller. Two examples are presented here. San Ramón an important city in the western extreme of of the central valley showed in 1997 official land prices in the range of 201 to 259 US \$/m². Most of the areas for future development close to the city of San Ramón are in the range of 41 to 100 US \$/m².

Naranjo had the highest official land values for 1997 in the range of 101 to 104 US \$/m². An area of potential future growth south of the city had values of 41 to 100 US \$/m². Another area with certain existing development west of the city show values of 11 to 25 US \$/m² in 1997.

The critical point is that the centers of those cities had relatively high land values but they decrease significantly at very short distances.

Additional comments about land values and their changes

In recent years land values have increased significantly in new developed areas for very high income people, many of them working for multinationals. As a consequence the current map of land values, that officially does not exist, is probably different from the ones presented here with the official 1997 assessment values. Some current data has been also collected for this paper, but it is not enough, to give the full picture of the rapid change.

It is important to say that the serious weaknesses of local governments of Costa Rica in charge of real estate taxation indicate, which is not even the 0,25% of the assessed value that the law indicates should be collected. In the metropolitan region and in the whole of the country market values and declared values to the local taxation offices have differences in many cases of around one order of magnitude.

Location decisions

There are more interesting and well paid jobs within than outside the GAM

Costa Rican have high participation rates on the labor force for people above 18 years old and open unemployment has been oscillating around 6% for several years. The search for jobs however is not simple and presents challenging realities: few jobs in small cities for professionals and industrial workers, no cheap land or housing in the GAM, and social and family networks available in the original city of many workers, located more than 60 minutes away from the center of the region but only 40 minutes from its border.

There are different solutions to these dilemmas: have two homes and travel the week end to your original place, travel every day to your work, find a less rewarding job or be unemployed. Except for the first one, none is optimal but many people do have to choose between them

Many young people and families do search for a place to live. Te purchase of a house or an apartment it has impacts for several decades, especially in a country with low housing turn over. The decision is then a very important one including as an essential element the interest rate in colones and dollars (much lower) but also many factors that constrain the opportunities available. Among them it is possible to indicate the following:

- Land prices are growing rapidly everywhere in the country.
- The center of the city of San José has been losing population since the census of 1963. There are many problems that motivate moving out from the center: noise, lack of cultural activities, and more dangerous than the rest of the city and the country. However, some neighborhoods near the border of the center are alive and well. They house different social classes, but most are for middle class or low income, the latter located near the margins of the rivers. Much research work done on the topic indicates that the central location to jobs and other activities and tradition are the main reasons to stay.
- The spatial structure of the public transportation system does not provide adequate service for trips between suburbs.
- The middle class does not qualify for government subsidies to get housing and does not earn enough to have many alternatives.

For poor people the decision is related to the possibility of moving into the city, renting in some place, sometimes just a room, and eventually moving into a squatter settlement and sometimes to a formal housing project with the financial support of the Costa Rican state.

In every case, but much more for poor people, the opportunities of finding the right place are limited. Those possibilities are related to construction and productivity and also to planning or lack of it in every city.

Decisions by Employers

The location of a firm depends on its characteristics; some are looking for markets, other for inputs, and many for workers. The location decision has several dimensions: which country, which city or area of the countryside, which specific location. In many occasions all these decisions are done simultaneously.

Some firms, especially multinationals have chosen sites near the secondary cities in the Central Valley but not in the Metropolitan region. Many of these manufacturing plants have closed recently due in part to Chinese competition. Some of the people working there now are traveling every day to jobs in the Metropolitan Region.

Integrative analysis

The integration of the data of environmental challenges, density, transportation, land values and spatial location of poor people in the Metropolitan Region of San José provides some hints of a sometimes hidden reality.

Poor people live in the middle of most neighborhoods of Costa Rica, allowing civil society, through very different types of organizations, to act directly in favor of their "local poor".

However, society through the State has to create policies that widen opportunities for all people, compensating in greater degree those with smaller sets of opportunities. The provision of public services of enough quality for every inhabitant of the country is an essential component. Good public services in rural areas will retain people and would slow down urban growth. Even more important and effective for the urban system, is to improve the quality of life, and the job and educational opportunities in intermediate cities. They serve as regional capitals, and help avoid excessive migration toward the main metropolis.

To improve the city is to open better opportunities for their inhabitants and visitors. The higher densities and agglomeration of people allows lower the unitary costs of many services and urban infrastructure. Housing and jobs are essential elements of the quality of life. A healthy urban economy provides both. This demands certain balance between the growth of the city population and the growth of economic activities. Even more important, is to diversify the type of jobs and education available, through a more sophisticated set of economic activities, that allows people to find productive activities that fit better their abilities and dreams. A good city design attracts new economic activities, as Singapore, Curitiba and other cities show. (Freire and Polèse, 2003).

When the cities are very small, the distances from home to jobs and social activities can be walked. When cities grow bigger, public transportation is necessary. Good public transportation is essential for the social equity and economic efficiency of cities of the developing world, where it is very hard to provide enough roads and highways for the cars of the middle class and higher income people. The excess of vehicles per kilometer of road in peak hours generates much higher fuel consumption and emissions of pollutants. (Bernick and Cervero, 1997).

Good public transportation requires enough customers per kilometer of line, during as many hours as possible. This requires higher densities of jobs close to the bus stops but also, even though more difficult, is to have high residential densities close to the bus routes. A good transportation network amplifies significantly the job opportunities for the people, and the potential employees for business and institutions.

Poverty, especially when concentrated in small parts of an urban region, presents very significant challenges to societies that are striving to get into a more sustainable path with greater economic efficiency, social equity and environmental respect. Many interventions are possible. Lack of resources should not be an acceptable excuse. Pilot projects, which should include reflection components, with a small group of communities would be very important learning experiences that would prepare many actors involved for bigger projects in the future.

When the cities grow over very valuable natural systems the growth of the urban areas or direct impact area creates very significant negative environmental externalities with the destruction of fertile soils, paving water infiltration areas, pollution effluents infiltrate the soils and eventually the aquifers underground, that represent significant natural resources for the present and the future.

Urban growth and renewal has to have good quality, this is more than a mere set of data for academic economists. Regulations restrict development, but regulation can and should provide better urban developments. It is well known that in some countries restricting housing densities is a way of social segregation. But social segregation and low densities occur everywhere, in particular in San José, where the level of regulation is small.

The role of planning: realities and dreams

Urban Planning in the city of San José

Costa Rica has planning regulations, but most of them are ineffective, limited and not enforced. Most of the housing construction in Costa Rica is in the formal sector. Effective zoning exists in less than half of the thirty-one counties of the metropolitan region. However, national construction regulations are followed. Seismic standards result in buildings with well-designed structures, but historically have been an excuse to choose "safer one story buildings". The green area around the city and big areas for expansion has been

relatively respected for more than two decades, even though individual houses are being built on this space and the agricultural production, especially coffee, is decreasing.

One of the most significant paradoxes is that, while planning is weak, and sometimes badly designed, the construction of many housing projects - most of them small with governmental subsidies - has shaped significantly the city. It has reduced the amount of funds available for urban infrastructure, and the land available for future development. The slow pace in the construction of roads and sewerage networks, and in particular of specialized public transportation infrastructure makes it difficult to increase population densities along their axis, and to have a more efficient urban region, as Curitiba and Bogotá have done.

In Costa Rica, there are plenty of cases of planning decisions and granting natural resources use to the powerful and the rich. There are all kind of cases: very low price for the extraction of water from aquifers for industries and private users, destruction of the national roads by overweight trucks, not charging for the benefits of road construction, very small tax to diesel compared with gasoline, abusive concession in the coastal areas and of course the serious limitations of the public urban infrastructure in hundreds of poor neighborhoods in the metropolitan region and the rest of Costa Rica. So the problem is not excessive planning, is the use of power to favor small groups through planning and other means.

The potential role of good planning

Good planning does not mean more planning, or all the planning that was not done before. Planning results, at the end, depend strongly of the social consensus built about collective interests expressed over the territory in form of open space, urban infrastructure, residential neighborhoods, and commercial developments. The social consensus, or more appropriately the results of partially resolved conflicts, should guide planning decisions, and they change with time. Planners argue that they have lost most of the battles. However, there is enough evidence, unfortunately, that bad planning ideas prevail many cases. The bad results are not immediately obvious, but take decades to be corrected. On the other hand, good ideas can be captured for powerful special interests, which dilutes them and sometimes ends up promoting other objectives.

The challenge is to create a planning policy for the urban system and in particular for the Metropolitan Region of San José which solves the following issues:

- a. Provision of additional land for housing and other urban uses (industrial and commercial, recreational, institutional),
- b. Promotion of a disperse but integrated urban growth,
- c. Real integration of labor markets and other urban opportunities within a metropolitan region,
- d. Reduction in the time required to access adequate jobs and educational opportunities, which influence dramatically the quality of life of the inhabitants.
- e. Improve the impact of migration to the urban system from the countryside or small towns.
- f. Protection of fragile and valuable environmental systems.

- g. Provision of adequate quality of urban development with an effective use of resources for infrastructure services provision.
- h. Improve the efficiency in the use of new and old urbanized land.

From the policy perspective, broadening land supply close to include the cities outside the limits of the metropolitan region permits a significant increment in the potential land available, decreases the impact of excessively powerful landowners in some cities, and permits a more balanced urban growth. This perspective is realistic and explains partially individual and market responses in many countries of Latin America such as Costa Rica, El Salvador, Paraguay to the challenge of finding a place to live with better quality of life within a reasonable commute. This strategy could help in the promotion of a successful organic decentralization and a reduction of transportation costs.

Another important element is the role of transportation in investments within the metropolitan region itself, its interaction with land purchases and urban expansion policies, and its impacts on land values. The construction of public transportation infrastructure services to poor areas would provide a value transfer to those poor neighborhoods that would be more accessible to the rest of the metropolitan region.

Costa Rica is in some areas a social development success story. Significant social investment has been expended on housing for the poor. However, there are many indications that a narrow perspective, that does not include better urban settlement practices has limited significantly the social effectiveness of those investments. (Fallas and Pujol, 2005) The expected results are that intelligent regulations and better investments can be effective in increasing the long-term sustainability of the cities, improve the quality of life of their citizens, and a deterrent to high land prices per unit of low income housing.

The unit of analysis should be the urban system and its interactions with the rest of the country and the economy.

It is very important to provide possibilities for flexibility to urban policies. Land supply for future development should be found in many different places. To avoid very expensive land, it is possible to combine several policies: open the search, partially to the borders of intermediate cities outside of the metropolitan region; renew the urban development in the central areas and in places with high current or future high accessibility through public transportation; increase real estate taxes unused urbanizable land, and decrease land taxes on land that should be protected.

The effort of PRU-GAM, the regional planning efforts financed by the European community is trying to correct the consequences of bad planning, incorporate all the relevant issues into the planning efforts, reinforce planning capabilities at the metropolitan and local level, integrate the physical planning with infrastructure proposals and develop subregional planning strategies at the submetropolitan level.

It would take several years to determine if these great efforts, that have created great expectations will fulfill them with better planning, a better city and a better quality of life for their inhabitants.

The Costa Rican experience can be relevant for other areas of the world

Positive aspects

- Urban developments with basic infrastructure are less expensive than correcting informal settlements.

- Urban policies can be improved and facilitated with national policies about infrastructure, taxation, and environmental protection.
- Effort to build solutions within a legal framework are worthwhile and effective in the long run.
- Accountability is very positive even though is not complete and totally effective.

Negative Implications

- Too much environmental damages in the process of urban growth.
- Fragmented decision making which makes decision making slow and solutions that arrive sometimes too late.

Some final conclusions

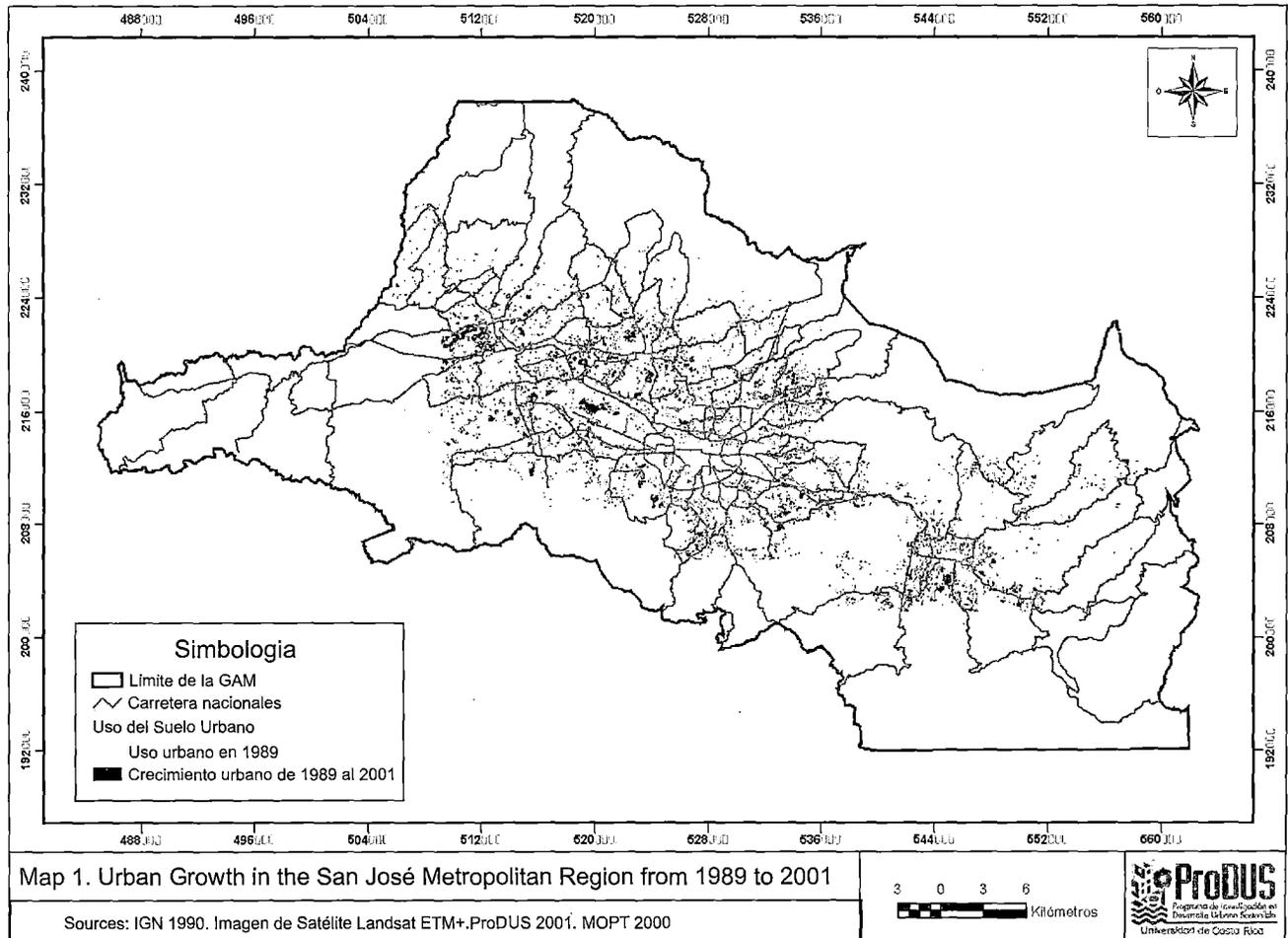
- The efficiency and effectiveness of an urban system, and of the major metropolitan region within it, requires as an indispensable prerequisite a decrease in social inequalities to tolerable levels consistent with minimum degrees of social solidarity and cohesiveness.
- Urban and regional planning can help in making the urban systems more efficient and effective. The effectiveness of urban and regional planning efforts increases significantly when they are combined with public investment, real estate taxation, and environmental and health regulations.
- Transportation investments open new areas. Adequate planning can make that process more effective and efficient if promotes higher densities with higher development quality.
- The developing world has great diversity. It is important to accept it and build a better world and much better cities based on this great opportunity.
- The poor require specific interventions in their favor. The opening of job and educational opportunities is important. It is also important to make available health, running water, electricity, telephone, and sewerage to everyone in an urban area, for the preservation of safety and security for all inhabitants and visitors. In most developing countries, that is not possible, but to explicitly defend that goal is essential. This presents critical challenges for financially weak governments; but to confront those needs, as soon as possible, is a long term very effective sustainability strategy in every dimension: economic, social, environmental, political and institutional.
- Urban interventions have to be seen as experiments which are designed for success but can help to provide learning elements for bigger and more ambitious projects in the future.

Acknowledgements

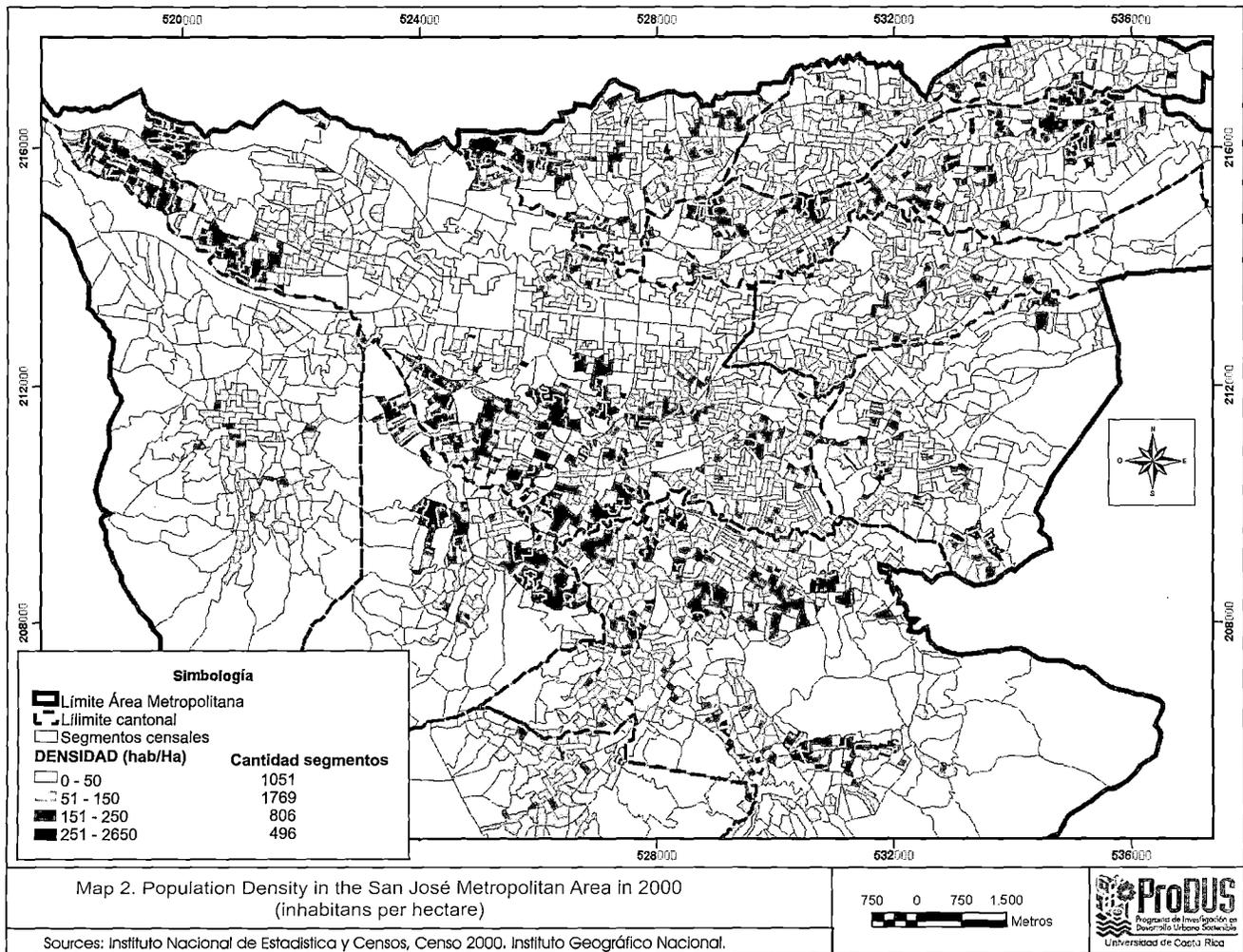
This paper has been possible thanks to the Vicerrectoría de Investigación de la Universidad de Costa Rica and the project Estado de la Nación of the four public universities of Costa Rica. Thanks also to the civil engineer Johana Salas which directed and partially did herself the GIS work presented in this paper.

Annex:

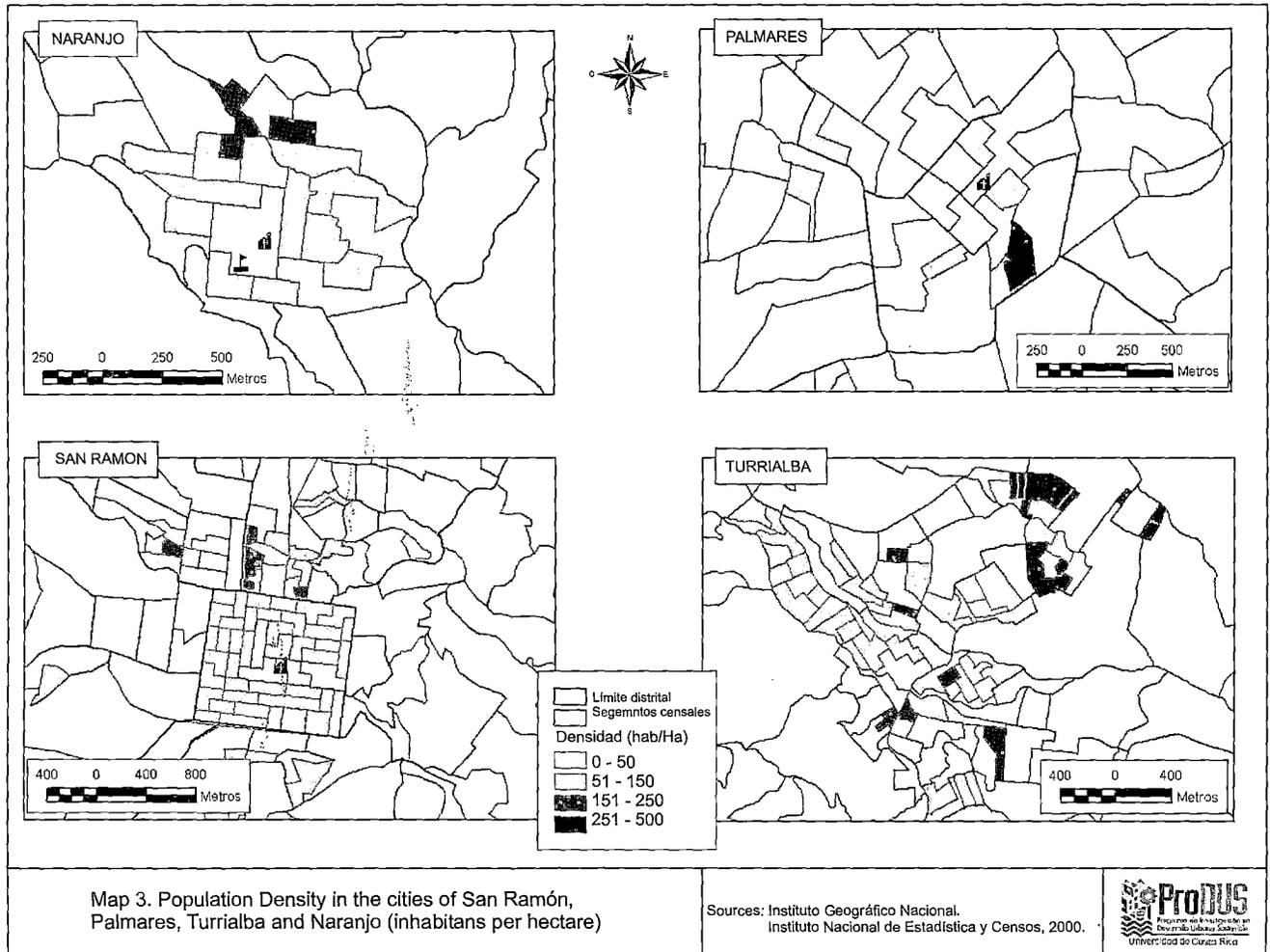
Map 1: Urban Growth in the San José Metropolitan Region from 1989 to 2001



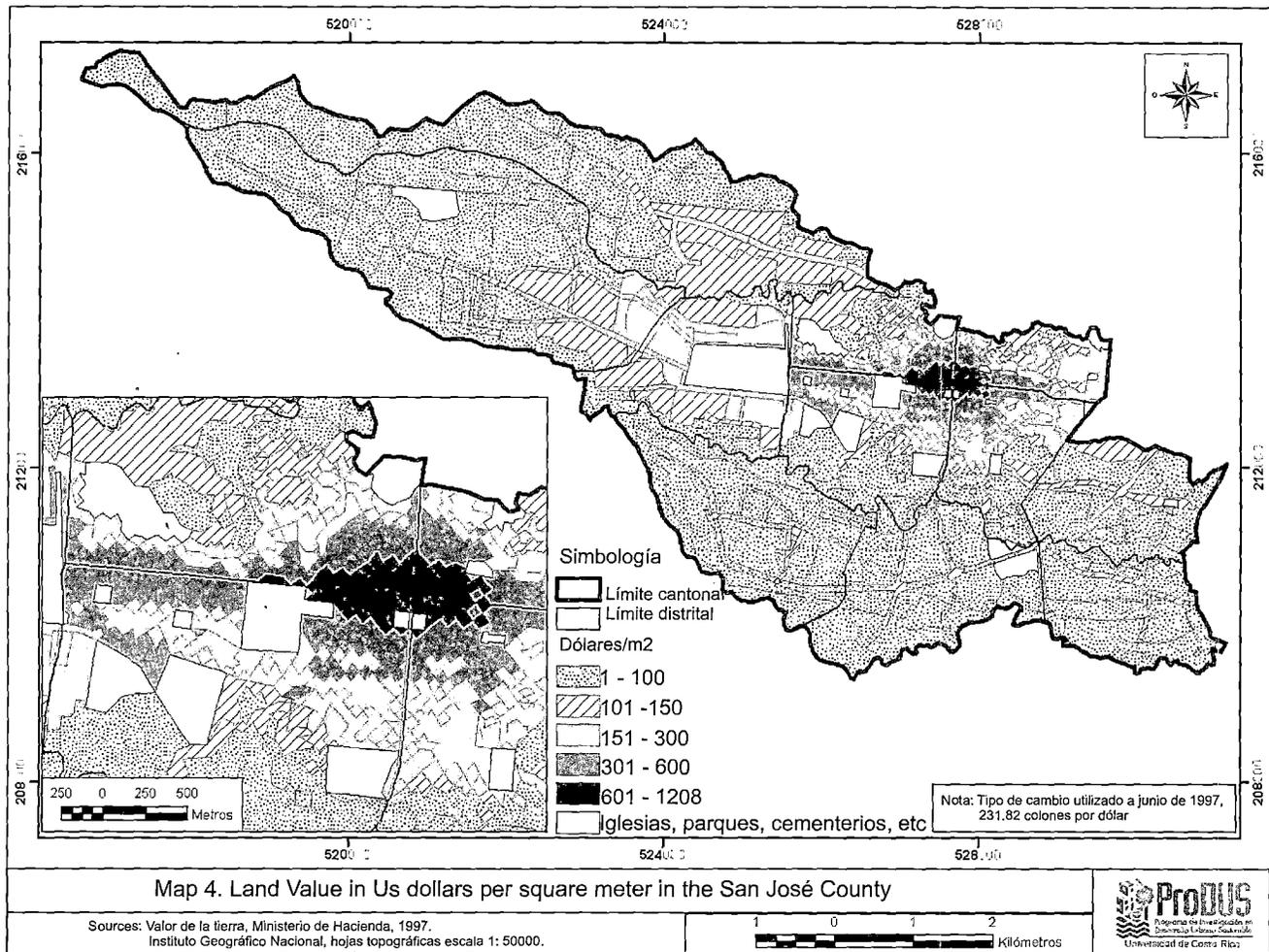
Map 2: Population Density in the San José Metropolitan Area in 2000 (inhabitans per hectare)



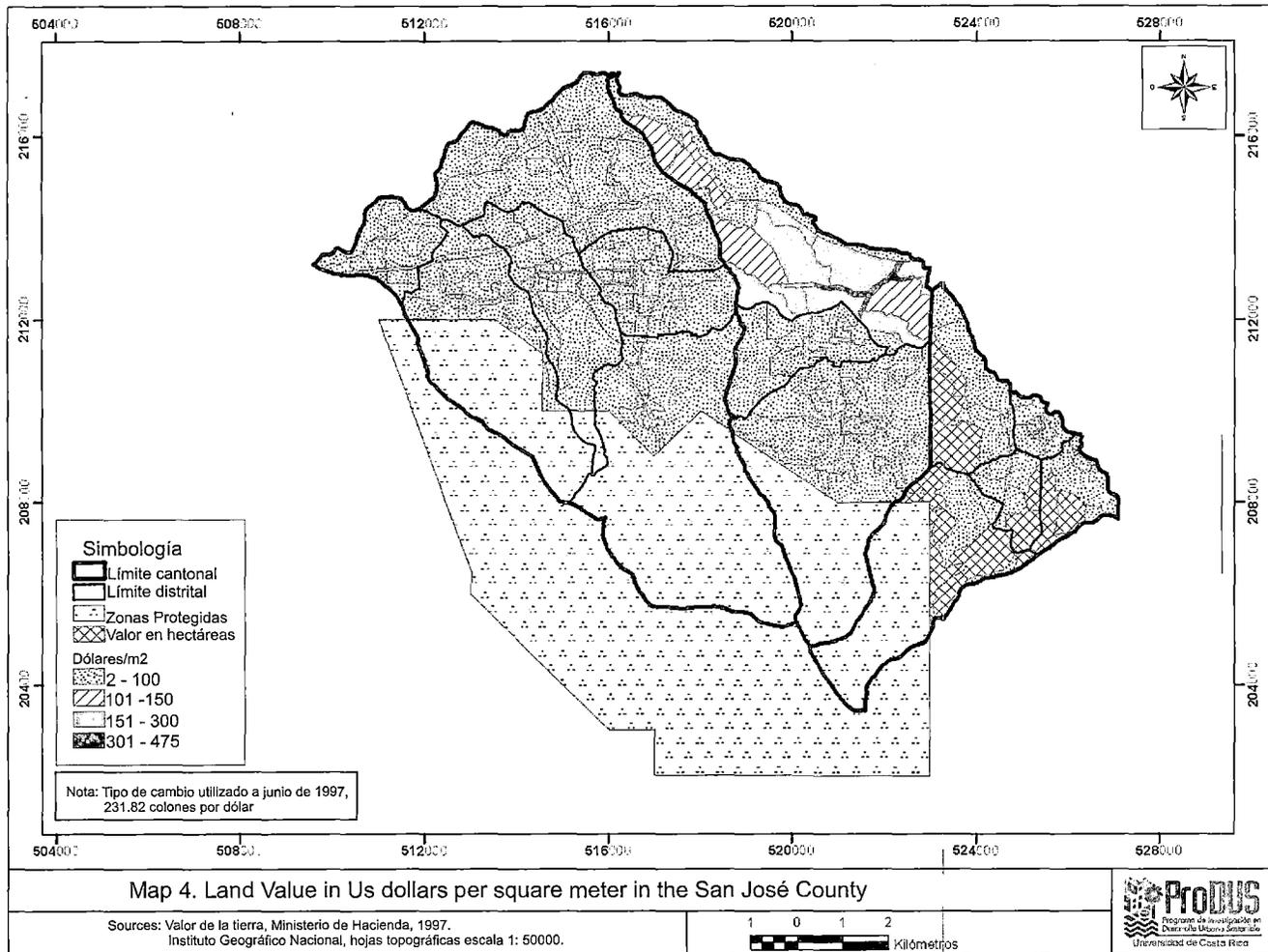
Map 3: Population Density in the cities of San Ramón, Palmares, Turrialba and Naranjo (inhabitans per hectare)



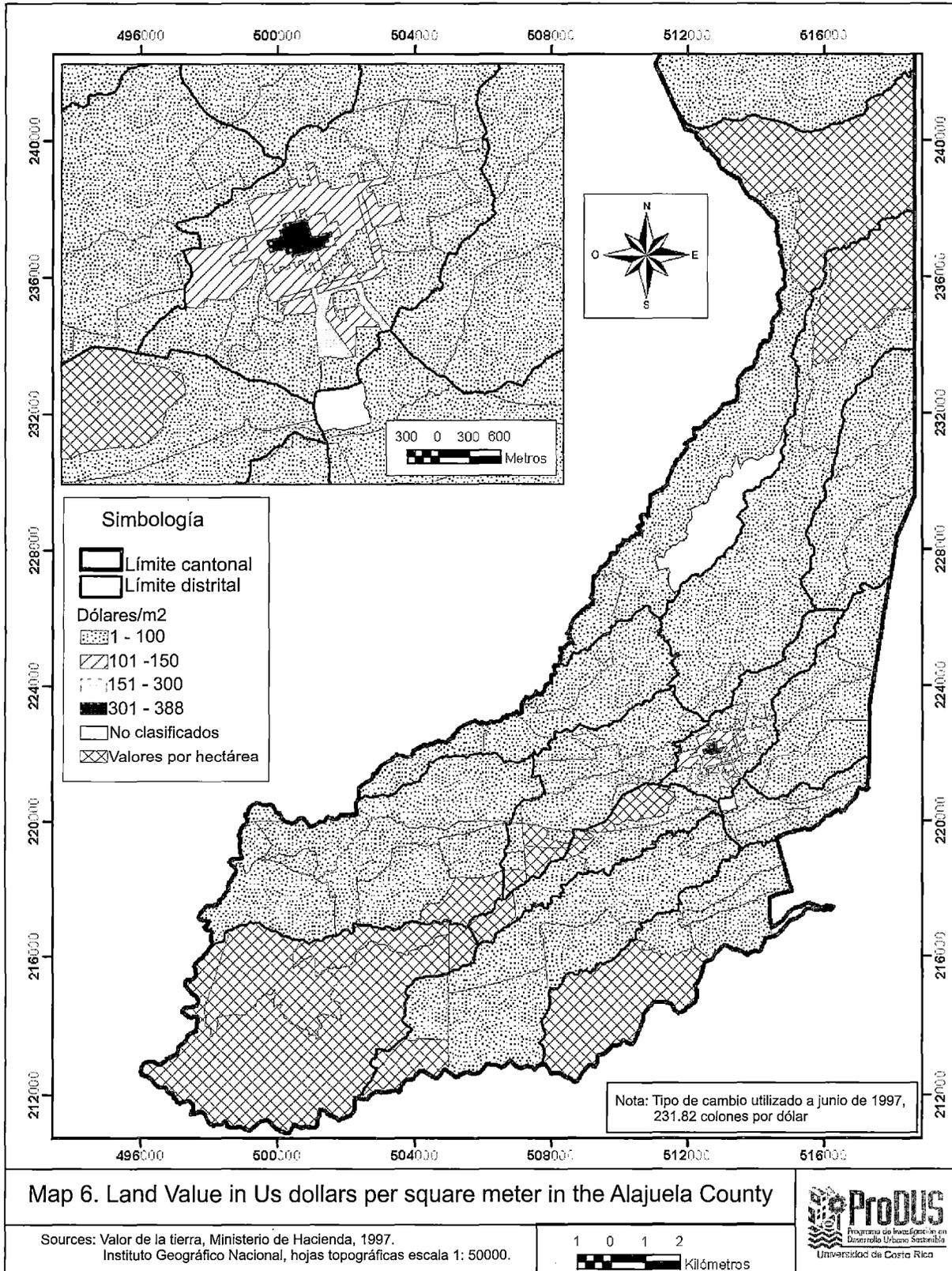
Map 4: Land Value in Us dollars per square meter in the San José County



Map 5: Land Value in US dollars per square meter in the San José County



Map 6: Land Value in US dollars per square meter in the Alajuela County



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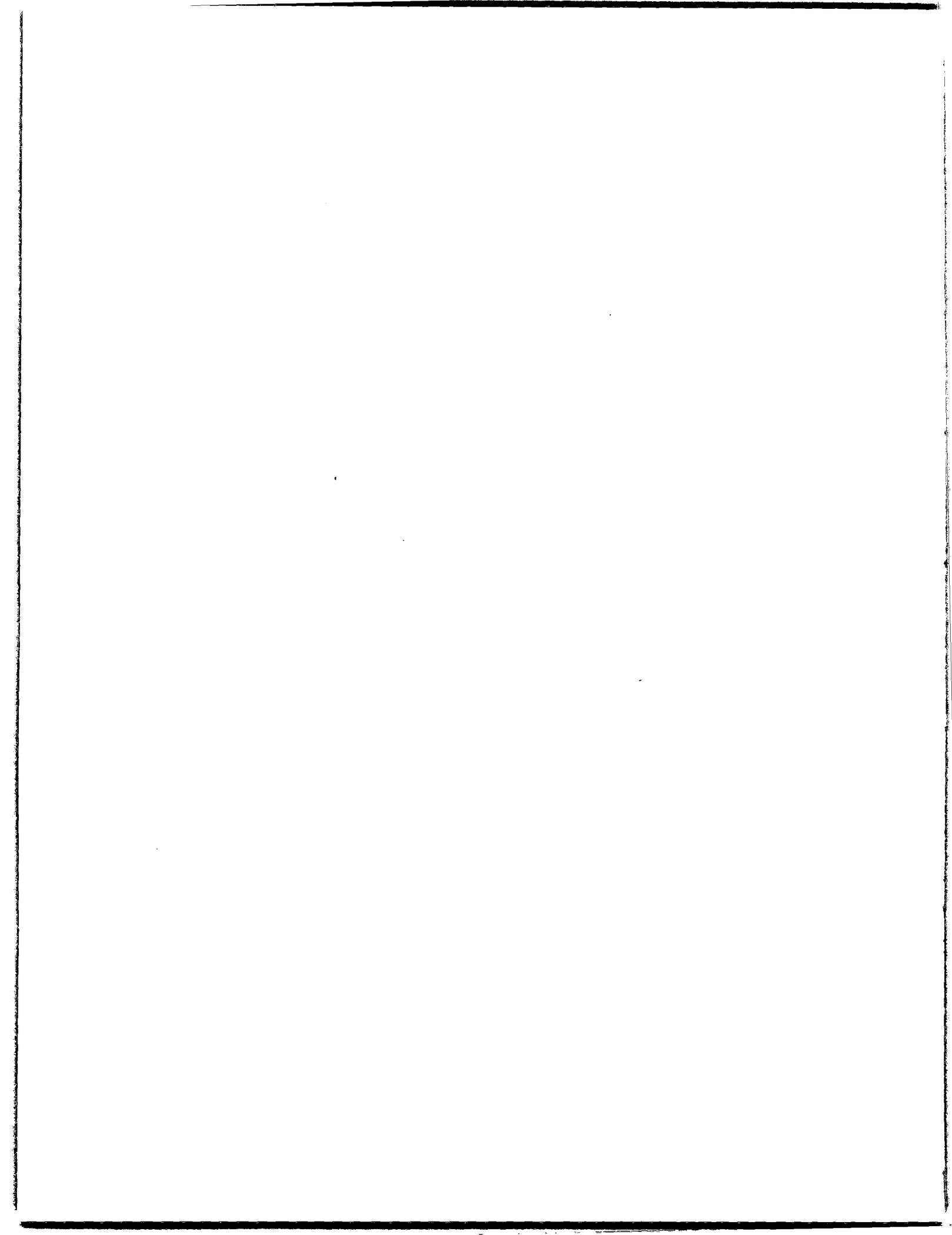
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Part V

HOUSING MARKETS AND PROGRAMS

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Bruce W. Ferguson

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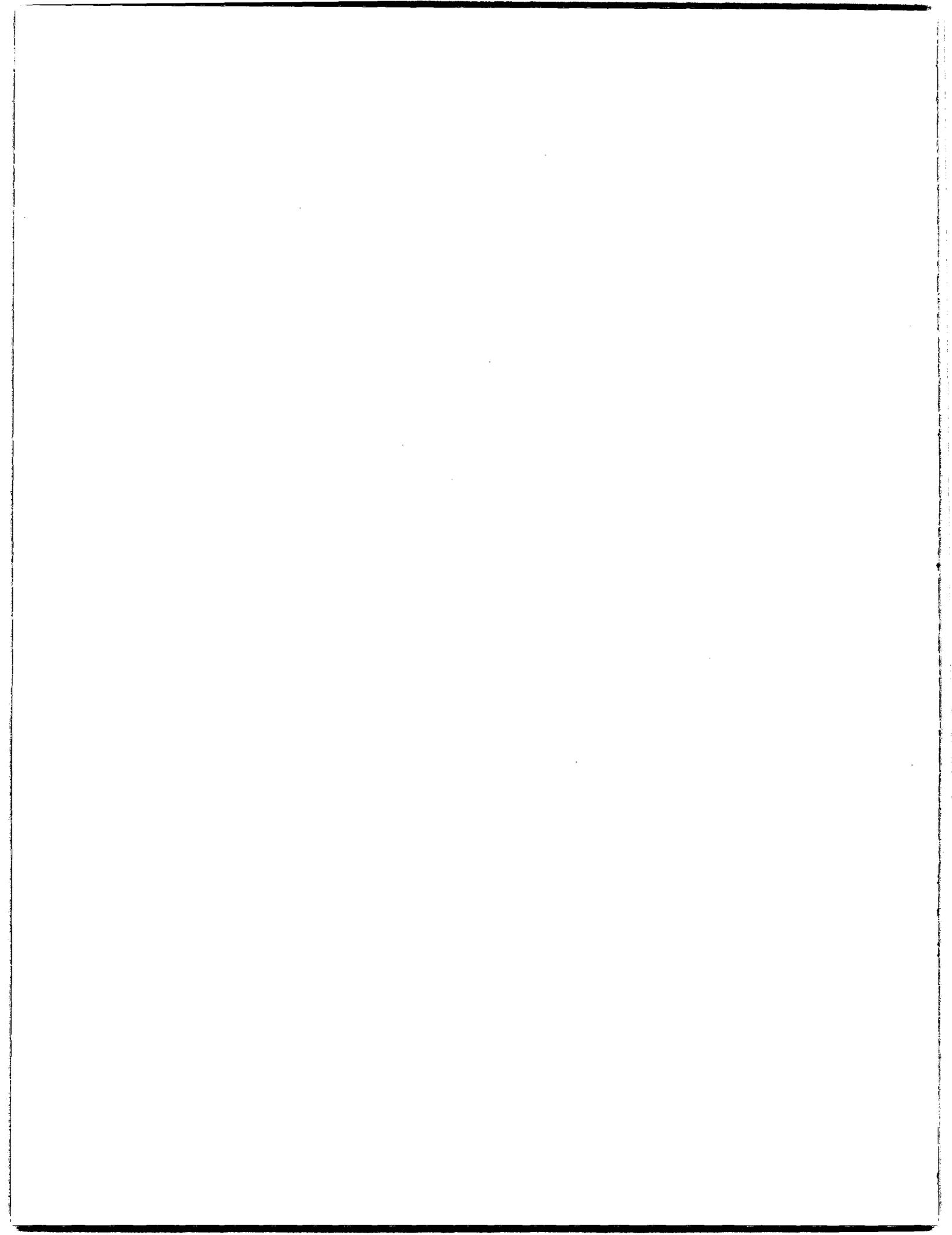
*Joseli Macedo, Diep Nguyen, William J. O'Dell, Marc T. Smith,
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Jieming Zhu



INTRODUCTION TO SECTION V

HOUSING MARKETS AND PROGRAMS

Bruce Ferguson

Housing program and policies have reflected the division in the underlying market between formal and informal development. In most emerging countries, only the top 10% to 30% of household can afford to purchase a commercially-built unit at market conditions. This fundamental limitation derives largely from intractable socio-economic realities that define "under development." Most importantly, the bulk of households have low incomes. Even in Mexico, a dynamic middle-income country, for example, half of households earn less than US \$450 per month. Real interest rates – including mortgage rates – are often extraordinarily high – from 7% to 20% above inflation (compared to those in most affluent countries today of 1% to 4% above inflation) – reflecting macro-economic imbalances (fiscal and trade deficits) and high risks (e.g. rapid devaluation, political instability).

In this context, most financial institutions are either unwilling to lend at the long maturities associated with mortgage finance in affluent countries, or ration such lending to their best customers (the upper and middle class) in order to avoid interest-rate risk and other financial problems. The fixed costs (including loan processing and underwriting, and titling) of mortgage lending also make up a larger share of the smaller loans required by lower income households, contributing to raising the effective interest rate for less-prosperous families. Even when they can get mortgage credit, most low-income households are highly reluctant to take on the long-term risks of such large loans as their incomes and employment fluctuate greatly. Thus, the market for the supply of and demand for mortgage loans for low-income households tends to clear near zero. Titling problems and infrastructure extension substantially limit the land on which formal-sector development can occur. In turn, developers build their business around serving a relatively small number of middle and upper-income households, rather than the low/moderate-income majority.

In this context, the production of affordable or "social" housing has served as a way to push formal market mechanisms – starting with mortgage finance – down to reach a greater share of the population and to reduce informal development. Many countries have also attempted to use government-assisted housing production as a means of generating economic growth and employment. This strategy has a long history, dating at least to the housing programs and institutions that the U.S. government instituted (e.g. the Federal Housing Administration and mortgage insurance program, and secondary housing markets to purchase these loans - Ginnie Mae and Fannie Mae - and a housing finance liquidity facility - the Federal Housing Loan Bank System etc.) to stimulate growth during that country's Great Depression of the 1930s. Indeed, housing expenditures typically have a large impact on the economy (through their high multiplier effect) and in generating unskilled and semi-skilled employment.

The experience of Latin America and of East Asia stands out. The archetypal Latin-American case is that of Chile. Starting in the mid 1970s, Chile replaced a confusing variety of supply-side subsidies (e.g. discounted land costs, below-market rate mortgage loans channeled through developers and financial institutions) with a "direct demand" housing subsidy. In effect, the direct-demand subsidy gives a grant to eligible families

("demand") that these households join with a market-rate loan and their own downpayment in order to purchase a developer-built new home.

A central purpose of Chile's direct-demand subsidy has been to stimulate home credit and household savings. Chilean households have used these portable vouchers to shop for new units by choosing among developers and projects, and to access mortgage finance by choosing among financial institutions, which compete for their business. The Chilean direct-demand subsidy has used a sophisticated beneficiary selection point system in which households qualify for these direct-demand subsidies based on their "effort" (based on the size and length of their household savings) as well as their "need" (based on income level, number of family members, condition of existing habitation etc.). The Chilean national government had used similar subsidies and point systems in on other social programs, and was experienced in managing the considerable administrative complexities involved. The Chilean financial system was also capable of providing the complementary mortgage credit. Finally, the adoption of Chile's direct-demand subsidy system coincided with the start of a long period of relatively high national economic growth. Over the next 25 years, Chilean GDP would rise at rates averaging 7% per annum, which has helped maintain government budgets and, thus, funding for the subsidy along with a strong political commitment to and the popularity of the direct-demand program.

In these circumstances, Chile's direct-demand housing subsidy program has performed spectacularly well. Formal housing production has exceeded new household formation for much of the last three decades. This success has virtually halted new informal development. Slum upgrading programs have largely addressed the remaining slums left over from prior eras. Even in Chile, however, the mechanism of a direct-demand subsidy has failed to stimulate formal-sector financial institutions and developers to serve low-income households, and national government continued to build for and finance directly this group (a process called "turnkey development"). Thus, the direct-demand housing subsidy program has worked well to incorporate moderate and middle-income households into formal systems, but not the poor.

Chile's impressive success with housing has reverberated throughout Latin America. Most other Latin American countries have adopted parts of the direct-demand subsidy Chilean model (Ferguson, 1996). Of these, Costa Rica, which adopted a direct-demand subsidy approach in the late 1980s, has had the greatest success. Similar to Chile, Costa Rica has built formal-sector units at rates above new household formation and greatly reduced informal settlement. Costa Rica's greatest success has involved the emergence of a network of strong and sophisticated housing cooperatives and NGO developers that have used the direct-demand subsidy to reach low-income households.

Most other Latin-American countries, however, have adopted only parts of the Chilean model and lacked many of the favorable conditions prevalent in Chile at the time. The most common problems have included uneven funding of the subsidy system and – as a result – disruptive lapses in the program that have cost economic actors (developers and financial institutions) great sums and damaged program credibility, lack of complementary credit for low-income households who are – thus – unable to complete the subsidy with a mortgage and unable to use the subsidy, lack of a supply of appropriate units because of a combination of uninterested developers and high land prices and low availability, and fraud and/or politicization in the use or targeting of the subsidy rooted partly in administrative shortcomings.

In contrast with Chile, housing subsidies in much of Latin America have largely replaced housing credit and household savings rather than stimulated these more sustainable forms of home finance. Housing subsidies

(direct-demand subsidies as well as other modes of subvention) have also widely served political ends – to gain votes of household beneficiaries and to channel housing-development and finance business to firms that are allies or friends. Housing subsidy systems also often develop incrementally without following basic principles (transparency, targeting, efficiency, administrative simplicity, sustainability) and join many components (land discounts, below-market interest rate loans, prompt-payment discounts, direct-demand subsidies, and others) into a convoluted whole (Hoek-Smit).

Finally, urban land prices tend to rise to consume ever-greater portions of the subsidy, even in Chile. Pumping more money – whether subsidies or credit – into a housing/land system suffering from important bottlenecks tends to raise land prices rather than reach households.

These problems have resulted in uneven experience with direct-demand housing subsidies and in poor performance in pushing formal-sector systems downmarket in the bulk of Latin American countries, although they often are an improvement on the supply-side subsidies that they have replaced. Here, as in most of the developing world (Africa, South Asia), informal development continues to have a predominant role in low-income shelter and settlement, and formalizing informal development (Solimon) remains the most viable overall approach to affordable housing. New technologies and approaches to financing (e.g. housing microfinance; Ferguson, 2004; UNCHS, 2005) and providing land for progressive development of many different types of low-cost “housing solutions” (Ferguson, 2003) that mimic but reduce the costs and increase the benefits of progressive housing represent the way forward in these areas.

The East Asian approach (e.g. Singapore, Hong Kong, China) to stimulating formal-sector housing development contrasts with as well as has some similarities to that of Latin America. The East-Asian housing strategy has occurred in the context of this region’s overall approach to economic development, often called the “developmental state”, has accompanied fast GDP growth, and has had a number of signal characteristics. Government has either forcefully managed or owned much urban land. This forceful public role in land development and the extremely high densities of East Asian cities have resulted in high-rise building. Finally, as Chile and Costa Rica, governments of East-Asian countries have invested large sums over long periods in affordable housing, funded the production of large numbers of units relative to new household formation, and greatly reduced informal settlement.

The papers of this section first profile housing markets and programs in Latin America, then, those of Asia, particularly East Asia. The first paper (Zanetta) assesses the experience of Argentina with the decentralization of the National Housing Fund (FONAVI) from central government to state government in the 1990s. FONAVI – a fund created in 1978 for housing development - contained the great bulk of federal monies channeled to this sector. From 1978 to the mid 1990s, a federal agency operated the resulting programs, which performed poorly. As is typical in traditional Latin American housing programs, FONAVI ended up producing a relatively small number of complete units largely for the middle-class through delivering high per-unit subsidies mainly through highly-discounted loans originated by government that households failed to pay back for the most part) unaccompanied by significant household savings. In contrast, current housing policy wisdom would suggest producing a wide range of “low-cost housing solutions” at large scale for low-income households through delivering modest per-unit subsidies through direct-demand subsidy programs joined with market-rate credit originated by private financial institutions and programmed housing savings.

As part of a much larger bargain for a macro-economic reform program and to finance the social security system, the federal government decentralized funding (about \$1 billion per year in total) and operational

responsibility for FONAVI to provincial governments, who have traditionally been strong components of Argentina's federal system. Unfortunately, FONAVI money came with few guidelines on its use. Not surprisingly, implementation has varied widely in its efficiency and its effectiveness among provinces, but – in general – has tended to re-create the high cost, high subsidy, low production, low cost recovery (in the form of grants disguised as loans by provincial housing agencies), and poor targeting of the previous federally-operated program. Although decentralization is often portrayed as an inherently superior strategy, clear guidance, effective technical and institutional assistance, and sound monitoring are – in fact – necessary for it to work – all of which were missing elements in the decentralization of FONAVI in the 1990s.

The second paper (Fonseca, Trani, Wakisaka) examines the experience of the state of Sao Paulo, Brazil with a low-income "self-help construction" housing program in the context of the state's overall housing effort. Sao Paulo state started funding its own housing programs when the federal housing finance system greatly reduced its contributions in 1989. Funded by a 1% increase in the state's value-added tax, Sao Paulo's state housing program has raised US \$150 to \$200 million per year. Over fifteen years to 1994, it has produced a total of about 350,000 units, 40,000 of which have been built through the self-help construction program.

The self-help construction program operates in partnership with Sao Paulo's municipalities. Essentially, municipalities are to provide land and infrastructure and the federal government provides the subsidy to build the house through guiding families in self-help construction and providing building materials. This distribution of roles, which is common in emerging countries, appears to fit the strengths of the governments involved. Local governments often have direct control over land use and the provision of services (which, however, increasingly occurs through service companies). Higher levels of government control greater funding and credit-finance sources. However, this assumption only holds to a degree. Many local governments often lack both land and the ability to provide services. In this regard, Fonseca et al note that – although successful – the self-help construction program requires further technical and financial support of local governments to work better.

The paper concludes with some noteworthy observations on housing program design and implementation: "...the experience of the State of Sao Paulo demonstrates the crucial importance of size and continuity of funding and operation in meeting housing needs. The stability resulting from these virtues has allowed the economic agents involved (state government, municipalities, households, construction firms etc.) to learn to use and improve the ...program....These elements and the political will to maintain the coherence and continuity of funding...should be seen as outputs of the process of the operation, and not as conceptual inputs....Thus, successful policies and programs develop as they function over time, rather than depend on a perfect initial design." Hence, although it seems to make sense to get the design right before ramping up housing programs and policies, the reality is much more interactive. From this perspective, size and continuity of funding and creativity in implementation produce success much more than the initial program design.

The third paper (Macedo and O'Dell) adapts the model used in the state of Florida for estimating housing need to Brazil. In essence, household formation rates are used to determine what percentage of each population age group will form a new household in each projection interval. The model confirms some of the stark regional differences within Brazil, and between Brazil and developed countries, such as the U.S. In Brazil, the proportion of owners to renters and income levels do not vary for different age groups, whereas they steadily increase in the U.S. One possible explanation is that income is more related to access to education and

professional opportunities than seniority. Vacancy rates are also exceptionally high - 12% in Brazil, compared to 3% to 5% in the U.S. These surprising results underlie the need for more research to form a better picture of housing markets and needs in emerging countries.

The final two papers of this section deal with housing in Asia, with a focus on East Asia. Yuen chronicles and analyzes social housing in Singapore, one of the most dramatic success stories in housing of the modern era. By all accounts, Singapore in 1950 had some of the most wretched and miserable slums in the world. Currently, 85% of Singapore's families live in 850,000 units in high-rise buildings in 23 new towns. The poor have equal access to housing; 37,823 households rent heavily-subsidized 1 and 2-bedroom units for a very modest share of their income – under 10%. In contrast, a majority of low-income households in the U.S. pay over one-third of their income for shelter, which is frequently located in communities with far inferior services to those of less well-off households in Singapore.

Although many factors played a role in Singapore's success, three stand out. The high GDP growth and transformation of Singapore's society during the last half century has contributed greatly to its striking success in housing. In turn, however, housing reform also played a large role in Singapore's socio-economic transformation. The Prime Minister of the early 1960s during which Singapore's housing policy took shape notes that: "My primary preoccupation was to give every citizen a stake in the country and its future. I wanted a home-owning society." This commitment was not just rhetorical – the usual case in both emerging and developed countries. The State has made the large investments necessary to house at remarkably affordable rates 85% of the population – in effect, virtually all households that cannot afford private housing, which constitutes the remaining 15% of the stock. Finally, government has forcefully controlled urban land by purchasing much of it. Under the Land Acquisition Act of 1966, government can compulsorily purchase any land at prices that reflect its current or zoned use, exclude its speculative potential, and – thus – are far below market. Although "draconian", this policy has allowed the State to increase its share of ownership of urban land from around 40% in the 1950s to 85% currently, and pass along this benefit to the great bulk of the population (85%) that lives in publicly-built housing.

From one perspective, the East-Asian developmental state – or, as Kotkin (2005) describes it, the "Confucian" ideal of moral order and collective will – underlies Singapore's great success in housing and urban development. From another perspective, the size and continuity of housing investment, control over urban land, and high rates of economic growth and increase in real household incomes joined to solve the housing and urban development problem so that Singapore's people and firms could focus on the central aspect of economic development (Jacobs) – climbing the quality ladder in manufacturing and export in an increasingly global economy. A third view is that Singapore as Hong Kong (until its recent integration with China) have been city-states with very limited land area, and have had little choice except to take control of housing and urban land.

The final paper of this section (Zhu) surveys housing in four high-density Asian countries – Singapore, China, Bangladesh, and Vietnam. The intense competition and efficient use of urban land has been a critical issue in all. The East-Asian formula – most thoroughly used in China - has consisted of public land ownership, private land development, and private ownership of the resulting condominiums in high-rise buildings. In Shanghai, for example, housing production increased only 58% while population multiplied 6.7 times from 1949 to 1979 before the introduction of markets into the Communist regime when the State owned housing. A quarter of the city's population was virtually homeless during this period. Production quadrupled from

to obtain their support for the overall reform program. Thus, it is not surprising that national authorities exhibited little interest in designing and implementing a decentralization process aimed at improving the fund's performance and the transparent and efficient use of FONAVI's resources. Consequently, the decentralization of FONAVI has failed to yield any significant benefits and, instead, many of the theoretical risks identified in the literature have materialized.

The paper is organized as follows: first, it examines the definition of decentralization and the theoretical benefits and risks identified in the literature. Second, based on the lessons learned from decentralization experiences worldwide, the paper derives a set of policy prescriptions that could have maximized the chances of success of the decentralization of FONAVI. Third, it contrasts the prescribed policy guidelines with the specific policy framework that underlined the decentralization of FONAVI and its implementation strategy. Fourth, the paper examines the actual results obtained a decade after the decentralization of FONAVI, showing that it had, at best, only a shallow success. Finally, the paper summarizes the important lessons that can be drawn from this case study, which unfortunately teach us more in terms of its failings rather than its strengths.

A Brief Overview of Decentralization

In broad terms, decentralization can be defined as the transfer of planning, decision-making, or administrative authority from the central government to other entities, including its local administrative units, semi-autonomous or quasi-public organizations, sub-national governments, non-government organizations, and the private sector (Rondinelli, 1983). Four major forms of decentralization can be distinguished based on the degree of authority that is being transferred by the central government to the decentralized entities and on the level of autonomy of these decentralized entities: deconcentration, delegation, devolution, and privatization. In this paper, we focus on devolution, which refers to the transfer of authority for decision-making, finance, and management from the national government to autonomous sub-national units of government. As lower levels of governments can exercise their newly assumed authority in an autonomous manner, devolution has the potential to yield both the benefits and shortcomings commonly ascribed to decentralization, making it both more promising and more risky than other forms of decentralization (Litvack et al. et al., 1998).¹

The main potential benefit from decentralization is that it can enhance the efficiency and responsiveness of governments (Oates, 1972; Tiebout, 1956; Musgrave, 1983). Devolving resource allocation to sub-national officials can potentially improve efficiency, as they are presumably better positioned to assess the needs and preferences of their constituencies to, in turn, decide on the best resource allocation of public services. It can also improve the management of public services, as sub-national officials can be held more accountable for the performance than more remote national bureaucracies and elected officials (Ostrom et al., 1993). If successfully implemented, decentralization can also reduce red tape and bureaucracy, improve credibility and legitimacy of the government in general, foster innovation while minimizing the risks in case of failure

¹ In contrast, deconcentration involves the transfer of administrative responsibilities—but not of authority—to lower levels of governments. Delegation, as its name indicates it, involves the delegation of decision-making and management authority of public functions from the central government to local governments or semi-autonomous organizations that are not totally under the control of the central government but are ultimately accountable to it (Rondinelli, 1983; Litvack et al., 1998). Thus, as a result of the lack of authority and full autonomy of lower levels of government, these two forms of decentralization are less likely to lead to the potential benefits and shortcomings of decentralization (Litvack et al., 1998).

(Rondinelli, 1983) and achieve greater representation of diversity through greater public input in pluralistic political environments (Pauly, 1973).

Among the risks from decentralization is the potential decline in the delivery of services as the result of the low technical capacity of sub-national governments (Burki et al., 1999). Similarly, decentralization can also exacerbate the ability of local elites to affect the allocation of public goods (Burki et al., 1999; Wilensky, 1974; Inman, 1997). In particular, if power at the sub-national level is more concentrated and more easily subject to the influence of local elites than at the center, then greater decentralization will not necessarily result in greater democracy or more 'power to the people' (Griffin, 1981). Also, decentralization policies can also result in widening disparities in social spending, such as health and education, with the consequent negative equity implications. Existing evidence suggests that decentralization often results in an increase in the variance of public service performance, with improvements in some jurisdictions and worsening in others (Burki et al., 1999). Likewise, decentralization can result in the loss of economies of scale and control over scarce financial resources by the central government (World Bank Decentralization Website).²

In general, there is little empirical evidence to support any of the theoretical benefits or pitfalls of decentralization (Litvack et al., 1998). As with any public policy, the simple creation of decentralized structures does not guarantee success, greater efficiency, or any other of the theoretical benefits of decentralization (Rondinelli, 1983). For decentralization to succeed, institutionally and technically adept decentralized structures need to be complemented with adequate systems of incentives purposely designed to induce pre-determined behaviors on the part of sub-national actors as well as safeguards against the potential obstacles that can impede a successful implementation process. Moreover, the analysis of what constitutes sound decentralization policies is country specific, as decentralization often involves drastic reforms cutting across sectors and levels of government. As pointed out by Griffin (1981) 'it all depends on the circumstances under which decentralization occurs.' The following sections explore Argentina's experience with the decentralization of FONAVI, the soundness of the underlying policy framework and the implementation strategy, as well as the main outcomes a decade after its decentralization.

Policy Prescriptions for Successful Decentralization Processes

Valuable lessons can be learned from decentralization experiences across the world. As shown on Table 1, these lessons can be summarized in four main categories: i) the balance between authority and accountability; ii) the role played by the national government; iii) the validity of the assumptions underlying the decentralization; and iv) the process of implementation.

One of the most important lessons drawn from experiences with decentralization worldwide is the need to strike a balance between responsibility and accountability. In other words, giving sub-national actors both the means (authority) and the incentives (accountability) to fulfill their newly assigned responsibilities is perhaps the most important factor in ensuring the success of decentralization reforms. On the one hand,

² Fiscal decentralization—as opposed to the decentralization of public services—also poses potential risks to macroeconomic stability. Decentralization might make it harder for central governments to use fiscal policy to adjust to economic shocks, as fiscal decentralization reduces central control over the aggregate public sector revenues and expenditures (Tanzi, 1996). Also, it might result in an over-expanded public sector when there is a mismatch between revenues and expenditures assigned to each level of government. Finally, decentralization might pose incentives for excessive sub-national borrowing if there is an expectation of bailouts by the national government (Burki et al., 1999). The risks associated with fiscal decentralization were given substantial attention by the decentralization literature of the 1990s, as a result of the high priority assigned to macroeconomic performance in the context of the Washington Consensus.

authority involves granting sub-national officials not only the legal authority to make decisions but also the financial and human resources needed to deliver results. On the other side, accountability aims at making sub-national officials responsible for their performance by tying performance to specific rewards and/or penalties. Thus, a good balance between authority and responsibility is a key ingredient to ensure the satisfactory performance of politicians and bureaucracies at lower levels of government (Burki et al., 1999).

Officials at all levels of government have to play their part if decentralization is to succeed. In particular, national authorities – the president, congressmen and political leaders – have a key role in: regulation, redistribution, enforcement, and evaluation and learning. Specifically, national officials are responsible for defining the rules for decentralization – i.e., the policy framework – that, in turn, determines the behavior of politicians at lower tiers of government (Burki et al., 1999). These rules ought to carefully reflect the specific objectives of individual programs as well as national objectives. To ensure that politicians and local officials have an incentive to be responsive, the instruments of decentralization – the legal and institutional framework, the structure of service delivery responsibilities and the level of financing from upper tiers of government – have to be consistent with the political objectives (IBRD Governance website). As indicated by Burki (1999), national officials also have a key role in deciding which of these rules are going to be enforced. While these decisions are not often made explicit, they have an important bearing on the results of decentralization efforts, as they constitute the true incentives – as opposed to the nominal policy framework – determining the behavior of sub-national governments.

Redistribution is also a valid function of the national government, both geographically – i.e., across sub-national governments – or by income – i.e., within sub-national governments. Redistribution criteria will be primarily reflected in the way resources are allocated among sub-national jurisdictions and in the rules determining allocation of benefits within each jurisdiction. In addition, given its privileged capacity to overlook at the totality of sub-national governments, the national government has a competitive advantage in promoting learning and horizontal fertilization among sub-national governments. Although often overlooked, this task has great potential in effectively fostering institutional learning by disseminating best practices and innovations while comparing the relative advantages and disadvantages of alternative strategies being tried at the sub-national level.

Although decentralization has frequently been portrayed as an inherently superior policy strategy, its success depends on the validity of the often-implicit underlying assumptions. One of the most widely accepted justifications for decentralization is based on the assumption that sub-national officials have a better understanding of the preferences of their constituencies and the determination to honor them. This is often not the case, as politicians' knowledge of local preferences might not be detailed enough in relation to the delivery of specific services. Even if sub-national authorities had this knowledge, their actual decisions might respond to the interests of local power elites that do not represent the wider preferences of the population. To ameliorate these risks, it is important to have mechanisms by which citizens can express their preferences in a way that is binding on the politicians—in this way, citizens have a credible incentive to participate. Participatory budgeting mechanisms, such as the one in Porto Alegre, Brazil, are a good illustration of such mechanisms. In addition, it is important that citizens are well informed about the costs of services and options involved, the resource that are available and their sources, so that the decisions they make are meaningful (IBRD governance site).

Another often-erroneous assumption is that the proximity of politicians at lower levels of government to their constituencies automatically translates into greater political accountability. In other words, if politicians do not do a good job, their constituencies can vote them out of office.

Table 1: Golden Rules for Successful Decentralization Policies

Strike a balance between authority and accountability
<ul style="list-style-type: none"> ● Grant sub-national governments an adequate degree of authority so that they can fulfill their responsibilities. <ul style="list-style-type: none"> - Legal authority - Financial resources - Human resources ● Make sub-national governments clearly responsible for their performance—i.e., framework of ‘institutional’ accountability. <ul style="list-style-type: none"> - Performance tied to mandates/penalties - Performance tied to incentives/rewards
The national government needs to fulfill its various responsibilities
<ul style="list-style-type: none"> ● Regulation: <ul style="list-style-type: none"> - The national government is responsible for determining the rules of the game— ‘policy framework.’ - These rules—together with the corresponding incentives and penalties—should reflect the specific program objectives, as they determine the behavior of lower-tiers of government. ● Enforcement <ul style="list-style-type: none"> - National authorities often enforce rules selectively, creating a parallel—although perhaps more important—de facto policy framework. ● Redistribution: National governments can pursue redistribution through the allocation of resources <ul style="list-style-type: none"> - Geographical redistribution: It can be achieved through the allocation of resources among sub-national governments - Redistribution by socio-economic characteristics of the population: It can be achieved through criteria determining selection of final beneficiaries. ● Evaluation and learning <ul style="list-style-type: none"> - Promote institutional learning and horizontal fertilization - Disseminate innovations and best practices
Make sure that the implicit assumptions about the quality of governance of sub-national governments are in place
<ul style="list-style-type: none"> ● Introduce mechanisms to ensure that sub-national authorities have good knowledge of local conditions. <ul style="list-style-type: none"> - Promote mechanisms of public consultation as well as partnerships with representatives of civil society - If these mechanisms are binding, there are added incentives for the population to participate and less chances of having local power elites determine policy outcomes ● Enhance the ‘political’ accountability of sub-national officials with respect to their constituencies. <ul style="list-style-type: none"> - Development of sound measures of performance that can be clearly understood by the citizens and allows comparisons across jurisdictions - Wide dissemination of performance measures among local constituencies - Support the activities of grassroots watchdog organizations ● Ensuring adequate technical and institutional capacity at the sub-national level <ul style="list-style-type: none"> - Technical assistance (TA) tends to work best when the emphasis is on promoting the exchange of information among peers rather than relying on top-down models. - Likewise, demand-driven TA tends to be more effective than supply-driven TA.
Devise a sound and realistic implementation process
<ul style="list-style-type: none"> - Incremental or partial decentralization processes can be more effective in minimizing risks. - ‘Certification’ of sub-national governments as an ex-ante condition for decentralization can ensure that key pre-conditions are in place.

This is not always the case, often as a result of the lack of adequate information. Thus, having in place an easily accessible and transparent information system to enable the community to effectively monitor the performance of the local government so they can react appropriately can be an appropriate strategy to enhance accountability (IBRD Governance Website). Likewise, the wide dissemination of this information among local constituencies and the presence of vital grassroots organizations can also enhance the political accountability of sub-national officials.

Ensuring that sub-national governments have the institutional and technical capacity needed to take on the newly assigned responsibilities is part of national authorities' responsibility to ensure that key 'enabling conditions' are in place. The success of decentralization often depends heavily on training for both national and local officials on the implications of decentralization and their respective responsibilities. In addition, technical assistance is often required for local governments and local non-governmental groups in the planning, financing, and management of decentralized functions (IBRD governance website). Lessons learned worldwide indicate that technical assistance tends to work best when the emphasis is on promoting the exchange of information among peers rather than relying on top-down models. Likewise, demand-driven technical assistance, in which sub-national governments determine their own needs in terms of technical and institutional strengthening, tends to be more effective than supply-driven strategies in which the national government defines a one-fits-all strategy. In addition, acquiring minimum levels of technical and institutional capacity can be a requirement for assuming new responsibilities. For example, in the case of Colombia, provincial and local governments had to be 'certified' before assuming responsibility for health and education (Burki et al., 1999).

Finally, some countries have been more cautious in their approach toward decentralization, adopting incremental implementation strategies to diminish the risks associated with decentralization – lack of technical capacity at the local level, undue power of local elites, widening disparities among sub-national jurisdictions. For example, Mexico implemented a form of micro-monitored earmarking as it embarked on sector decentralization (Burki et al., 1999). These and other forms of incremental or partial decentralization can help national governments gauge the success and shortcomings of ongoing decentralization processes and make necessary adjustments while minimizing risks.

In summary, for decentralization to succeed, it is crucial to formulate a national housing strategy in which the national government plays a central role in establishing a sound normative framework that responds to the actual housing needs of the population instead of to the concerns of special interest groups benefiting from ongoing practices. Likewise, the national government needs to set in place – and to enforce – incentives and mandates that foster efficiency and transparent practices among provincial governments. The national government can also play an important role in fostering cross-fertilization among provincial governments, disseminating best practices, and providing technical and institutional assistance. As in the case of the decentralization of health and education, the reassignment of responsibilities of provincial governments was not accompanied by the corresponding redefinition of responsibilities at the national level. This failure is hardly surprising, given that the need to curb public spending at the national level, rather than the vision to drastically reform the delivery of social services, was the driving force behind decentralization policies in Argentina.

The Decentralization of Argentina's Housing Fund (FONAVI)

Argentina's FONAVI was created in 1972 to attend the housing needs of lower-income segments of the population. During the two decades following its creation, FONAVI became the primary mechanism for

financing low-income housing, commanding considerable financial resources—e.g., 97.3 percent of public resources allocated to housing and infrastructure in 1999 (MECON, 2000). Nevertheless, FONAVI programs satisfied the housing needs of just a small fraction of potential beneficiaries because of its narrow focus on the production of costly, finished units and the chronic mismanagement of its resources. One of the main factors contributing to FONAVI's poor performance was the centralized administration of its resources and an inadequate system of incentives that failed to induce provincial governments to administer FONAVI funds efficiently. As a result, the FONAVI system was plagued with structural administrative inefficiencies, including excessive unitary costs, heavy subsidies and insignificant levels of cost recovery (Buckley, 1988, 1991).

The decentralization of FONAVI took place in 1992, as part of the reform program that was implemented in Argentina during the Menem administration. As in most countries in the region, the reform program was aimed at tackling fiscal imbalances and reducing the role of the state. Ideologically, Menem's reform program sought to dramatically reverse the economic model that had been in place for over five decades – one of heavy state interventionism, inward-looking trade orientation and disregard for macroeconomic equilibrium – replacing it by an economic strategy based on competition and economic openness. Although not an end *per se*, decentralization was an important element of the reform program. The role of the central government was drastically reduced both as a regulator of economic activities and as a provider of services. Equally important, decentralization efforts were motivated by the need to reduce spending at the national level to sustain the fragile macroeconomic stability that had been achieved as part of the so-called Convertibility Plan. In this context, sub-national governments and the private sector became more active in the provision of services, as the national government completed the privatization of most public enterprises and transferred the responsibility for some public services – i.e., public hospitals and secondary education – and programs – such as FONAVI – to the provinces (Zanetta, 2004, 2004b).

The decentralization of FONAVI was part of an agreement between the national and provincial governments that modified the terms of the automatic revenue system – the so-called first Fiscal Pact of 1992. Under the Fiscal Pact, provincial governments agreed to forgo 15 percent of their shared revenues to finance national social security reform in exchange for a minimum level of transfers – set at US\$725 million per month or US\$8.7 billion per year. In exchange, the national government also guaranteed a minimum level of FONAVI transfers of US\$75 million per month – or US\$900 million a year – in case the receipts from the gasoline tax were lower than the minimum established (Viola, 2000; Ministry of Economy, 2000). To make the agreement more palatable for provincial governments, the national government also agreed to transfer to the provinces the financial resources corresponding to four national funds, including FONAVI (Vetter and Zanetta, 2000; Cuenya, 1997). In this way, provincial governments assumed control of all FONAVI funds – amounting to approximately US\$1 billion per year – and full responsibility for defining and administering their own housing programs, including their technical and financial characteristics (Cuenya, 1997; Martínez de Jiménez, 1997).

Given the historically poor performance of the program as well as the wide variations exhibited by Argentina's provinces in terms of most demographic, geographic, and socio-economic variables, the decentralization of FONAVI provided an opportunity to enhance the efficiency and responsiveness of public housing programs. As pointed out in the decentralization literature, the type and mix of housing programs could have been improved, as provincial officials are generally better positioned to assess local needs and preferences. Likewise, the decentralized administration of FONAVI funds could have resulted in better management – such as

increased cost recovery – as provincial officials could potentially be held more accountable for their performance. If successfully implemented, FONAVI's decentralization could also have resulted in less red tape and bureaucracy, increased innovation, better representation through greater public input, and enhanced credibility of provincial governments in general. If adequately instrumented, the decentralization of FONAVI could have potentially benefited those segments of the population that were being negatively affected by the structural adjustment program (Zanetta, 2004b).

Policy Framework and Implementation Strategy for the Decentralization of FONAVI

As with the decentralization of other public services in Argentina, the decentralization of FONAVI was not the result of a well thought-out reform strategy aimed at improving efficiency in resource allocation, enhancing transparency or fostering public participation. Instead, the national government used FONAVI as a bargaining chip in the negotiation of the Fiscal Pacts to gain the support of provincial governors for the reform program and, thus, ensure the sustainability of the newly achieved macroeconomic stability. Through the Fiscal Pact of 1992, the national government succeeded in reducing its automatic transfers to the provinces, a major step toward controlling fiscal deficits at the national level. In exchange, the transfer of FONAVI funds gave governors de facto control over this important mass of resources, with very little oversight on the part of the national government (Zanetta, 2004). With other actors unwilling or unable to exert sufficient influence, the decentralization of FONAVI had a narrow political focus, at odds with larger social and economic objectives (Zanetta, 2004b).³

Although not necessarily incompatible with technical considerations, the political motivations driving the decentralization of FONAVI did not engender a process of decentralization aimed at enhancing the efficiency, effectiveness and transparency of FONAVI. Although the technical staff at the Secretariat of Housing made a substantial effort to introduce sound mandates in the new legal framework, national authorities exhibited little commitment to their enforcement. Moreover, many of the lessons learned from decentralization processes elsewhere were ignored, consequently repeating many mistakes that could have been easily avoided. Equally importantly, Argentina's authorities overlooked many opportunities that arose from the decentralization of FONAVI that could have resulted in substantially better housing programs without compromising the support of provincial governors.

Authority: In 1995, a new legal framework (Law 24.464) was enacted to adapt the original FONAVI legal framework to the terms agreed under the Fiscal Pact of 1992. The new law established a Federal Housing System (*Sistema Federal de Vivienda*) that put FONAVI under the jurisdiction of provincial governments. Provincial housing entities (*Institutos Provinciales de Vivienda*, IPV's) were given full responsibility for the administration of the resources, and a newly created National Housing Council (*Consejo Nacional de la Vivienda*, CNV) was charged with the coordination of normative, planning and evaluation functions (Cuenya, 1997). In practice, the provincial housing entities received full authority to manage their share of the funds, without much interference from either the national government or the National Housing Council. Arguably, provincial governments received too much authority, considering that they were hardly accountable for their performance.

³ As noted by Zanetta (2004b), the decentralization of FONAVI funds to the provinces received the support of the construction industry, as it left intact—or even enhanced—its ability to influence the adoption of favorable housing strategies. Alternatively, other social actors, such as labor unions, popular urban movements and the poor in general, lacked enough political leverage to introduce any special concessions or considerations as part of the housing policies implemented in the context of the reform program.

Accountability: The 1995 Law included some incentives and mandates aimed at ensuring that the potential benefits of decentralization would occur. For example, the Law provided that the allocation of FONAVI funds among provinces, which is determined by formula explicitly determined by law, could be modified every other year according to changes in the housing deficit and provincial performance, including adequate use of funds, levels of cost recovery and the levels of provincial investment. Likewise, as part of the 1992 agreement, provincial governments were required to maintain a Registry of Applicants (*Registro Permanente de Postulantes*), including data on the applicants' household structure, income and date of application, as a way of enhancing the transparency in the allocation process (Zanetta, 2004). In addition, and despite strong resistance on the part of provincial governments, the executive branch—the *Subsecretaría de Vivienda, SVN*—later audited provincial FONAVI accounts to ensure that the funds were not channeled to other uses, partly due to pressures from the construction industry and the World Bank (Cuenya, 1997; Holubeck, 2002).

Redistribution and other program objectives: The 1995 legal framework somewhat expanded the narrow political objectives that drove the decentralization of FONAVI, as it offered provincial governments greater flexibility to adapt their low-income housing strategies to respond to their specific needs and established new guidelines for the use of resources, encouraging greater diversification. For example, instead of restricting financing to housing units built under FONAVI, the new law set spending targets requiring provinces to provide mortgage loans to individuals purchasing housing in the market, as well as upgrading and expanding their current units. Specifically, it required that loans to final beneficiaries account for at least 15 percent of all FONAVI spending, with a goal of 45 percent by 1998 (see Table 2). Likewise, it encouraged the construction of community facilities and the provision of urban infrastructure, up to 20 percent of all FONAVI funds (Cuenya, 1997). The 1995 FONAVI Law, however, fell short of providing any incentives or enforcement mechanisms aimed at ensuring larger social coverage, a wider spectrum of housing solutions and the wider participation of economic and social actors, including medium and small construction firms, cooperatives, and non-government and community organizations (Cuenya, 1997).

Enforcement: The most serious shortcomings associated with the decentralization of FONAVI are related to the lack of enforcement and weak implementation. In particular, the national government showed an astonishing lack of political will to enforce the mandates of the 1995 Law. As illustrated by the consolidated FONAVI spending in 1999 (see Table 2), the almost exclusive focus on the construction of new housing has persisted, absorbing most of the resources (89 percent of total funds when excluding operation costs). Likewise, the possibility of offering individual loans to final beneficiaries, one of the main innovations of the 1995 FONAVI Law, has remained untapped. Only 4.5 percent of the resources were allocated to this category in 1999 compared with the minimum 15 percent stipulated for 1995 and the 45 percent anticipated for 1998. Similarly, there has been very little investment in community facilities or basic infrastructure. Only 2.4 percent of all FONAVI funds were being used for infrastructure in 1999, which is negligible compared to the upper limit of 20 percent defined by the FONAVI Law (SVN, 1997). The mismatch between the Law's spending targets and the actual allocation of FONAVI resources has been particularly large in some provinces. Likewise, as of 2000, only nine out of 23 provinces have in place up-to-date registries and, in most provinces, the selection process is not based on clearly defined criteria or a transparent process (MECON, 2000). Despite the wide differences in performance among provinces, no changes have been made in the original allocation, with FONAVI funds continuing to function as fixed transfers (Zanetta, 2004).

In summary, although the policy framework underlying the decentralization of FONAVI provided some incentives and enforcement mechanisms to diversify investments and enhance transparency in the selection of final beneficiaries, the national government was unwilling to enforce them. Motivated by narrowly defined political interests, Argentina's authorities failed to capitalize on the window of opportunity that opened with the decentralization of FONAVI, which could have resulted in substantially better housing programs targeting the poor, ameliorating at least in part the high social costs of the overall reform program.

Results after a Decade of Decentralization

Not surprisingly, the decentralization has failed to render any substantial benefits, except for reducing the bureaucracy at the national level – at the expense of forgoing any policy making technical and institutional capacity at the national level – and fostering new partnerships with alternative actors, such as labor unions, municipal governments and non-government organizations. Other improvements include an increase in the level of provincial funding and a reduction in construction start-up times, as most of the administrative processes were now within provincial jurisdiction. Overall, annual production has increased from approximately 30,000 units between 1983 and 1992 to 48,000 units between 1993 and 1999, including 6,600 alternative housing solutions (MECON, 2000) (see Table 3).

Table 2: Spending Targets Established by 1995 FONAVI Law and Consolidated Provincial FONAVI Spending by Category, 1999

Expenditure Category	1999 FONAVI Spending		Target Law 24.464/95
	\$ Million	%	
Housing construction	966	69.1	n.a.
Loans to final beneficiaries	62	4.5	Minimum 15 percent; 45 percent by 1998
Community facilities	22	1.6	n.a.
Infrastructure	33	2.4	Up to 20 percent
Administrative Costs	312	22.4	n.a.
Total	1,395	100.0	

Source: Zanetta (2004)

There have been, however, important shortcomings as a result of the decentralization of FONAVI. For example, there has been a considerable expansion in provincial bureaucracies, which, in turn, has translated into substantial increases in administrative costs. In 1999, administrative and operational costs accounted for 22.4 percent of all consolidated FONAVI spending, compared to the typical 7 to 10 percent of similar programs (MECON, 2000). Likewise, decentralization has also widened technical and institutional differences between provinces. More important, the decentralization of FONAVI has failed to overcome the traditional shortcomings, including high unitary costs and the consequent lack of affordability for low-income households, lack of transparency in the selection of final beneficiaries, narrow emphasis on finished housing, chronic low levels of cost recovery and systematic administrative delays (MECON, 2000) (see Table 3).

The poor performance of FONAVI in the decade following its decentralization should not come as a surprise. After all, improving sector policies, increasing the efficiency of the system, or promoting wider participation among various societal actors were not the driving forces behind its decentralization. Likewise, the fact that old practices have continued at the provincial level should not be surprising either, as decentralization did not respond to the demands of wider sectors of society calling for greater participation (Aguilar and Sbrocco, 1997). Instead, the decentralization of FONAVI was indeed successful when examined through political lenses, as it succeeded in rallying the support of provincial governments for the Convertibility Plan, which in 1992 depended heavily on the signing of the Fiscal Pact (Zanetta, 2004b).

Conclusions

Although the decentralization of FONAVI resources was an appropriate step in a country as large and diverse as Argentina, the national government did little to ensure that the potential benefits of decentralization did indeed materialize. Specifically, the national government failed to create an environment of accountability by tying the allocation of FONAVI funds to provincial performance, thus fostering inefficiency among provincial housing programs. Likewise, it did not enforce the targets established in the 1995 FONAVI law, such as minimum levels of spending on urban services and individual loans, effectively relinquishing its policy making responsibility. Finally, it failed to enforce minimum standards, including ensuring transparency in the selection of final beneficiaries.

It is not surprising that the theoretical benefits of decentralization largely failed to materialize in the case of FONAVI, as the national government effectively relinquished its responsibility to implement it adequately. As a result, the traditional shortcomings of FONAVI have persisted, including high unitary costs, lack of transparency, narrow emphasis on finished housing and chronic low levels of cost recovery. Furthermore, FONAVI's experience illustrates some of the potential risks associated with decentralization, such as widening disparities among provinces and the enhanced ability of local elites to affect the allocation of public goods.

Overall, Argentina's decentralization of FONAVI indicates that, as with any public policy, the simple creation of decentralized structures does not guarantee greater efficiency or any of the theoretical benefits of decentralization. For decentralization to succeed, it needs to be supported by clear policy guidelines, effective technical and institutional assistance, sound monitoring and control mechanisms and, most importantly, a willingness to enforce them on the part of the national government. All these elements have been missing in the decentralization of FONAVI as it was implemented during the 1990s.

As a manner of epilogue, it is interesting to point out that the collapse of Argentina's economy in December 2001 brought about a drastic policy shift, not only at the macroeconomic level but also within individual sectors, including housing. In contrast with the Menen administration that advocated for reducing the role of government in the economy, the current administration believes in the government playing a strong role guiding economic growth and actively participating in the provision of infrastructure and social services. Within this model, the construction of pro-poor housing is one of President Kirchner's flagship initiatives to reduce unemployment and poverty. Since taking office in May 2003, the Kirchner administration has launched a number of ambitious housing programs to support the construction of over

440,000 new housing units and the expansion and upgrading of over 140,000 additional units with approximately US\$7.4 billion in financing from the national government. These programs, which operate outside the sphere of FONAVI, reflect a trend toward 're-centralization,' with the national government playing a stronger role in their implementation than under the 'decentralized' FONAVI model. While provincial IPV's and, in the case of some programs, also municipalities, play an important role in implementation, being responsible for providing vacant land, project design, bidding and contracting, and supervision of works, the Under-Secretariat for Urban Development and Housing (*Sub-Secretaría de Desarrollo Urbano y Vivienda* – SDUV) at the national level is responsible for approving individual project proposals submitted by the provinces. Likewise, funds are transferred to the provinces only after appropriate certification of work (*certificados de obra*) is submitted to the SDUV.

While the recentralization of housing programs may have been partly motivated by the poor results achieved under the decentralized FONAVI model, there are clear indications that the current implementation model cannot keep abreast the ambitious scale of these housing programs. As of June 2006, official data show that only 42,400 new housing units have been completed, equivalent to roughly 10 percent of the overall target. The proportion is even smaller for expansion and upgrading programs, which show that only 6,600 housing units have been completed, equivalent to 5 percent of the original target (SDUV, 2006). While provincial IPV's and municipal governments are undoubtedly far from being without blame, delays on the part of the national government to transfer funds to the provinces are not only causing a slow-down in implementation but also the financial asphyxia of the private construction firms that have been awarded construction contracts under these programs, or that of those provincial governments that have accepted to advance the funds from their own treasuries.⁴ In this way, Argentina is once again experiencing the limitations associated with centralization. This, in turn, suggests that re-centralization might not be the best way to respond to the unsuccessful decentralization of FONAVI that took place during the 1990s. Instead, a better approach might be to take the decentralization process further, incorporating the lessons learned during the 1990s.

⁴ See, for example, 'Más suspensiones de obreros que construyen viviendas sociales,' *La Capital*, 1 July 2006, Rosario, Santa Fe; 'Admiten demoras en el Plan Federal,' *La Opinión*, 17 July 2006, San Rafaela, Santa Fe; 'Bell Ville aún espera 24 casas del Plan Federal,' *La Voz del Interior*, 3 October 2006, Córdoba.

Table 3: Outcomes resulting from the Decentralization of FONAVI

Positive Outcomes
<p>Bureaucracy has decreased at the national level</p> <ul style="list-style-type: none"> ◆ There has been an important reduction in the number of employees working on housing and urban issues at the national level, with only 15 employees remaining in 2000. However, the price tag for such reduction has been high, as the policymaking capacity was virtually destroyed. <p>There is more diversity in the institutional arrangements</p> <ul style="list-style-type: none"> ◆ Alternative approaches for the production of new units have been developed, including: i) co-financing with other institutions, such as labor unions, ii) decentralization to municipalities, which are responsible for providing the land and selecting final beneficiaries; iii) financing of individual credits; and iv) titling through the BHN, S.A. ◆ In turn, this institutional diversity has translated into an increase in annual production, from approximately 30,000 units between 1983 and 1992 to 48,000 units between 1993 and 1999, including 6,600 alternative housing solutions. <p>There has been an increase in provincial contributions</p> <ul style="list-style-type: none"> ◆ There has been a significant increase in provincial funds allocated to complement FONAVI transfers in each province, equivalent to a 57 percent increase between 1996 and 1999. ◆ Provincial contributions constituted 22.5 percent of all FONAVI funds in 1999, compared to only 13 percent in 1996. <p>Construction start-up times have decreased</p> <ul style="list-style-type: none"> ◆ Provincial governments were given responsibility for evaluating firms' technical and financial profile as part of the bidding process, previously in the hands of the national government. This has resulted in shorter administrative times.
Negative Outcomes
<p>There has been an increase in administrative costs</p> <ul style="list-style-type: none"> ◆ Administrative costs—such as personnel, fees, and legal expenditures—have climbed steadily, from almost 18 percent in 1996 to 22 percent in 1999. ◆ These costs are excessive high, as compared to the average 7 to 10 percent benchmark typical for this type of programs. ◆ Large differences in the incidence of administrative costs among provinces—ranging from 0.07 percent to 47 percent of overall expenditures—point to severe inefficiencies in some provinces. <p>Technical and institutional inequalities among provincial governments are exacerbated</p> <ul style="list-style-type: none"> ◆ Large variations in the number of provincial employees—even when taking into account differences in number of beneficiaries and number of finished housing units—indicate strong differences in technical and institutional capacity across provinces. For example, the number of finished units per employee ranged from 1 to 56 in 1999.
Persistent Shortcomings
<p>Cost recovery remains low</p> <ul style="list-style-type: none"> ◆ When measured as the ratio between actual payments received versus the payments due on an annual basis, provincial performance in terms of cost recovery shows almost no improvement between 1996 and 1999—48.14 percent and 48.7 percent respectively. ◆ There are extreme variations in the level of cost recovery among provinces, ranging from just 15 percent to almost 79 percent. ◆ Low levels of cost recovery seriously jeopardize the sustainability of the system. ◆ Unitary costs continue to be excessively high ◆ Unitary housing costs remain excessively high, at an average of \$26,000 per unit. ◆ High housing costs continue to pose a barrier to improved affordability and targeting of the program to low-income groups.

(continued)

(continued)

Persistent Shortcomings

There is a persistent lack of transparency in the selection of final beneficiaries

- ◆ As part of the 1992 agreement, provincial governments were given the responsibility for defining the criteria to select final beneficiaries.
- ◆ In addition, provincial governments are required to maintain a Registry of Applicants (Registro Permanente de Postulantes), which includes data on the applicants' household structure, income and date of the application as a way of enhancing the transparency in the allocation process.
- ◆ As of 2000, only nine provinces have up-to-date registries. In most provinces, the selection process is not based on clearly defined criteria or a transparent process. Thus, the historical lack of transparency of FONAVI has not been overcome with decentralization.

Ineffective targeting of low-income sectors of the population

- ◆ An analysis of the income eligibility criteria for the various FONAVI programs indicates that those programs implemented by local governments and other intermediaries are more likely to serve low-income groups.
- ◆ However, these decentralized programs account for only one-third of all FONAVI housing units being built in a year, with the remaining two-thirds of the units goes to households whose income is higher than FONAVI's intended target population.

There is a persistent emphasis on the construction of new units

- ◆ FONAVI's historical bias toward new housing units still persists. Of all units completed or financed in 1999, 83 percent corresponded to new units compared to only 17 percent for alternative housing solutions, such as expansion and upgrading of existing units, sites-and-services, and basic sanitary modules.

It has been difficult to break away from the old FONAVI models (Martínez de Jiménez, 1997)

- ◆ Most newly built housing complexes are located outside the existing urban structure.
- ◆ Almost all provincial governments continue to use the same housing prototypes, with no innovative use of materials or non-traditional building techniques.
- ◆ There has been very little community participation or involvement of NGOs in the definition of housing strategies at the provincial level.

Subsidies are still highly regressive (IDB, 2001)

- ◆ While the interest rates vary greatly among provinces, from 0 percent to 12 percent, they are significantly below comparable market rates—i.e., 16.9 percent in February 2001.
 - ◆ Highly subsidized interest rates translate into heavy indirect subsidies, which represent approximately 54 percent of all FONAVI resources.
 - ◆ There are additional subsidies, such as hidden land and construction costs, as well as low repayment rates from final beneficiaries.
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Source: Zanetta (2004)**References**

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THE CHALLENGES OF STATE-MUNICIPALITY PARTNERSHIPS IN SELF-HELP HOUSING PROGRAMS: ASSESSEMENT OF A LARGE-SCALE INTERVENTION IN THE STATE OF SÃO PAULO - BRAZIL

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Abstract

The housing policy experiment of the state of São Paulo innovates to the extent that it introduces different construction processes as it integrates institutional partners with the aim of expanding resources and including the community in the process of housing construction.

The creation of *Pro-Lar-Autoconstrução* Self-help Housing Program (also known as Habiteto), characterized by a partnership agreement with municipalities to share responsibilities and commitments, in which CDHU¹ transfers funds to municipalities to cover the costs of building materials and the local governments donate the land, provide infrastructure and monitor construction works carried out through the mutual-help efforts of future dwellers selected through public lottery.

Given the significant scale of the Program - involving the production of almost 40.000 housing units since its creation in 1995, the commercialization of 25,000 dwellings in more than 400 municipalities, with an estimated U\$ 150 millions in total financial resources – we will focus on the factors that lead to successful outcomes in the provision of housing and the obstacles and issues involving the relationship between the state and local governments, including the alternatives available to overcome them.

The aim of this paper is to critically evaluate the relationship between state-government actions carried out by CDHU, performance of municipal governments in the deployment of infrastructure and in coordination of construction works, and the participation of families in the self-help construction process.

The state-municipality partnerships will be assessed in terms of the institutional capacity of the local government, including its technical know-how for program development, its administrative experience in preparing and conducting the social aspects of mutual-help housing construction, and its financial ability to provide the infrastructure required to ensure the basic urban standards.

The conclusions reached will contribute to elaborate new perspectives for managing housing policies that target low-income families in their search for adequate dwelling conditions and their formal inclusion in the city.

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¹ CDHU: São Paulo State Government Housing and Urban Development Corporation, São Paulo, Brazil.

Introduction

The low-income housing policy of the State of São Paulo is unique within the context of the Brazilian nation. In 1989, government financial resources were reduced for all agencies of the Housing Financing System (Sistema Financeiro de Habitação, or SFH). In order to resolve this problem, the State of São Paulo government created an innovative mechanism. It increased the Commodities Circulation Tax (Imposto sobre Circulação de Mercadorias e Serviços, or ICMS) on goods and services by 1%, from 17% to 18%, by law¹. These fiscal resources, thanks to the high collection base of the State, are rather significant. Since 1990, they have resulted in an annual average amount of US\$ 174 million. These resources are channeled from the State Treasury to the Housing and Urban Development Company (Companhia de Desenvolvimento Habitacional e Urbano, or CDHU). The CDHU is a public company, which is a branch of the State Housing Secretariat. It operates several housing programs following a policy of providing subsidy grants to low-income families².

The design of this mechanism enables the allocation of funds from the ICMS for the construction of housing for low-income families. Since its beginning, the CDHU has been the most productive state company in the country. Although heavily subsidized, it is the only public company to operate with its own financing system. Its priority is to meet the housing needs of families with a maximum income of five monthly minimum salaries.

Striving for a more rational application of resources and responding to the housing needs in the 645 municipalities over the state, several lines of action and forms of production were put into practice during these last 15 years. Many paradigms and myths have been confronted during this process: the issue of homeownership; sites and services projects; expandable core dwellings; public rental housing; payable right of use; mutual-help and self-help housing; alternative construction technologies; standardization of urban design and lack of collective facilities; absence of landscaping; and regularization of projects. The common goal is to increase efficiency in resource allocation to face the huge housing deficit that accumulated during the last three decades of unplanned urban growth.

It is not an overstatement to affirm that social policies, in general, and housing policies, specifically, have not been sufficient, either nationally or in large metropolitan regions, to improve the living standards of the most vulnerable segments of the population, forced to occupy improper areas in shantytowns, informal settlements, slum tenements, water sources protection areas, and all forms of sub-standard housing.

Over the past 15 years, the State of São Paulo has attempted to use its funds more efficiently in meeting comprehensively housing demands of the 37 million inhabitants residing in 645 state municipalities³. As a result, different lines of action have been put into practice.

As a result, in order to combine an efficient use of resources with the huge housing deficit which had accrued over the past three decades, the CDHU has adopted different actions for people in need. These actions include providing, among others:

¹ The law 6.556/89 has been reissued annually in order to ensure the allocation of resources to household construction. 75% percent of those transfers go to the State government (CDHU), and 25 percent is deployed to all of the municipalities, in accordance with their contribution to ICMS collection.

² Consult about this theme: BORBA, M.O.G.; RUDGE, M.S.; CARÁ, G.C; MARCUCCI, E.P. – "Subsidy policy to promote affordable housing and wholesome human settlements for the poor". Experience of State of São Paulo Governmental Housing and Urban Development Agency (CDHU) – February/2005 - Paper for the Third Urban Research Symposium – BIRD/IPEA.

³ RMSP – São Paulo Metropolitan Region with 39 municipalities and approximately 17.5 million inhabitants; RMBS – Santos Coast Metropolitan Region with 9 municipalities and approximately 1.4 million inhabitants, and RMC – Campinas Metropolitan Region with 19 municipalities and approximately 2.3 million inhabitants.

- access to homes;
- serviceable land parcels along with construction materials;
- home expansion projects;
- public rental housing;
- payable right of use;
- self-help construction;
- assisted self-help housing construction;
- alternative construction technologies;
- architectural and urban project standardization;
- the purchasing of turn-key homes;
- shantytown urbanization.

Over this period, the CDHU has also faced challenges due to an overall lack of public infrastructure in fields related to health, education, sports and leisure, landscaping services, drainage, water and sewerage infrastructure, public lighting, and paving, among others. These challenges have hindered the CDHU's effectiveness.

In addition to the complex equation involved in housing production and urban services, the final cost of these products require, on the side of public policy, the granting of heavy subsidies. These subsidies are necessary so that low-income families can have access to housing and financing.

However, facing the housing needs of the State of São Paulo⁴ remains the primary challenge. The housing deficit has grown to about 740,000 homes, most of them centralized in the metropolitan area of São Paulo (69%). In addition, there are almost 3 million inadequate households in the entire state.

It should be recognized that public policy regarding the housing of low income families will not, by itself, be able to raise the living standards of the most impoverished sectors of the Brazilian population. Certainly, it is necessary to work on a way to have a fairer distribution of wealth and a higher rate of employment generation.

Nevertheless, by implementing construction models that seek the financial backing of institutional partners who are focused on raising living standards, the experience of the state of São Paulo has been rather positive.

The Self-Help Program – which is the main focus of this paper – fits into this context. Its experience and results have allowed us to improve state policy and gather examples for other public state agents and for the local powers in their supplementary operations.

Although the CDHU⁵ was created in 1949, it started its effective operations only in 1967, when it became a part of the Federal Housing Bank (Banco Nacional de Habitação, or BNH). During that time it operated according to the rules of the SFH (Housing Financing System) and its actions were strictly dependent on the influx of resources made available by the bank. Then, in 1986, the BNH ceased operations and its functions

⁴ The estimate of "expanded housing deficit" was developed by the Management of Social Research of SPE/CDHU.

⁵ Previous denominations of CDHU: from 1967 to 1978: CECAP (Caixa Estadual de Casas para o Povo), after CECAP (Companhia Estadual de Casas Populares); from 1979 to 1982 CODESPAULO (Companhia de Desenvolvimento Habitacional de São Paulo); from 1983 to 1988 CDH (Companhia de Desenvolvimento Habitacional), and finally, starting from 1989, CDHU (Companhia de Desenvolvimento Habitacional e Urbano do Estado de São Paulo).

were transferred to the Federal Savings Bank (Caixa Econômica Federal or CEF), whose programs were mostly oriented towards the construction of housing projects located on the periphery of large cities.

The scale of construction and the modernist ideas regarding architecture, which were popular at the time, led the CDHU to execute some leading-edge housing projects for low-income families, such as the Zezinho Magalhães Prado project. As happened all over Brazil, large-scale housing projects were spread throughout the state of São Paulo, occupying land plots lacking infrastructure on the periphery of large cities⁶.

During the late 1970s and '80s, the BNH, began following the path of international agencies in some other developing countries. It decided to fund serviced land plots (sites and services), which, in the case of São Paulo, had proven to be totally inefficient with regard to providing respectable housing and urban life standards. Previously, these areas had only generated shantytowns and other irregular settlements.

In the face of the BNH's lack of resources and, consequently, its impending demise, the State of São Paulo, decided to invest in an unprecedented partnership with municipalities for the purpose of housing construction. It was conducted through a self-help program named the Municipal Housing Program (Programa Municipal de Habitação, or PMH). Using this program, all details were personally discussed among participants of the process (i.e. the users and the project staff under the supervision of CDHU social services). Despite its small scale and some difficulties related to the finishing of some housing projects, the PMH marked an age of surprisingly good results,

The second-half of the 1980s brought an increase in the importance of the housing issue throughout the state. This was especially true in the city of São Paulo, with its uncountable irregular public and private occupations on the city periphery. The supply of homes available for low-income families through public agents and private initiative fell far short of demand, increasing the housing deficit. Self-help housing construction became the normal process of construction in low-income neighborhoods.

The social movement that organized itself for demanding its rights after the 1988 Constitution enactment now turned to the "right of dwelling". They demanded government financing for the construction of housing units, using the self-help process which was to be self-managed by a low-income residents associations. The movement then developed and implemented the first phase of the Self-Help Program. By that time, the last big housing projects financed by the BNH had been completed. The program begins to purchase the last large plots of land remaining in the city of São Paulo. A policy of "land stockpiling" for the construction of large housing projects will serve as a foundation for meeting housing needs for almost 20 years.

As a result of the legal approval of the ICMS tax increase, the following period, from 1990 to 1995, is marked by a great deal of entrepreneurship. Along with the continuation of self-help construction housing projects in São Paulo, two new initiatives provided access to new resources. On the one side, the CDHU created many partnerships with municipalities from the interior) of the state for the construction of low-cost homes on a massive scale (Programs SH-2/SH-3/SH-4⁷). On the other side, a model of construction wholly developed by private initiative, the "Turn-key" Program (Programa Chamamento Empresarial) was developed to meet the needs of medium and large-sized cities. This program included the purchase of plots, as well as the approval and construction of various housing projects.

⁶ Vertical architecture typology of 4 or 5 floors, with parallel plates interconnected transversely for circulation and stair boxes.

⁷ Since 1987, the housing programs are denominated SH (Housing Secretariat), numbered according to the areas of action: SH-1, capital; SH-2, partnership with city halls from the interior and SH-3/SH-4 for the rest of the state.

After 1995, under the government of Mário Covas, the actions of the CDHU adopt a rather clear policy:

Expand the number of units being built through a closer partnership with municipalities;
Channel fiscal budgetary resources to the model of assisted self-help construction by the municipalities;
Strengthen the Self-Help Construction Works Program with low-income residents, including enhancements to the construction process.

During this period, the Program Habiteto (currently named the Self-Construction Program) is expanded to all regions of the interior of São Paulo State. This happened because it was impossible to meet the housing needs of the City of São Paulo within the metropolis, as there was simply a lack of cheap and serviced land plots available at the time.

In 2001, after the six-year term of Mário Covas, the new governor, Geraldo Alckmin, made meeting the housing demands of people in high risk areas, slums, etc., a priority. He expanded the CDHU housing program, mainly for the São Paulo Metropolitan Region. In the interior of the State, he began a partnership with the municipalities for the Self-Construction Program, taking advantage of a low cost housing model that brings with it a revitalization of the construction materials sector.

In 2002, CDHU housing construction was strongly focused on the interior of the State, where 75% of units were sold. However, by the end of 2004, the number of homes constructed is as follows:

Interior	47%
Metropolitan Region	23%
City of São Paulo	30%

These percentages demonstrate how, by 2004, the previous trend of providing the majority of housing in the interior had been reversed, with the larger proportion of housing construction now aligning itself with where the needs are greatest.

Overall, the CHDU has created a complex and heterogeneous housing network with over 2,000 housing projects in almost 600 municipalities. By December of 2004, 350,000 housing units had been sold, a record in Latin America.

The Self-Help Construction Program was born in 1995 as an alternative partnership to the CDHU, aiming at increasing efficiency in the application of available funds.

In the 1980s the SH-2/SH-3⁸ programs established partnerships only for the purpose of land donation, and the CDHU hired construction firms directly. This model ended because these arrangements were found to be no longer successful. This model ceased to be attractive to the municipalities since they did not receive the resources and were deprived of having a more direct relation with the beneficiary households.

As a result, the Self-Help Construction Program innovated, allowing partnerships to be established with the direct participation of municipalities. The municipalities were obliged to purchase the construction materials, promote the public bids for the materials and organize the self-help construction procedures on the construction site. Both models have advantages and disadvantages which will be analyzed below.

⁸ Partnership with municipalities which counterparts resumed in land donation.

Program history

Since the implementation of the Self-Help Construction Program in 1995, three different construction models have been used as steps in the continuous process of development. They are described below:

Initially, it was conceived as an alternative program to the traditional process of housing construction by means of contract work. It was aimed at reducing costs in order to enable access by low-income families, especially those earning one to three monthly minimum salaries. The program was designed mainly for the State interior, and in its initial phase was called Habiteto (1995-1998). It was characterized by the transfer of resources from the CDHU to the municipalities, which were responsible for making the housing projects feasible and for managing the execution of works in the self-help construction process. In the initial stages of the construction, after the municipalities carried out their earthmoving works, they were advised by the CDHU to adopt a pre-manufactured process for the deployment of housing infrastructure (columns and beams). This acted as a way of speeding up construction and making the erection of houses easier. The subsequent construction stages were executed by the future residents.

During the second stage of the program, My Dream / Self-Help Construction, 1999-2002, municipalities used less pre-manufactured structural elements, partially because of technical problems and a lack of qualified personnel to carry out the pre-manufacturing at the work site. Also, flaws had been discovered in the pre-manufactured items. There were reports of cracks and a risk of collapse due to weak buttresses, which required repair after the occupation of the homes. At this stage, the municipalities opted for building housing unit structures with the conventional process. Additional funds for the execution of specialized services needed during the self-construction process were included in the final cost of materials.

The current stage of the Self-Help Pro-Housing Program (Programa Pró-Lar Autoconstrução), 2003-2005 is characterized by:

Meeting low-income sector "general demand"⁹;

Servicing families with specific housing needs, such as the dwellers of risk areas (risks such as land-slides, flooding and emergency conditions), and

Supporting urban interventions for shantytown demolition carried out by municipalities

In addition, financial aid is planned for housing construction on legalized urban land plots (Pró-Lar Lotes Próprios) whose owners do not have the means to erect houses. Also planned are housing constructions in the rural settlements of ITESP/INCRA, in addition to meeting the needs of rural workers living in urban areas (Pro-housing Rural)

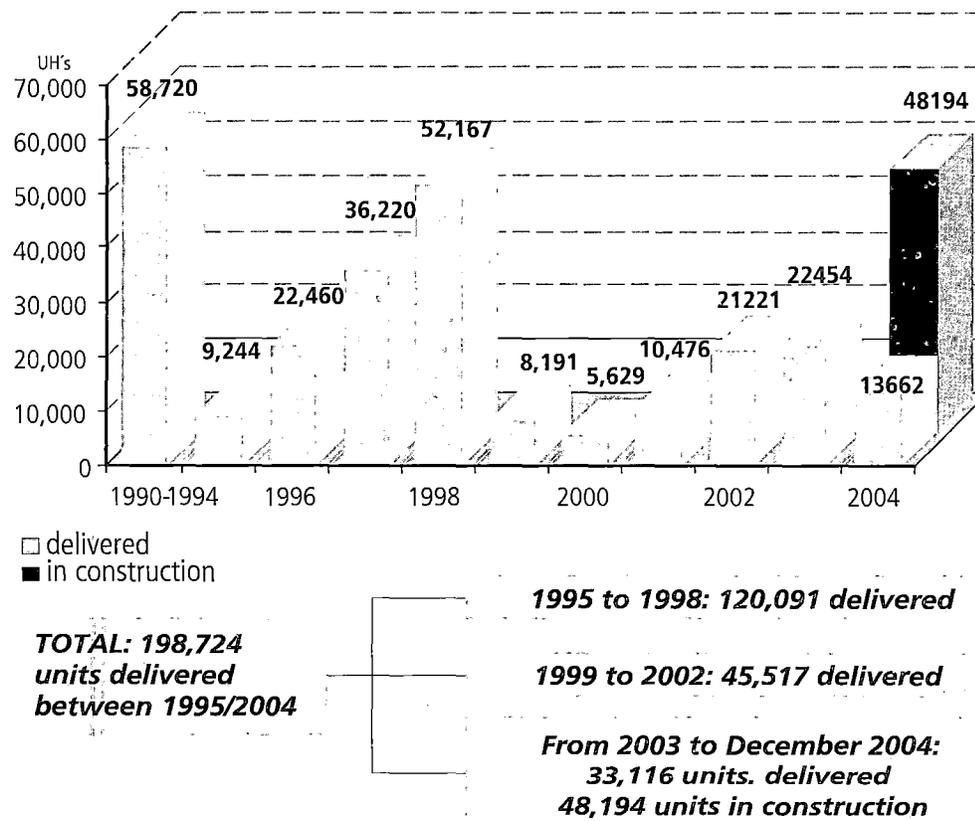
The novelty of this third stage is the transfer to the municipalities of the administration fee, which is designed to provide specialized services and workforce training for the self-help constructors. In addition, it provides financial contributions for part of the deployment of urban infrastructure at the housing projects.

⁹ "General Demand": population in need of social interest housing service, with family income between 1 to 10 minimum monthly salaries that can apply for housing unit acquisition produced by CDHU. This acquisition is offered by registration called by public announcement and drew in a public event. It is different from the "closed demand", which is constituted by groups of families in specific situations such as, in Self-Construction Programs or in interventions of urbanization of irregular settlements, slum destruction or in risk situation.

CDHU's Housing Production in the Self-Help Construction Program

Since its creation, the CDHU has delivered over 340,000 housing units and manages a portfolio of around 250,000 mortgage holders in more than 90 percent of the municipalities of the state of São Paulo. The pace of production has accelerated since 1990, with almost 200,000 housing units delivered and more than 48,000 under construction.

CDHU: Production of social-interest housing: 1990-2004



Participation in the Self-Help Housing Program, which is currently 29% of the CDHU's production, is striking as compared with other traditional programs such as Contract Core Dwelling (Núcleos por Empreitada), Global or Turn-key, which account for 38% of all units. The Community Self-Help Program, which accounts for almost 19%, is a sound alternative for meeting the demand for housing.

CDHU: Distribution of Production by Housing Program 2001-2004

Housing Program	Units delivered 2001 – 2004	Units under construction	Total of Units	% Total	% Total
Self-Help construction – general demand	14,079	12,746	26,825	23.6 %	29.0 %
Self-Help construction – shanty towns, risk areas	4,491	1,364	5,855	5.2 %	
Self-Help construction – rural areas	-	203	203	0.2 %	
Contract Core Dwelling – Global/Turn key	25,770	17,435	43,205	38.0 %	38.0 %
Community Mutual Help	8,726	12,847	21,573	18.9 %	18.9 %
PAC –Slum Tenements Association	466	764	1,230	1.1 %	14.1 %
Integrated Servicing	2,977	1,008	3,985	3.5 %	
Indian housing	57	118	175	0.2 %	
Quilombola housing	-	-	-		
Social Commitment :					
Handicapped	2,218	579	2,797	2.5 %	
Senior Citizens	1,295	306	1,601	1.4 %	
Police officers	5,274	568	5,842	5.1 %	
Pilot project					
Housing units for civil servers	-	256	256	0.2 %	
Housing units for Senior Citizens	66		66	0.1 %	
TOTAL	65,419	48,194	113,613	100.0 %	100.0 %

Source: CDHU/SPE/GCI - 2004

Since its creation in 1995, the Self-Help Housing Program has already delivered 27,123 housing units and another 15,702 are being built.

Below, these units are broken out into sub-categories, created to meet several demands (risk areas, shantytown rooting up, etc).

CDHU: Self-construction Program – Production 1995 – January 2005

Period	Program	No. of units delivered	No. of units under construction
		6,705	
1.995 – 1.998	"My Dream" / "Habiteto"	12,617	
1.999 – 2.002	"My Dream" / Self-Help construction	6,757	13,885
2.003 - 2.005	Self-Help Housing Program/General Demand	127	
	Self-Help Housing Program/Allotment	872	1,503
	Self-Help Housing Program/Shantytown rooting	45	314
	Self-Help Housing Program/Risk areas	27,123	15,702
TOTAL			

Source: CDHU/SPE/GCI - 2004

The first stage in the meeting of housing demands of municipalities in the Self-Housing Program is to establish the Intentions Protocol between the municipality and the CDHU. This protocol ensures a commitment and makes feasible the necessary requirements (land plots and work projects, etc). In the future, a formal agreement will be signed for channeling resources for housing construction.

The diagram below shows that 62.4% of protocols signed during 2003-2004 became contracts and that 35% percent of the housing units initially intended to be built were not constructed. This reveals the difficulties municipalities had in meeting the requirements needed for partnership with the CDHU. These problems were mainly related to the obtaining of land plots, which reflects the need for reviewing the partnership terms so that the municipal needs could be met.

CDHU: Comparative Chart of Commitments – Self-help Construction Program

Commitments	Nº of housing projects	%	Nº of housing units	%
Letter of Intentions (PIs)	298	100.0 %	35,944	100.0 %
Agreements	186	62.4 %	12,554	35.0 %

Source: CDHU/DPP/SGA - 2005

Regarding the Distribution of Service

Over time, the Self-Help Housing Program has spread to almost every territory of the State of São Paulo. It has been implemented in 497 municipalities (77% of total), in nearly every region, except for the Capital and areas with physical problems (such as steep slopes) or environmental problems.



Source: CDHU/DPP/SGA - 2005

Regarding the distribution by Regional Management Action (Gerência de Ação Regional or GAR) of the CDHU

The Self-Help Housing Program is focused on the interior regions of the State, with around 79% of housing units. This contrasts sharply with the large congested populations occupying the periphery of the Metropolitan Region.

Regional Operation Management	% units delivered + under construction (2000 / 2004)	%
Araçatuba	11.6 %	78.7%
Araraquara	9.1 %	(interior)
Bauru	7.8 %	
Marília	10.6 %	
Presidente Prudente	10.9 %	
Ribeirão Preto	19.7 %	
São José do Rio Preto	9.0 %	
Baixada Santista	2.3 %	21.3%
Campinas	5.5 %	(RMSP)
Sorocaba	4.8 %	
Taubaté	8.7 %	
Total	100.0 %	100.0 %

Source: CDHU/SPE/GPE - 2004

Regarding Service by size of municipalities

67% of housing unit construction under the Self-Help Housing Program is in small-sized towns of up to 50,000 inhabitants, 22% in larger urban areas and only 11% in the great urban conglomerates.

Size of the municipality	% units delivered + under construction (2000 / 2004)	%
Up to 5,000 inhabitants	16.5 %	
From 5,001 to 10.000 inhabitants	12.2 %	
From 10,001 to 50.000 inhabitants	38.3 %	
Sub-total		67.0%
From 50.001 to 100.000 inhabitants	10.1 %	
From 100.001 to 300.000 inhabitants	10.4 %	
From 300.001 to 500.000 inhabitants	1.5 %	
Sub-total		21.3%
Over 500.000 inhabitants	11.0 %	
TOTAL	100.0 %	100.0 %

Source: CDHU/SPE/GPE - 2004

Characteristics of the program

The construction of housing units under the Self-Help Housing Program is a process involving the State of São Paulo government, via the CDHU, the municipalities, and also the direct participation of the previously selected families.

A typical partnership begins with an official document addressed to the Housing State Secretariat by which the municipality, through a municipal executive authority, expresses its interest and justifies the need of constructing housing units designed for low-income families, targeting mainly households with monthly earnings of one to three minimum wages.

Once having the orders, available resources are checked and demand¹⁰ is analyzed, along with the historical background of housing servicing in the municipality.

The partnership begins with the signing of a Protocol of Intentions that seals the commitment of the CDHU with the municipality. This Protocol establishes the number of housing units to be constructed, guidelines for the partnership and the responsibilities of each party until the signing of the Terms of Agreement itself.

Afterwards, the municipality provides a land parcel, where the housing units are to be constructed. The parcel is donated to the CDHU and offered to a firm that will carry out technical feasibility studies. Such analysis is carried out by a specific sector, the Land Superintendence, where topographic characteristics and its potential for urban habitation are examined.

Once the plot is approved by the CDHU, the Protocol of Intentions is replaced by a Terms of Agreement, a public instrument defining the role to be played by each of the agents during the time period of housing project construction until commercialization of units. Upon the signature of the Agreement, the already approved land parcel is donated to the CDHU.

After the land donation, the Terms of Agreement states a list of 18 duties to be carried out by the municipality, among them should be highlighted:

- to execute earthmoving and basic infrastructure deployment¹¹;
- to gather the personal documents of the people to be benefited and ensure the signature of commitment terms with these people;
- to manage, supervise and assist the works executed by beneficiaries; to enforce the application of what was established in the works regulation¹²;
- to provide technical advisory staff;
- to take charge of security and surveillance of the work site, if needed.

¹⁰ The CDHU, the agreements executor, consults its Social Management Research, which estimates the real housing need in each State municipality.

¹¹ They are networks related to water, sewage, electricity, sewage treatment, and, when necessary, ditches and even street curbs.

¹² The construction regulation is approved in Assembly meetings carried out by the municipalities with the beneficiaries at the beginning of the construction.

Also, the municipality is held accountable for a quarterly statement ensuring the correct application of financing resources.

The duties of the CDHU comprise, in addition to the transfer of financing resources:

- managing the housing works;
- supervising its physical execution by means of measurements
- receiving applications;
- hold a lottery;
- equipping and marketing the units to final users.

The amount of resources designated to home construction is R\$11,773.76 (eleven thousand, seven hundred and seventy three reais and seventy- six cents, base date of December 2004) for each housing unit, to be re-adjusted annually by the IPCE-Material index. Such an amount corresponds to the value of a basket of materials, specified according to the type of home, plus an administration fee and an amount designated for infrastructure deployment. See below:

- R\$ 9,419.23 (nine thousand, four hundred and nineteen reais (at an exchange rate that has fluctuated around 3 reais per US \$1 at this time) and twenty-three cents) is designated for a basket of materials, per unit.¹³
- R\$ 1,731.01 (one thousand, seven hundred and thirty-one reais and one cent) per unit, is designated for the administration fee (which includes tool acquisition, beneficiary training, the hiring of specialized technical advisers and the execution of urban improvements).
- R\$ 623.52 (six hundred and twenty three reais and fifty-two cents) per unit, designated for infrastructure, preferably water and sewage.

After the agreement is signed and the project accepted, the CDHU issues an Order to Initiate the Works, which releases 15% of the total amount agreed upon. With these initial resources, the municipality can make a bid for purchasing material and hiring specialized personnel for technical consulting and the training of the families to be benefited.

Before issuing the Order to Initiate Works, the CDHU requires the following:

- a protocol of the real estate registration at the notary's office, certifying the donation of the land plot;
- a building permit issued by the city authority;
- the start of earthmoving works by the municipality;
- the definition of a timetable for the execution of works of the basic infrastructure, to be carried out by the municipality;

¹³ This value corresponds to the sum of the items values of the basket of materials necessary to the unit construction.

- a statement issued from the municipality certifying that the housing units will be constructed under the self-help construction regime, for the purpose of obtaining exemption from contributions to the INSS (Social Security Service);
- delivery to the CDHU of the Certificate of Technical Responsibility, signed by the engineer in charge of the works, duly collected by the Engineers Class Association.

These technical requirements serve to ensure the CDHU of the initial inputs for the good progress of the works.

Subsequent construction releases are done monthly, in accordance with the measurement of services actually carried out, and as previously defined in the work timetable.

Management activities are outsourced and hired by the CDHU. One of those activities is the monthly measurements. Also, the management firms hired should keep track of the works and issue measurements, and assist the City Authority and also the CDHU regional offices in securing precise compliance with the agreement. This job requires efficient coordination and planning, as the good progress of the works demands the supplying of materials at the right time, purchases in compliance with legislation, and quality standards pre-established by the CDHU.

The construction timetable, developed in partnership with CDHU technicians, should keep track of progress, being modified as necessary, as it is the record for management of the construction work and its resulting measurements and outlays.

The amount allocated to the administration fee should be used in accordance with the characteristics of each municipality, but experience shows that a minimum technical staff to supervise the works should consist of a civil engineer, a social assistant, a foreman and a stock clerk.

The time period for the execution of the works, which is from 24 to 36 months, is apparently long as compared with other constructive processes, but is justified by the participation of the beneficiaries at the work site, which typically happens on the weekends.

All actions, assignments and responsibilities stated in the program pursue one common objective - offering to the low-income population an affordable product that should be a result of a joint action among the State, municipalities, and the population.

Implementation phases; emerging problems

Land plots donated by municipalities

An essential part of the partnership between the CDHU and the municipalities is the availability of land plots for the implementation of housing projects. It involves complex factors, since the choice of possible land plots dictates the size of the actual donation and transfer to the CDHU.

Plots presented by the municipality are analyzed by the CDHU in terms of:

- localization;
- soil usage;
- urban surroundings —such as urban public transportation, the availability of infrastructure (drinkable water, sewerage, electricity, public lighting, drainage, etc.);

- the existence of public equipment and services;
- urban and environmental restrictions.

After technical approval, legal and land analyses are conducted. The average period of time for this stage of technical analysis and final approval for land plots, including the completion of all necessary documentation, ranges from four to six months.

Some relevant issues should be taken into consideration by the State-Municipality partnership in relation to land plots donations:

- **Land Plot Localization**

Most municipalities of the State of São Paulo do not have a Master Plan for providing guidelines for urban expansion and household localization in a way that takes their environment into account. The localization of a great part of potential land parcels is inadequate as they are on the fringes of the urban network.

As a result, these areas often have geotechnical and environmental problems regarding the implementation of low-income housing. The expectation is that the issuance of Federal Law no.10257/01 (City Charter) will bring a gradual improvement in the quality of land plots. This Charter requires that municipalities with over 20,000 inhabitants implement a Master Plan and that those cities with more than 500,000 inhabitants implement a Housing Plan.

- **Quality of Land Plots**

Recently, the land provided for affordable housing has tended to have geotechnical and environmental problems (rough topography, fragile soils, bordering a stream or body of water, green areas, etc.), due to a real-estate valuation process that leads to public-sector acquisition of low cost and low quality land requiring significant investment related to earthmoving, drainage, infrastructure and equipment implementation.

- **Infrastructure Implementation**

Many of the land parcels offered are not technically and/or economically feasible, for development due to the lack of interest in investing in such areas from public agents and agents responsible for infrastructure, such as sewerage, transmission lines, water mains, etc.

- **Donation of land plots to the CDHU**

Several obstacles hinder the donation and transfer of land plots to the CDHU. In addition to the reduction in the number of municipal public plots available, there is a difficult process of expropriation which, in most cases, increases the final costs of the land plot, having an impact on the municipal budget. Another obstacle is the land plot documentation, which has to be fully regularized.

In large urban centers and metropolitan regions the complexity of housing needs and the real estate dynamics impose greater restrictions on obtaining land plots by the municipalities. In general, these larger municipalities require that the CDHU meet their housing needs through maximizing the level of occupation on the land parcels offered. This process demands the implementation of specific models of construction that ensure the greatest number of housing units (vertical and superimposed). These types of models

increase substantially the cost of the materials (foundations, structures, etc.) as well as other characteristics of the Self-Help Housing Program.

Finally, some of the land plots offered are irregular settlements found in large urban centers where the municipalities are implementing housing projects for urban and land regularization. The intention of offering these specific plots is to propose a partnership with the CDHU for the partial eviction and replacement of homes. However, this process is problematic because of the difficulty of separating and organizing the real estate property documentation in order to transfer the property to the CDHU.

All of these obstacles are becoming increasingly frequent. As a result, a review of the following is urgent:

- the criteria and requirements on the part of the CDHU of the physical, geotechnical and environmental characteristics of the land plot offered;
- the requirements for the acceptance of land deemed inadequate under urban planning norms;
- solutions for enabling urban interventions for urban and land regularization;
- the costs of all items that compose the resources channeled to the program, including the land plot.

Housing Unit Typology

The Self-Help Construction Program is tied to the composition of the basket of construction materials, previously defined and based on the typology, or housing model, adopted by the CDHU. The standard housing unit is a one-story detached house (TI24A), with nearly 40 square meters. A standard house has two bedrooms, living room, kitchen and bathroom. This housing unit can be expanded by the dweller after its construction to up to four bedrooms. It can be adapted to most urban land plots, resulting from the parceling of traditional soil and from urban planning.

The standard housing unit meets the minimum requirements for comfort and has been adopted, due to its simple design and the speed and functionality of the self-help construction process, and the compatibility of the construction materials required. Municipalities have adopted this typology for these reasons.

However, the standard model, replicated in almost 77% of municipalities that have adopted the program, shows little diversity in design and architectural creativity. This is due to financial restrictions (cost of the unit and size of the land plot) that do not allow room for diversification or adoption of other typologies.

This lack of diversity in the style of units provided should be discussed with the municipalities, especially with those of larger size. For example, by using initiatives such as a "Low-Income Household Project Bank", a greater variety of blueprint alternatives, pre-approved by the municipalities, could be provided. This initiative could, in the future, give to the dweller a more personalized home, adapted to his necessities. It would certainly be a more stimulating environment.

Urban Planning Projects

After the housing typology is defined, an urban planning project composed of four elements is developed for the implementation of the housing project:

- earthmoving, drainage and roadway system projects;
- urban development project, including subdivision;
- urban infrastructure project (water, sewage, paving, etc.);
- supplementary projects such as landscaping, public equipment, etc...

Typically, these projects are developed in stages and are developed by both the CDHU and the municipality. The stages are:

- preliminary study (EP);
- basic design (PB), and,
- executive design (PE).

On some occasions, the CDHU can develop, internally, the so-called EPs or PBs, and contract the development of executive designs. Or, CDHU can propose to the municipalities that they develop or contract these preliminary elements. The alternative chosen is based on the internal operational capacity of the CDHU staff and comparing it with the volume of projects to be developed.

As the Self-Help Housing Program has evolved, responsibility for the design of the urban housing projects which will be implemented has changed:

In the beginning of the Program, all project designs were done by the CDHU. Afterwards, because of the great volume, project designs were outsourced to registered engineering and architectural offices.

Currently, the Program is open to the possibility of municipalities developing or contracting firms to design their projects, with the cost reimbursed by the CDHU afterwards. This option was made available to the municipalities because of operational problems at the CDHU, which limited the CDHU's ability to design projects internally or contract third parties to do so.

CDHU: Self-Help Housing Program – General Table of Projects

Responsibility for the project design	N° of housing projects	%	N° of housing units	%
CDHU	199	34.3 %	13,153	27.5 %
Municipalities	381	65.7 %	34,702	72.5 %
TOTAL (*)	580	100.0 %	47,855	100.0 %

Source: CDHU/SPE/GPE - 2005

(*) The total includes all projects done for the housing project, in any situation: commercialized, under construction, hired but not initiated or in any phase of project development.

Currently, municipalities prefer to develop their own projects instead of transferring this phase to the CDHU. This provides opportunities for local professionals and stimulates the economic activities of the tertiary sector. The CDHU is in charge of carrying out the registration of professionals and supervising their activities, so as to ensure that projects have a minimum standard of quality. There have been problems in that process of supervision and support from the CDHU, burdening the process in terms of time and costs. So the initial goal, which was to optimize the process, has not been accomplished.

The critical point in the process of developing projects is that they have to be analyzed and approved by the CDHU's technical area, which has a restricted technical staff in terms of number of people. This limitation results in delays related to releasing projects and, consequently, in the progress of construction at the work site.

The table below compares projects developed by the CDHU with those developed by municipalities for the Self-Help Housing Program.

Responsibility for the projects	Characterization	Difficulties	Advantages
CDHU	Projects developed internally Outsourced projects	Slowness in hiring project designers Slowness in having public agencies and municipalities approving the projects Different levels of involvement on the part of municipalities as a result of less or more qualification of the technical body; lower or higher engagement from local administration to accelerate the development and approval of projects	Greater experience and agility in the relationship with project designer hired; obtaining product more rapidly than the municipalities
Municipality	Internally designed projects and approved by CDHU Projects contracted by municipalities and designed by project designers not registered with the CDHU	Trouble in the relationship of CDHU with technical staff of municipalities, whose level of expertise varies depending on the size of the city. In smaller cities (up to 20,000 inhabitants), technical staff is nonexistent or lacking in qualification, which requires technical support from CDHU. Medium-sized cities (up to 50,000 inhabitants) have good technical staff that establishes an efficient relationship with CDHU. Big cities (with more than 50,000 inhabitants) have a technical body but the relationship with CDHU is difficult. Lack of control from CDHU over deadlines for development of projects with the municipalities, that have been larger than the ones executed internally.	In general, projects developed by the municipalities get approval by public agencies with more efficiency than when developed by CDHU, which ensures regularity of the housing project.

Source: CDHU/SPE/GPE – 2005

In the case of outsourcing projects, the desired results depend more on an integrated relationship between the CDHU and the municipalities. Also, reviewing the criteria for the selection of land, multiplying the options available for donation from the municipalities can lead to faster progress and better results. It also helps the CDHU avoid rough topography and provides a forum for a review of the types of homes to be adopted.

Approval of Projects by Government Agencies

The approval of projects by government agencies is the first step towards the implementation of housing projects, both for the construction works and for the legal warranty. Approval enables household registration and ensures the property rights of future residents.

The CDHU Self-Help Housing Program: Projects Delivered (1995-2004)

Responsibility Projects	Status	Number of Projects	%	Number of housing units
CDHU PROJECT	Registered	4		211
	Non registered	147		10,175
	Sub-total	151	51.0 %	10,386
MUNICIPALITY	Registered	81		8,282
	Non registered	66		7,360
	Sub-total	147	49.0 %	15,642
PROJECT (PM)	Registered	85		8,493
	Non registered	213		17,535
TOTAL (CDHU + PM)	TOTAL	298	100.0%	26,028

Source: CDHU/DPP/SGA - 2005

The process of project approval consists of:

- Pre-approval of the urban development project including the subdivision by municipalities;
- Approval of the project by State agencies (i.e. housing, sanitation and infrastructure, environment, public health, etc) is centralized at the Analysis and Approval Group for Housing Projects of the State Housing Secretariat (Grupo de Análise e Aprovação de Projetos Habitacionais da Secretaria de Habitação do Estado, or **GRAPROHAB**);
- After state approval, final approval is given by the municipalities for the housing project.
- This process is relatively long and has a significant impact on the implementation of projects. It can set back the start of work. However, it is essential, for legal regularization and to obtain the houses' titles.

Traditionally, state government agencies for housing construction, including the CDHU, start and execute works even before the final approval of a housing project. This is done in an attempt to accelerate the projects' approval and to obtain the houses titles.

Regarding approval, the table above shows a clear advantage to projects developed by municipalities, as compared to those developed by the CDHU. This is due to the agility of the municipalities in obtaining approval for their own projects in the municipal sphere, which also accelerates the process in the state sphere. This process shortens the period of time for final approval and to obtain the houses' title.

Selection of families

Once the Terms of Agreement are signed, the phase of receiving applications from interested households, conducting the lottery and qualifying families takes place. Although responsibility for defining the target group is with the CDHU¹⁴, the municipalities are required to participate in the process. Municipalities encourage people to fill out applications, make available a location for holding the public lottery, and offer support for the selected families.

¹⁴ Self-Construction Program – General demand, the families register themselves for a public lottery, respecting the CDHU criteria. There are, however, other programs in which the municipalities appoint who will be the beneficiaries, servicing a closed group.

Besides of their willingness to work in the construction of homes, there are other pre-requirements to fulfill in order to participate in the Program:

- The housing unit is designed to be occupied by a structured family;
- The head of the family must reside in the city, or be employed within the municipality for at least three years;
- The family¹⁵ cannot own a rural or urban housing unit or hold any other mortgages in the country;
- Family monthly income shall be from one to ten monthly minimum salaries; and,
- In the case of the family having a handicapped member, it has to present a medical report.

For legal reasons, the lottery in Sao Paulo State¹⁶ is public and is held on a date and time previously noted to the applicants.

Seven percent of housing units are designed for families with a member that is severely handicapped or seriously impaired. This member could be the head of the family, spouse or living-in partner, children or protégées. Those are the members of the family who, alone or jointly, should be available to work on the building of the housing units.

Five percent of units are designated for the Program for Meeting the Needs of Senior Citizens.

Four percent go to civil police, military police, security and prisons guards, surveillance and bodyguard agents. When demand is greater than the percentage offered, a specific lottery is carried out to meet the demand of those groups.

Execution of Works

The works begin after the municipal authority delivers the technical documents required for the Order to Start Works to the CDHU. At that point, earthmoving needs to have been concluded. However, some municipalities do not have the resources to comply with this requirement¹⁷, which may delay the starting of the works.

The municipality is in charge of purchasing construction materials and the necessary tools. They also need to hire a specialized technical adviser, not only to qualify the agreeing participants, but also to execute some specific activities which cannot be done by the families.

The procedures for purchasing construction materials and for hiring labor are carried out by means of a public bidding, as established by Federal Law¹⁸. By nature, this is a slow process (taking three to six months). The bidding process ensures that the mayor's office is negotiating in good faith, and that they will be held accountable for expenses, as is currently enforced by the Fiscal Responsibility Law.

¹⁵ Any component that contributes to the income family.

¹⁶ Law # 10.310 from 12th of May, 1999.

¹⁷Some municipalities, usually small, don't have the equipment, technical personnel or financial resources to hire the earthmoving executers. They depend on loans from neighboring municipalities or other state institutions to complete this requirement, delaying the work.

¹⁸ Law # 8.666 from 21st of June, 1993.

After the municipality finishes the earthmoving, the families participating in the Self-Help Housing Program start working on their site. The municipality is in charge of following and supervising their activities during the works. The CDHU is responsible for measuring the physical progress of the works as well as the pace of the physical-financing timetable, which is done by a management firm hired to do this service. However, the municipality is responsible for the construction materials and tools, and for the actual participation of the families.

The time period for building is long, as compared with other construction procedures or other programs of the CDHU. The families should work at the work site for 16 hours a week and are mostly represented by women. They also work on the weekends. In the Self-Help Housing Program, construction progresses at an average pace of 5% a month, while a housing project under the Global Undertaking process occurs at a pace of 12% a month. Considering that, in the finishing phase of the work, the self-help construction pace averages only 1% a month, we have a total time of 18 to 36 months, which is quite long.

The disadvantage of this long time period is worsened if we consider the costs involved for work-site supervision, monitoring and management of the works and the expectation and necessity of the families waiting for a housing unit.

This long construction period is the primary negative aspect of the Self-Help Housing Program. It is recommended that the State-Municipality partnership try to find ways to reduce this time period. However, the participation of future dwellers in the construction process gives the final user of the Self-Help Housing Program a level of satisfaction much higher than the one obtained with the Contract Program, where the beneficiary family receives a housing unit ready and finished, without having any involvement in the building process.

Implementation of Urban Infrastructure

The steps for implementing the infrastructure needed for the housing project (water supply, sewerage with final treatment of its flows, electricity public utility, etc) should be undertaken simultaneously with the securing of land, and the contracting and construction. This is a job to be carried out by the municipalities, as it is part of the partnership, as defined by the Agreement established with the CDHU in the Self-Help Housing Program.

However, municipalities have been having troubles executing such works, which includes the conclusion of the works itself. This negatively impacts the program's public image as well as the delivery of housing units to beneficiary families. As a result, the CDHU is faced with the reality of having to bear the burden of the infrastructure and finishing costs of the housing project, or wait until the municipalities have the resources available to carry out their part. The table below shows this reality.

Partnership responsibility in urban infrastructure implementation - CDHU vs. Municipalities

Self-help Construction Program / Housing project delivered from 2003 to 2004 (partial data)

	Number of projects	%/total	Number of housing units	%/total
Projects with infrastructure implemented by CDHU	31	28.7 %	2,044	11.3 %
Projects with infrastructure implemented by municipalities	77	71.3 %	18,155	89.9 %
TOTAL	108	100.0%	20,199	100.0 %

Source: CDHU/SPE/GPE - 2004

The above data, although partial, are relevant as they show that, in approximately 29% of the housing projects, the CDHU was responsible for infrastructure implementation. This situation points to difficulties in the municipalities' ability to fulfill their functions, as defined by the Agreement, which calls for changes in the configuration of the Self-Help Housing Program. One alternative would be to establish new partnerships with other State agencies in order to ensure the basic infrastructure for the project implementation. Such actions could join more sources of funding and facilitate the Self-Help Housing construction program. These connections can be promoted by the State Housing Secretariat.

Partnership state-municipality

Political-Institutional Capabilities of Municipalities

The first step that seals the partnership commitment is the Protocol of Intentions, signed between the municipalities in demand of housing units for low-income families and the State of São Paulo government, the agent that fosters the building of those housing units.

On signing the Protocol of Intentions for implementation of the Self-Help Housing Program, the municipalities express their interest in participating in the program. There are no restrictions to their participation due to political reasons. Over the last ten years, over 76% of São Paulo municipalities have had those needs fulfilled. However, municipalities have had difficulties demonstrating housing demand and deficit in a way that the housing units offered be compatible with local needs. Changes occurred in 2003, with the launching of the Pro-Housing Self Construction Program. The changes which occurred within the areas of Risk, Shantytown Demolition and Rural, emerged as answers to the specific needs of the municipalities and provided a new incentive and a new drive for the Program.

However, commitments under the Protocol of Intention are not always converted into agreements, as the municipalities need to fulfill important demands for making feasible the projects, such as the presentation and donation of technically feasible land parcels, and the development and approval of project designs.

It must be noticed that only a part of those Protocols of Intentions are converted into Agreements. So, only part of the demand is fulfilled. This underscores the municipalities' troubles in meeting the requirements and counterpart requested by the Program, especially obtaining land.

This is an aspect that should be investigated during search for other feasible solutions for the State-Municipality partnership. The opening of financing lines for land plots purchased with other fund resources¹⁹, for example, could be an alternative to this problem.

Municipality Finance Capacity for Meeting the Program Financial Counterpart

The municipalities receive resources from the additional 1 percent of the ICMS tax; 75% of this amount goes to the State and 25% to the municipalities. However, these funds are not enough to solve the problem of the lack of infrastructure in the city. Consequently, municipalities often have trouble providing their counterpart to the Self-Help Housing Program, which includes donation of the land, execution of earthmoving works, and infrastructure construction. Such cases are more frequent in small- towns. Even the resources from the Housing Lottery, whose purpose is to support municipalities, does not address the scale of the problem.

¹⁹ The Housing Secretariat has the use of the Housing Lottery, a specific modality with revenue addressed to the State Secretariat. This sum represents, on average, an annual amount of R\$ 5 million that is set aside for construction, mainly infrastructure, in the State municipalities.

Over the past two years, in an attempt to remedy the lack of resources of the municipalities for the execution of infrastructure works, CDHU has been modifying the agreements' total cost agreed by decreasing the 15% amount . designated for the administration fee, and increasing the value designated for infrastructure.

This increase of funds should be used, preferably, for water and sewerage infrastructure works. If this system is maintained in the future, total infrastructure will be implemented with resources from the agreement itself, relieving the municipality from the financial counterpart in this regard. This, however, does not ensure the lessening of problems for finishing the project. It is necessary to establish new terms for the partnership involving financial control mechanisms.

Administrative-Management Capacity of Municipalities

The process of purchasing construction materials by the municipalities should be reviewed, as experience shows that the public bidding phase is only launched after CDHU resources are disbursed.

This practice tends to delay the start of the works and, consequently, over longer time periods, the entire housing project of the implementation. The municipalities have budgetary problems in launching public bids without the availability of resources that are only released after the issuance of the Order for Starting Works, which creates dependency on the CDHU. If those public bids were launched simultaneously, with some activities done in advance of the bidding, certainly the starting of the works could be anticipated. Some of these activities could include, for example, definition of target group, receipt of applications, conducting lotteries and signature of terms of agreement by the families, earthmoving execution by the municipality, etc. There is great interest on the part of municipalities in the public bidding for materials acquisition and the works management processes because they are very important to the local or regional economies. They stimulate business, commerce and the workforce; in short, the city's economy.

The stages and activities that require actions from the municipal technical bodies are directly related to the size of the municipality. These include:

- the survey and selection of land plots to be analyzed by the CDHU;
- the development and approval of projects;
- earthmoving execution;
- materials and services public bid;
- social care to the participants of the self-help programs;
- execution and/or supervision of earthmoving works;
- building and infrastructure works.

A Municipality should have available a number of professionals with enough experience for meeting its needs, but this is not always the case. As a result, the Self-Help Program identifies the lacking of technical capability, recommending where it is necessary to give more support to small municipalities. Medium-sized cities offer better operational conditions; however, some of the larger cities present some problems as well.

As compared with CDHU actions, the municipalities are faster in approving projects with public agencies, enabling the process of legalization and registration.

The State-Municipality partnership is a key issue for the Self-Help Housing Program, as there is no mayor who is not interested in making feasible housing units for low-income families in his/her city.

However, once aware of the problems in making available and feasible land parcels and carrying out infrastructure works, the partnership can be reinforced, or it can be broken. With the exception of medium-sized municipalities, the partnership is broken when the Protocol of Intentions does not become a Term of Agreement. In the cases where the agreements are signed, the CDHU experience reveals that, despite the length of time needed to reach the desired result (as compared with other programs developed by CDHU) certainly, the level of satisfaction among beneficiaries is very high.

Conclusions

An analysis of the public housing policies targeting low-income families in Brazil shows a lack of large-scale programs. Instead, the literature commonly profiles pilot projects that fall far short of meeting the need and diversity of conditions in Brazil's 5,560 municipalities

This report, on the State of São Paulo public policy, demonstrates the importance of intervention at a massive scale supported by considerable funding (US \$200 million on average per annum from the ICMS tax) over a substantial period of time. Of particular note, the Self-Help Construction Program has operated over ten years, reached almost 500 municipalities, produced 43,000 housing units, and improved the living standards of approximately 200,000 citizens of the State of São Paulo.

A recent survey²⁰ conducted with the population shows that the level of satisfaction of residents of the housing units is very high – 96.5% were pleased with their houses, although they did identify problems with the quality of infrastructure services.

In conclusion, the experience of Sao Paulo demonstrates the crucial importance of size and continuity of funding and operation in meeting housing needs effectively. The stability resulting from these virtues has allowed the economic agents involved (state government, municipalities, households, construction firms etc.) to learn to use and improve the Self-Help Housing Program. In particular, a number of lessons have been learned for enhancing the State-Municipality partnership that lies at the core of this approach:

The **first area for corrective measures** involves internal aspects of the management of the promoting/financing agent – the CDHU. It is necessary to increase the efficiency of the decentralized system of the CDHU's regional offices, and to increase support for the construction management. This would promote more interaction with the municipalities in the phases of project development, supervision of works and after the occupation process. In order to do this, employee technical training and skills upgrades, and the dissemination of techniques and objectives appropriate for the characteristics of this program, could bring substantial gains. This would result in a more rational application of resources and, in the end, an improved quality for the housing project.

The **second set of measures** involves the relation of the promoting/financing agent, the CDHU, with its local partner, the municipality. The need to create programs of Institutional Development is undeniable, aiming at improvement in the municipal public mechanisms. Since the enactment of the new Constitution

²⁰ Survey made by the Department of Control and Evaluation of the State Secretariat. It evaluated the Self-Construction Program between 02/01/2004 to 30/09/2004 (rapport # 382/2004, from 28th December 2004).

in 1998, and with the guidelines of the Charter of Cities Law of 2001, Brazilian municipalities have been increasing their duties as managers of cities, particularly as regards social issues. Those new duties have not been followed by a modernization in the administrative system or in the staff structure.

In fact, there is an overall resource deficit for those purposes. It is also necessary to reinforce local capabilities, transferring know-how in the fields of works and services, and in the purchasing of construction materials, development of projects and work site management, administrative management and financial control, and also in the supervision of families participating in the Self-Help construction.

The **third measure** is to emphasize Citizen-Municipality partnerships. The resources foreseen in the Program pertaining to the hiring of specialized services and labor training of the families participating in the self-help construction program could be better applied. Several suggestions could be analyzed, geared to the reality of each municipality participating in the program. Partnering institutions such as SEBRAE and SENAI, and non-governmental organizations and OSCIPS should be involved in this process, with the goal of making the execution of works quicker, more efficient and of better quality. In addition, these institutions should also help to qualify families and help them have more access to opportunities in the labor market.

A **fourth measure to be explored** involves the possibility of expanding the State-Municipality partnership with other institutions. Since 2003, the Self-Help Housing Program has been involved with demolition and relocation of shantytowns at high risk. These actions require a search for partnerships by municipalities to make the housing intervention more effective.

Several experiments in Brazil demonstrate that housing interventions succeed best when the programs are linked with other initiatives in education, health, vocational training, digital inclusion, etc. This initiative should also take into account a solution that ensures an adequate urban use of the expropriated areas.

A **fifth and last series of recommendations** to be considered has to do with the most crucial problem raised by this survey - the financial difficulty municipalities have in providing their financial counterpart, agreed upon at the moment of the Financial Agreement signature.

The central mechanism of this program developed by the CDHU is to assign enough resources for purchasing construction materials and supplementary services, with the municipality held responsible for providing the land and the infrastructure. Previous analyses have shown the need to promote some adjustments in the arrangement related to the total value of transferred resources, mainly for the related infrastructure. It is desirable that creative and diversified alternatives for funding be found.

However, the central problem remains. New financing sources have to be sought out for the infrastructure works and/or to maintain tighter control over the municipalities in default.

The possibility of capturing ICMS transfers prior to their receipt by municipalities should also be explored. This action would help to avoid discontinuities in the operation of the promoting agent during program implementation.

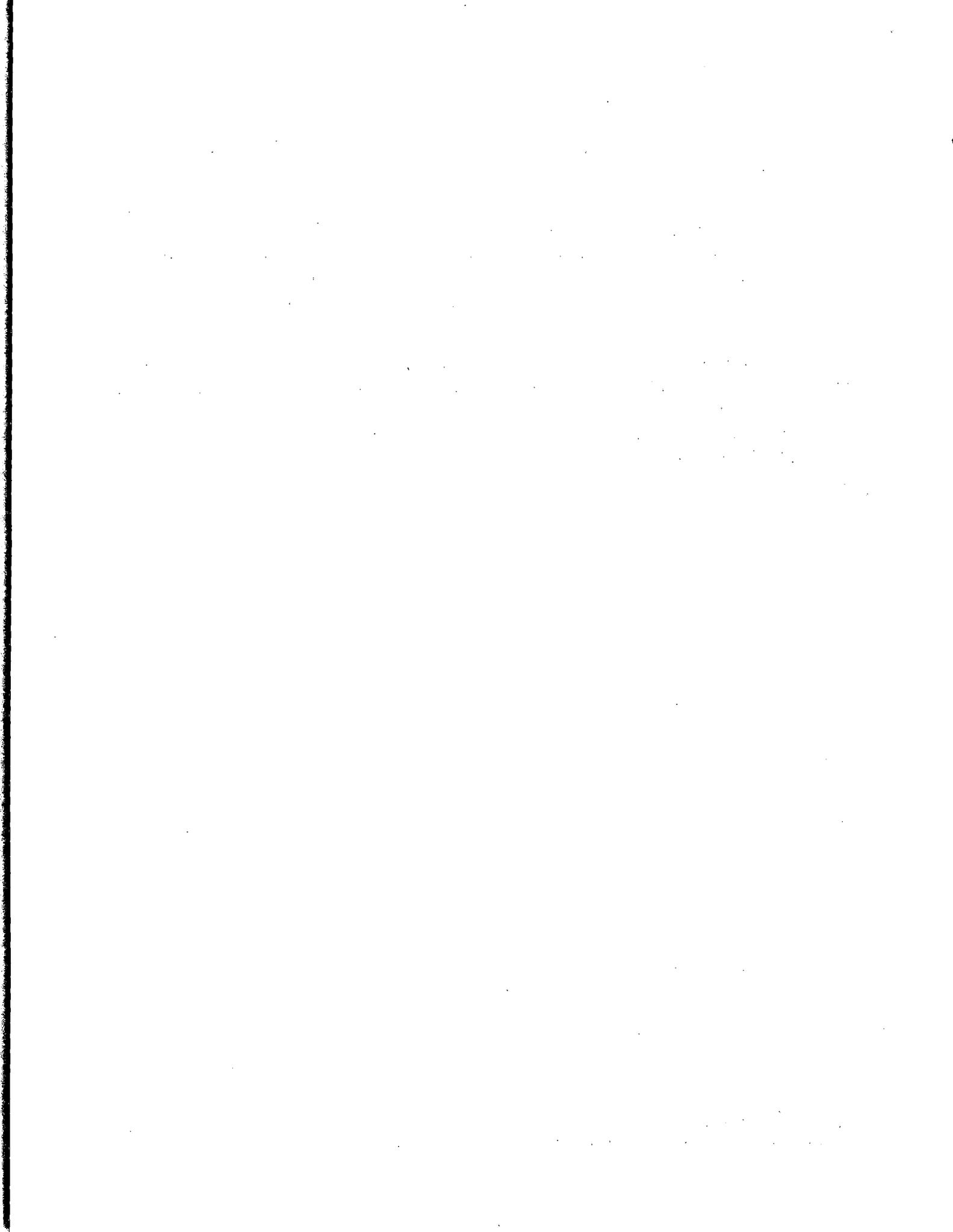
Such considerations and suggestions could serve as guidelines for pro-active change in the operation of this important State of São Paulo housing program. Its contribution is valid not only in that it stimulates similar initiatives in other States and regions of Brazil, but in that it could also help to reorganize CDHU future

policies. In short, the State-Municipality partnership faces huge challenges but also is a notable social-policy success in Brazil.

Every public policy has conditioning factors; that is, economic, technical and even legal restrictions that guide the decision making process within a political context. However, these elements and the political will to maintain the coherence and continuity of funding of a program should be seen as outputs of the process of the operation, and not as conceptual inputs. In other words, they should be seen as possible results of the process and not as prerequisites. Thus, successful policies and programs develop as they function over time, rather than depend on a perfect initial design.

The success of a policy will depend on the efforts and capability of its executing agents. Effective implementation requires the capacity to reorder issues, reformulate problems and modify solutions, based on their unique contingencies. "Implementation is evolution", said Majone and Wildavsky (1995). In every step, the agent faces new circumstances that lead it to upgrade its organizational capacity,²¹ regardless of the content of the policy that has been implemented.

²¹ A cut in the Federal Secretariat budget, such as the one that occurred with the CDHU in 2003, can force the decision maker to re-analyze the targets and to re-distribute the resources allocation in a creative way without jeopardizing the previous commitments.



AFFORDABLE HOUSING NEEDS ASSESSMENT METHODOLOGY: THE ADAPTATION OF THE FLORIDA MODEL TO BRAZIL

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Abstract

This paper presents the adaptation of the "Florida Affordable Housing Needs Assessment Methodology" (Noll et al., 1997) to Brazil. This was a task developed jointly by the Florida team with researchers from IPEA and the World Bank. The Affordable Housing Needs Assessment Methodology, developed for the State of Florida by the Shimberg Center for Affordable Housing, is based on household estimates calculated from household formation rates and population-by-age projections.

The Brazilian Model was developed for four regions: the country of Brazil as a whole, the Integrated Development Region of the Federal District (RIDE of DF), and the Metropolitan Regions of Recife and Curitiba. This paper describes the adaptation process, presents the newly developed Brazilian Affordable Housing Needs Assessment and analyzes output from the model.

The results obtained through the adapted model confirm some prior predictions of the housing deficit in Brazil. Some unexpected results include the constant proportion of owners to renters across all age categories and constant income across age categories. Another contrast relates to standard and substandard conditions; the model found that as householders mature, they tend to occupy standard housing. Still, almost half of the population lives in substandard conditions regardless of age.

The projected total demand for housing in Brazil is not simply a function of increasing demand resulting from population growth and the need to address the problem of overcrowded, shared households. High vacancy rates also present a challenge to policy makers. Construction need is a function of demand and vacancy rates; if vacancy rates in Brazil were lowered, construction need could be diminished. Another important factor is the substandard condition of some households. Construction need numbers could be reduced by addressing adequacy of housing units, including basic sanitation needs and overcrowding, without necessarily having to build a new unit. In addition, the way in which land tenure issues are addressed might modify the way in which construction need is estimated, including the manner in which the methodology for this project was developed.

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We also met with staff from the Ministério das Cidades (Ministry of Cities) and the Federal District's Government (GDF—Governo do Distrito Federal). From the Ministério das Cidades (Ministry of Cities), we would like to thank Laila Nazem Mourad, Inês da Silva Magalhães, and Vera Ribeiro. Their insight and advice made a substantial contribution to our assumptions. From GDF, we would like to thank Denise Prudente Fontes Silveira, Maria Helena Buckmann, Laura Regina Simões de Bello Soares, Mônica de Oliveira França, Arnaldo Barbosa Brandão, and Sérgio Ulisses da Silva Jatobá.

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We would also like to thank M. Vitor Serra from the World Bank for giving us the opportunity to work on a challenging project and for providing us feedback throughout several drafts. Dr. Serra's insightful advice and guidance has helped proceed in the right direction. His patience and encouragement have been invaluable throughout the entire process.

Introduction

The World Bank asked the Shimberg Center to adapt the Florida Affordable Housing Needs Assessment Methodology (Noll et al., 1997) to Brazil. This report describes the adaptation process, presents the newly developed Brazilian model and analyzes output from the model. A brief description of the Florida model is important to understand the similarities and challenges that had to be dealt with during the adaptation process. An explanation of the Brazilian context is also necessary, particularly given that tenure issues and practices in Brazil are different from conventional notions in the US. In addition, there are cultural differences that modify the way in which people consume housing. These nuances are crucial to an understanding of why certain decisions were made in the development of the Brazilian Affordable Housing Needs Assessment.

For the World Bank's 2005 Urban Research Symposium the report has been shortened to fall within the constraints of the Symposium format. The major difference between this "Symposium" version and the original report is a replacement of the sections on the metropolitan region of Recife, Pernambuco and the Federal District Integrated Development Region (RIDE) with summaries.

The Florida Model: a brief description

AHNA Methodology

The Affordable Housing Needs Assessment Methodology developed for the State of Florida, henceforth referred to as the Florida Model, is based on household estimates calculated from household formation rates and population-by-age projections. There are five basic dimensions of demand: tenure, age of head of household, size of household, income of household, and cost burden. Household estimates are constructed based on the assumption that household formation rates and the distribution of household characteristics remain constant

across the projection horizon. The household formation rates are age specific and are derived from the most recent decennial Census.

For the Florida Model, three data sets are needed -- number of householders by tenure and age, population by age from 1990 and 2000 Census for each jurisdiction, and population projections for each age group. A headship rate is calculated from the 2000 census data by dividing the number of householders in each tenure/age group by the total population of that age group. The projection of householder by age/tenure is then calculated by applying that ratio (headship rate) to the age group projections of population for each projection period. The methodology assumes a constant headship rate in each age category.

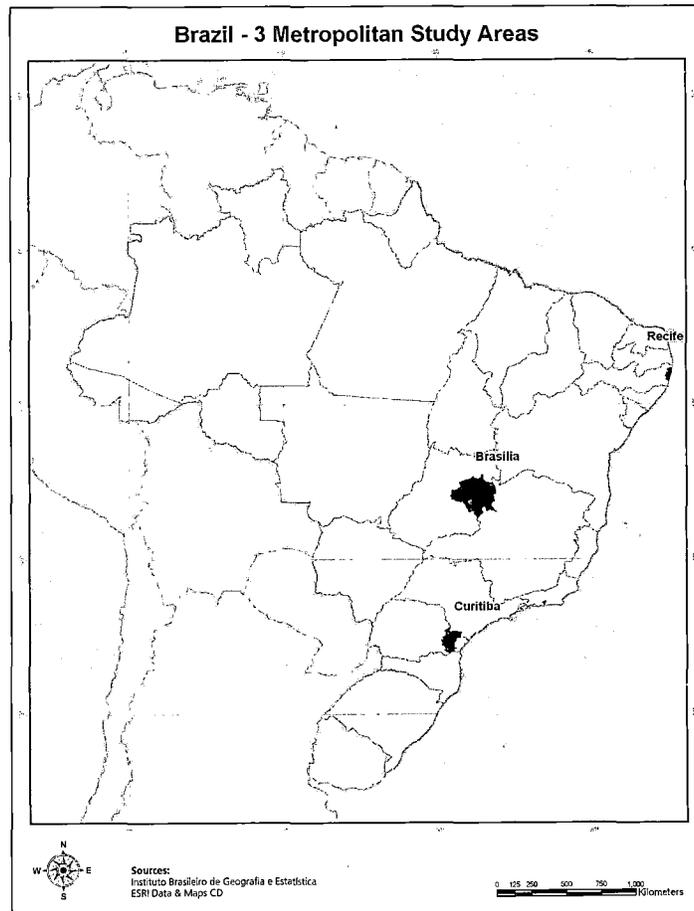
Finally, complex cross-tabulations from the Census are required to calculate other household characteristics. These cross-tabulations include income, size and cost burden projected by age group in each tenure category. The result is a projection of various household characteristics that can be compared to the housing supply to determine the need for net new units, that is, construction need.

The Brazil Model: a complex adaptation

All researchers involved in this project knew, even before looking at the data, that a revision would be required to apply the Florida Model to Brazil. As expected, the adaptation required new assumptions and alternative approaches. The first adaptation came as a result of available data. An obvious example is the Brazilian decennial census. The information collected by the Brazilian Census Bureau, henceforth referred to as IBGE (Instituto Brasileiro de Geografia Estatística), is different from that collected by the US Census Bureau and used by the Florida Model. During the adaptation process, researchers used a smaller and simpler data set, the PNAD (National Survey by Household Sample)¹ to test some of the assumptions and to aid in the development of a methodology reflecting the Brazilian situation.

¹ The PNAD (Pesquisa Nacional por Amostra de Domicílios) is an annual survey done by IBGE, based on a smaller sample of households by Census tracts, and updated every year between the decennial census years.

As established by the contract, the Brazilian Model would be developed for four regions: the country of Brazil as a whole, the Integrated Development Region of the Federal District (RIDE),² and the Metropolitan Regions of Recife and Curitiba, capitals of the States of Pernambuco and Paraná, respectively. Thus, data for these four regions had to be collected in a consistent manner to allow for comparisons, and that in itself was the first challenge.



Population Projections

As mentioned above, jurisdiction-level, population-by-age projections are a fundamental building block of the AHNA methodology. Although population projections are available for all States in Brazil up to 2050, population-by-age projections were neither available at the jurisdiction level nor at the metropolitan level. Nor were we successful in finding regional authorities that had produced population-by-age projections for their metropolitan regions. The research team then decided to take a different approach: by constructing the population-by-age projections for all the jurisdictions in the State and controlling that to the projected total,³ we could then develop consistent population-by-age projections for the metropolitan areas in the study.

² The Região Integrada de Desenvolvimento do Distrito Federal e Entorno (RIDE) is the designation for the metropolitan region of Brasília and includes municipalities in the States of Goiás and Minas Gerais in addition to the Federal District.

³ Population by age projections for each State up to 2020 were provided by CEDEPLAR.

The jurisdiction-level population-by-age projections require two time periods, typically decennial Census. Brazil had, because of institutional and organizational issues, a 1991, rather than a 1990 Census. So we had to balance the use of consistent data sources with the practicality of significant reprogramming of the Florida model. Fortunately, a special tabulation for 1990 population existed, which we felt was a reasonable substitution for the 1991 Census data.⁴

A second alteration dealt with the way new cities were created in Brazil. For political and institutional reasons, a number of municipalities had been created between 1991 and 2003. In Brazil, states are divided into municipalities and there are no unincorporated areas. This meant that the new municipalities were actually areas that had been partially split from existing jurisdictions, sometimes twice, and although the population was the same, it was counted under different jurisdictions in each year. So the programmers involved in the research project had to create an artifice to include these split jurisdictions in the population projections. In addition, one of the study regions, the RIDE, comprises jurisdictions in the states of Goiás and Minas Gerais, besides the Federal District. Since there were only two small jurisdictions in the state of Minas Gerais, with a population of 90,400 in the year 2000, which represented three percent of the total RIDE population, the team decided not to include those in the projection.⁵ Thus, the RIDE population used in the study comprises the populations of the Federal District plus 19 municipalities in the state of Goiás that are part of the Integrated Development Region of the Federal District (RIDE).

Finally, the last obstacle was the fact that, since the population data for 1990, 2000 and 2003 and the population-by-age total projection were all from different sources, programmers had to insert simple controls to assure consistency.

Household Estimates and Projections: the Demand-Side of Housing

Household formation rates are used to determine what percentage of each population age group will form a new household in each projection interval. Household formation rates and the distribution of household characteristics are assumed to remain constant across the projection horizon. That is, the proportions of householders observed in the year 2000 in each age cohort are maintained in the calculation of subsequent years.

The five basic dimensions of demand used for the Florida Model were maintained in the development of the Brazil Model: tenure, age of head of household, size of household, income of household, and cost burden. What follows is an explanation of each dimension and the changes made to the categories within each, as well as the assumptions and adaptations that had to be made to create a Brazilian Model.

Tenure

The Florida Model has two tenure categories: owners and renters. The headship rates for renters tend to be higher for younger people and as the age of the householders increase, so increases the probability that they will own a house. In Brazil, researchers were faced with multiple tenure categories, although home-ownership

⁴ This is an example of a very practical application of the Florida model to the Brazilian context. Utilizing a 9-year cohort would have required not only reprogramming of the existing model but also a series of additional interpolations to produce the appropriate projection years.

⁵ Today, there are actually three municipalities in the State of Minas Gerais that belong to the RIDE. Cabeceiras Grande split off Unaí in 2001. Unaí was included in our estimates of Minas Gerais population in the RIDE and would have been part of our projections as Unaí. The third jurisdiction simply incorporated about ten percent of the original jurisdiction's population.

is encouraged and most housing assistance programs focus on ownership rather than rent. Extensive discussions among IPEA staff and researchers from both Florida and Brazil, including staff from the Ministry of Cities, took place to determine the ideal tenure typology. The first conceptual question concerned land ownership. Informal settlements have provided housing for the poor in developing countries for years. These settlements, albeit substandard by any definition, sometimes represent the only opportunity that poor families have to acquire a house. The idea developed by Turner (1968, 1972, 1976) was that through self-help, such as that going on in informal settlements, the poor could gain ownership if infrastructure and security of tenure were provided. Abrams (1964) went as far as suggesting that what most people often regarded as a problem was in fact the solution to house the poor. Nonetheless, the Housing Needs Assessment Methodology projects the need for adequate housing. Since informal settlements usually present other structural deficiencies besides lack of title, researchers decided to develop special criteria to quantify these additional characteristics of substandard dwellings.

One set of criteria was possible because IBGE collects separate information on the housing unit and the land it sits on. The Census questionnaire includes six different types of housing unit ownership and three different types of land ownership. At the onset, there were three reasons to support an argument to leave the land ownership variable out of the equation. First, the Affordable Housing Needs Assessment methodology estimates the need for net new housing units (comprising the lot and the house), not for titling or regularization of existing units built on squatter settlements. Second, the percentage of units declared not to be on owned land was very small, 0.3 percent of the total number of households and 4.2 percent of the owned houses. Third, serious questions exist about the accuracy of the land ownership status since the information collected by IBGE is self-declared, which means that dwellers may perceive (and thus declare) themselves as owners of the land their house sits on even though they have no legal title to it.⁶

In sum, the research team's rationale was that, if a housing unit were otherwise standard, lack of land title would not constitute a housing need. Moreover, given the ambiguity in the system of private property and the expectations that the Brazilian legal and political systems will move (and have moved) to eliminate this issue over time, it could be assumed that land title would eventually be issued to those families who have successfully secured a lot for a certain period of time.⁷ Despite this argument, researchers decided to keep the variable land ownership in the tabulations. Since most households declaring themselves as not owning the land were located in substandard areas and had incomes lower than three minimum monthly wages, the methodology would in the end categorize them as substandard.

The six types of housing unit tenure used by the Census include: owned – house paid for, owned and still paying, rented, lent by employer, lent by other, and other conditions. The three types of land ownership include: owned, lent, and other condition. Since both these items are self-declared, an overwhelming majority of the households declares themselves owners. As far as housing unit ownership, most households declare themselves in the first category, owned – house paid for (68 percent), and only 4.2 percent of those declare they do not own the land on which the house sits. Conversations with Brazilian researchers and technicians

⁶ Furthermore, the majority of people who live in informal settlements have actually paid for the land, but since they purchased it through an illegal transaction, they do not have any legal proof of ownership and thus, do not have any guaranteed property rights, nor the obligations that follow from those, such as property taxes.

⁷ Provisions of the Estatuto da Cidade, Federal Law no. 10257, approved on July 10th, 2001, suggest that land ownership will be gained by families living in consolidated informal settlements. This legislation implements articles of the 1988 Constitution that established the social function of the land.

confirmed the perception that the Census numbers did not reflect the reality of the tenure situation in Brazil. The problem, as in the land tenure category, is the fact that information is self-declared.

The researchers' objective was to produce a methodology that would be useful to Brazilian institutions, reflecting programmatic uses as well as addressing quality of life issues. Since the informal / formal discussion seemed to be at the forefront of Brazilians concerns, the set of developed criteria honed concepts as precisely as the Census data would allow. However, the literature on informal settlements discusses tenure mainly from an institutional and political standpoint. Because of the applied nature of this methodology, researchers developed the criteria in terms of standard and substandard, taking into consideration certain physical characteristics that would indicate adequacy of shelter. Nonetheless, land tenure was included since it is a measure of security that, if not guaranteed, could represent a need for housing (Turner, 1968, 1972, 1976).

The first item utilized to redefine (aprimorar) tenure information was Sector Type. This is not a self-declared item; the Census surveyor analyzes the type of settlement as a whole and classifies it as standard or substandard.⁸ Since most informal settlements are classified as substandard sectors, researchers decided to use this item as a filter, that is, by crossing the self-declared housing unit and land ownership numbers with the sector type it was possible to separate those households that, even though they had been declared owned and paid for were actually part of informal settlements. Another assumption was made in consonance with the objectives of the Affordable Housing Needs Assessment Model. Since this model estimates need for housing and that means adequate housing, the housing units located in these substandard sectors would, at minimum, require some kind of improvement or upgrade so they should be counted separately from the "formal" housing stock.

After this first "filtering," the percentage of households that would be considered "informal" was still much lower than expected; only four percent of all households are shown by IBGE to be in substandard sectors. One caveat is that IBGE only collects information on Sector Type for settlements larger than 50 units. In an attempt to identify those households that were living in substandard conditions within areas that would not be considered substandard as a whole or that would be part of smaller settlements, researchers decided to use information on infrastructure to determine their adequacy. In Brazil, water and power are considered a right of every citizen and many informal settlements take advantage of this provision to acquire public services. So researchers decided to use sewerage disposal as a qualifier. One caveat regarding sewerage data is that the Census considers sewage going into storm drains as appropriately disposed, so households either connected to the sewerage network (including storm drains) or to a septic tank with draining field are included in the methodology as standard.

Most dwellings in rural areas have what is called a rustic tank, that is, a septic tank without draining field. Even though these dwellings would otherwise be considered standard according to other definitions of the typology established in the methodology, these rustic tanks present an environmental threat and should be considered, at minimum, in need of upgrading. The decision to not include rustic tanks as appropriate sewerage infrastructure would only present a potential problem in rural areas, and primarily in the Northeast region, where the percentages of substandard housing are higher for rural areas than for urban areas. Since

⁸ Besides standard and substandard, the Census has six additional types of sector included in this item, mostly group quarters, such as military bases, camping grounds and tents, boats, Indian tribes, prisons, and orphanages, convents, hospitals and asylums.

this study focuses on three metropolitan regions and since the impact of considering rustic tanks appropriate for urban areas would be greater than not considering it appropriate in rural areas, we decided to follow the Census definition of appropriateness. By crossing tenure with type of sector with sewerage network information, a better picture was produced. The team went a little further and also included information collected by IBGE regarding the existence of indoor plumbing and toilet facilities; this was intended to account for those units within areas perceived as “formal” that do not have minimum basic sanitation conditions and therefore would require, at minimum, rehabilitation or upgrading.

Another assumption made to narrow down the number of tenure categories concerns renters and households living in housing lent by employers or other people, such as relatives. Families who declared they lived in lent-housing were included in the renters categories and considered to have a no-cash rent situation. Essentially, these households occupy dwellings free of rent and the only calculation affected by this would be cost burden. Since cost burden for Brazil can only be calculated for renters, the team decided to collapse the lent housing categories with the renters categories.⁹ Lastly, the households counted by the Census as “other tenure conditions” were all included as substandard units since, by definition, illegal occupations and inadequate dwellings, such as renters of rooms in non-residential properties or leasing rural properties, are included in that category.

Another group that certainly represents a housing need but, given the manner in which the Census questionnaire is structured, is not included in any of the above categories is called “improvised.” These would be akin to the homeless in the US, plus families living in temporary shelters or other inadequate conditions, such as rooms in commercial properties. Although this group did not represent a high percentage of the total number of households (0.3 percent), researchers agreed that it would add insight and provide additional information about the large percentage of population perceived to live in “informal” conditions. Thus, those households classified by the Census as “improvised” have been included as substandard in the tabulations to be used by the Brazil model. Through this gradual and cumulative exercise, the research team was able to identify specific characteristics of households and narrow the initial eleven tenure categories down to four: owners in standard areas, owners in substandard areas, renters in standard areas, and renters in substandard areas.

Age

The Brazilian Model comprises six age groups—15 to 24, 25 to 34, 35 to 44, 45 to 54, 55 to 64, and over 65. The household formation rates for the age group 15 to 24 are much lower than those experienced in Florida because, unlike the US, in Brazil most children live with their parents until they finish college, and often until they get married. This was found to be a cultural phenomenon known in Brazil as “late-stayers” (Carneiro et al., 2002). The groups with higher household formation rates are the 35 to 44 and 45 to 54 groups.

Even though researchers observed some difference in the sample household formation rates calculated with PNAD data for the groups 65 to 74 and over 75, it was not possible to use those age categories for the Brazil model because population-by-age projections were not available. The sample tabulations also confirmed the lower household formation rates for the age group 15 to 24; however, the team decided to keep it as a separate category because, if the “late-stayers” phenomenon changes in the near future, changes in house consumption patterns for young householders can be easily detected.

⁹ For a complete explanation of cost burden calculations, assumptions and exceptions, see item Cost Burden.

Size

This category also differs somewhat from that adopted by the Florida Model. Households in Brazil tend to be larger and often accommodate extended family members. The phenomenon of increasing one-person households that has been experienced in the US for some time now is not present in Brazil. The number of one-person households is negligible. However, sample tabulations revealed that more than half of all households comprise three or four persons. Therefore, the household size categories used in the Brazil Model are: 1 to 2, 3, 4, and 5 or more persons per household.

An observed phenomenon in Brazil is the presence of multiple families in one household. The argument that some families share a household by choice is very plausible, given the Brazilian culture and custom of having extended family members living together. Most people participating in the preliminary discussions of the model development phase agreed that additional families in a household would only represent a need for additional housing if they were not adequately accommodated, that is, they would definitely represent a potential demand for new housing if they were living in overcrowded conditions. Since IBGE collects information on families as well as households, it was possible to account for those families who share a household.¹⁰

To avoid overestimating the number of families in need of housing, the research team thought it would be necessary to identify and differentiate those families who share a household by choice from those who do it by necessity. One way of making that distinction is to cross the information about household sharing with overcrowding. In other words, if there were multiple families occupying the same household in overcrowded conditions, the sharing is occurring out of necessity and represents a demand for new housing. Likewise, if there were multiple families occupying the same household but not overcrowded, the model would assume that they were choosing to share the household and no additional demand exists. Thus, criteria were developed by researchers to “spin-off” multiple families sharing overcrowded households and count them as a demand for new housing.

Another assumption made in relation to overcrowded conditions has to do with multifamily units known as “cômodos.” These are essentially rooms or studio-style apartments that are part of a multifamily unit. They can be rooms in a previously single-family home that has been subdivided or they can be individual units, similar to tenements in the US, but without direct access to a street or other public areas. The Census collects information about these units in the dwelling typology item that includes single-family, detached house; multifamily, apartment or condo unit; and “cômodos.” The reason it was suggested to the research team that these units be treated separately was that most of them present inadequate living conditions. However, they could not simply be treated as substandard units since most of them are in areas with infrastructure and, judging by their physical characteristics would match the criteria used in the model to qualify as standard. To resolve these methodological conflicts and the perception that “cômodos” offer inadequate living conditions, each additional family living in “cômodos” was treated as representing a need for a new housing unit.

For the purposes of this model, the “additional” families in overcrowded, shared households are called secondary families, differentiating them from the primary family represented by the householder or head of the entire

¹⁰ The term used in Portuguese for this phenomenon is “cohabitação” (literally translating, cohabitation). Because the word “cohabitation” in English has a different connotation, we adopted the term used by Coccato (1996), who refers to this phenomenon as household sharing.

household. All secondary families in multifamily overcrowded shared households/units and in "cômodos" are counted as additional demand for units. These additional families are incorporated into the count of households by tenure, age, size and income and thus influence the calculation of the overall household formation rate. In order to assign the four household characteristics to the additional, secondary families we use information in the Census for that secondary family or its householder (head) – age, size and income – and we assign the secondary family to the same tenure category as the primary family.

Income

The Florida Model uses income categories based on percentage of jurisdiction medians. In Brazil, the prevailing income unit is the monthly minimum wage, which is established by the Federal government.¹¹ This has actually facilitated the development of the income category for the Brazilian model, since the same income levels are used for all study areas.

Most housing programs in Brazil are based on the monthly minimum wage (m.m.w.). The lower income housing programs are for families earning between 0 and 3 m.m.w. Other programs are for families earning between 3 and 5 m.m.w. Most recently, new housing programs are being developed and, although the 0 to 3 m.m.w. category has remained, new housing programs are designed for families with incomes up to 6 m.m.w. and above 6 m.m.w. There is also one program that facilitates financing for families with incomes above 12 m.m.w., and although the number of families in this income bracket is very small, it was considered as a separate category.

The largest percentage of the total country population (75 percent) earns less than three monthly minimum wages. Therefore, it was necessary to break down the lower income categories. The Brazil Model resulted in six income categories: less than 1 m.m.w., 1 to 1.99 m.m.w., 2 to 2.99 m.m.w., 3 to 6 m.m.w., 6 m.m.w. to 12 m.m.w., and over 12 m.m.w. These categories should reveal a clear picture of the housing situation concerning poverty levels and the connection between income and lack of adequate housing, which will prove useful for programmatic analysis and policy decisions.

Housing Inventory: the Supply-Side

The supply-side of the Florida model comprises the housing inventory adjusted for seasonal occupancy and vacancies. The same will occur for the Brazil model. IBGE collects information on occupied dwellings as well as seasonal and vacant units. Unfortunately, the level of detail provided by the Census information does not allow for a precise diagnosis of vacant units. That is, Census data do not indicate whether the dwelling is vacant because it is on the market, or because it is rundown and not in condition to be occupied, or it has simply been abandoned.

As a general rule, group quarters would be excluded from all appropriate data. However, the population projections used for the Brazil model did not exclude the population living in group quarters. Thus, to exclude these households of estimates and projections would be incongruent. In addition, the population living in group quarters represents a rather small proportion of households. The total number for Brazil is

¹¹ The monthly minimum wage was increased to R\$151.00 on April 3, 2000, an amount equivalent to \$87 US dollars. The last monthly minimum wage increase to R\$350.00, on April 1, 2006, is equivalent to \$161 US dollars (all values reflect the present value on the date of the increases). It should be noted that the ratio of purchasing power parity conversion factor for Brazil is 0.3 (World Bank, 2004 World Development Indicators).

72,052 households, which represents 0.13 percent of the total number of households. Each one of the metropolitan regions included in the study had less than one thousand such households, representing between 0.09 and 0.11 percent of the total number of households in each region. Therefore, rather than exclude group quarters from supply while the population occupying them were included in the population projections, researchers decided to include them in the household formation rates and household projections.

Construction Need and Projected Total Demand for Housing

The 2005 - 2020 projection of construction need is based on occupied housing (households) and a percentage allowance for vacant units (a percentage allowance for units expected to be lost due to various causes is not estimated) compared to the supply of permanent units in 2000. To determine the total number of additional housing units that will be needed in the metropolitan area over the projection horizon (construction need), we establish a relationship between households and housing units. The number of housing units that are needed at any point in time is equal to the number of households plus the number of units needed to provide an adequate vacant supply from which householders may choose.

The number or percentage of housing units representing an adequate vacant supply will vary by place. Only units that are in the permanent housing stock are considered in this estimate; this excludes seasonal units. The vacancy rate used for the projections is a constant and set at the rate in 2000 (from the 2000 Census). The vacancy rate is the permanent vacancy rate, that is, for units occupied or expected to be occupied by permanent (not seasonal) households.

To calculate total housing demand the permanent vacancy rate is applied to the 2005 - 2020 projections of total households [projected total households are multiplied by one over one minus the vacancy rate = total households $\times 1/(1-\text{vacancy rate})$]. Construction need is the difference between demand at any point in time and the available supply in 2000. So, for example, the supply available in 2000 (from the Census) is subtracted from the projected demand in 2005 to calculate a basic construction need for housing units in the year 2005.

Data Analysis

The population projections utilized for this research project were provided to the Florida research team by CEDEPLAR.¹² The household data were processed by IPEA staff from IBGE's 2000 Census microdata, based on the methodology developed by Shimberg Center researchers in collaboration with IPEA staff. Shimberg Center programmers then applied these two data sets to the Brazil model. The analysis that follows applies to the three metropolitan regions used in the production of the Brazil model, the Metropolitan Region of Curitiba, Paraná, and the Metropolitan Region of Recife, Pernambuco, and the metropolitan region of Brasília, which receives the designation of Federal District Integrated Development Region (Região Integrada de Desenvolvimento do Distrito Federal e Entorno - RIDE). Although there are significant regional differences in the country of Brazil, the same analysis is done for the country as a whole. The assumptions made are the same for all study areas.

¹² The population projections used for the Brazil model were supplied by CEDEPLAR (Centro de Desenvolvimento e Planejamento Regional da Faculdade de Ciências Econômicas) at the Minas Gerais Federal University (Universidade Federal de Minas Gerais). These projections were part of projects done in agreements with PRONEX and INEP from the Education Ministry.

Brazil

Introduction

According to the 2000 Census, Brazil had a total population of 169,799,170. Comprising 26 states and one Federal District, Brazil has well-developed agricultural, mining, manufacturing, and service sectors, outweighing the economies of all other South American countries. Nonetheless, an estimated 22 percent of its population lives below the poverty line. Brazil also has a rather uneven distribution of wealth; the Gini index published in 1998 was 60.7 percent (World Bank, 2003).

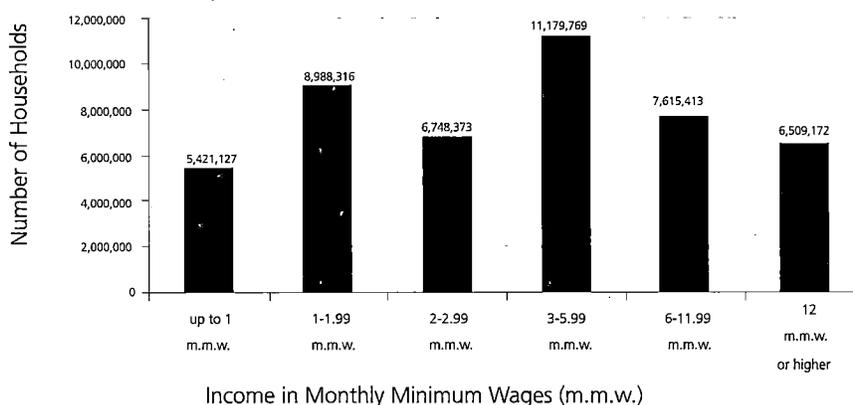
Housing Profile

According to the 2000 Census, there were 44,601,522 households in Brazil, 74 percent of which were owner occupied and 26 percent were renters. Of the 34,736,129 heads of household who declared themselves owners, 52 percent live in standard housing.¹³ This proportion is about the same for renters, 55 percent of renters live in standard conditions. The majority of householders are between the ages of 35 and 44 (25 percent), followed closely by the 25 to 34 year old group (23 percent). Seven percent of householders are under 25 years old and 13 percent are older than 65. For the 45 to 54 and 55 to 64 age groups the proportions are 19 and 13 percent respectively.

Households with one or two persons represented 23 percent of the total, while those with three and four represented 21 and 23 percent respectively. The largest percentage of households, 33 percent, had five or more persons. The majority of Brazil's population is low-income. Forty-six percent of all households earn less than three monthly minimum wages. Less than a third (30 percent) of all households earns more than six monthly minimum wages (m.m.w.): 16 percent earn between 6 and 12 m.m.w. and 12 percent earn more than 12 m.m.w. Almost 12 percent earn less than one monthly minimum wage.

Although the ratio between owners and renters is constant across age categories, a higher percentage of standard owners (and lower of substandard owners) can be observed as householders age. While 60 percent of households whose head is between 15 and 24 years-old is standard, that percentage increases to 68 percent for households with heads 65 and older. For both owners and renters, the older the householder the lower the percentage of households occupying substandard housing.

Number of Households by Income, Brazil, 2000



¹³ The definition of "standard" used here is the one developed by the methodology, which is explained in detail in the first section of the report.

Population Projections

The population projections for Brazil were provided to Florida researchers by CEDEPLAR. Additional projections were developed by Shimberg Center programmers. Brazil had 169,799,170 inhabitants in 2000 (IBGE, 2002). The projected population for 2010 is over 190 million and almost 211 million for 2020, which represents an increase of about 20 percent in the next 17 years.

Household Estimates and Projections: the Demand-Side of Housing

Based on 2000 Census data, Brazil had 44,601,522 households. The total number of housing units needed to accommodate additional families spinning-off due to overcrowded conditions would add more than two million new households for a total of 46,689,818.

Most additional households came from the owner tenure category (over 1.5 million families), which indicates that 73 percent of families that would potentially form a new household live in households in the owner tenure category. Of the 2,088,296 potentially new households, 561,669 live in rented housing. In terms of housing condition, 54 percent of families share substandard, overcrowded households. Including both owners and renters, 956,596 families live in standard conditions, while over 1.1 million live in substandard conditions.

Tenure

Of the total estimated number of households needed in Brazil (46,689,818), 34,736,129 households would be owner occupied. According to the criteria developed for the Brazil model, 24,473,628 households would be standard, and 48 percent of the households, including owners and renters, would be substandard.

The projection of tenure status to 2020 reveal that owners will continue to represent about 74 percent of households while renters will account for the remainder 26 percent. In absolute numbers, it is estimated that in the next 17 years there will be 17,368,103 additional owner-occupied households and 5,135,632 renter-occupied households. As for condition, by 2020 there should be an additional 10,715,879 standard households and 9,358,183 substandard households.

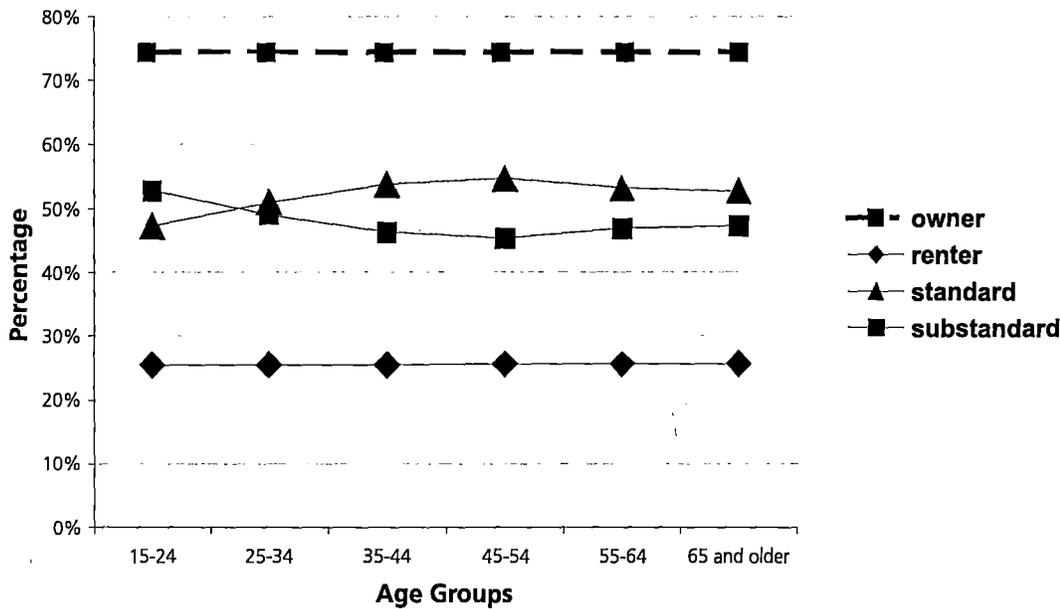
TENURE	YEAR				
	2003	2005	2010	2015	2020
owner standard	19,117,470	20,028,460	22,422,340	24,760,781	26,959,838
owner substandard	17,884,553	18,716,465	20,911,166	23,023,660	24,980,615
renter standard	7,002,447	7,335,948	8,213,024	9,069,908	9,875,958
renter substandard	5,722,921	5,988,794	6,689,502	7,362,695	7,985,042
Total	49,727,391	52,069,667	58,236,032	64,217,044	69,801,453

Age

The number of households with heads in the 15 to 24 age group is relatively low when compared to the other age groups, which confirms a cultural trend. In Brazil most children live with their parents until they finish college, and often until they get married. Younger households represent about seven percent of all households. The age groups with higher household formation rates are the 25 to 34 and 35 to 44 groups.

Most households whose head is between the ages of 15 and 24 are owners (74 percent). In this age category, more households live in substandard areas (54 percent) than in standard areas. The overall owner-renter proportions are similar across all age categories, increasing slightly with age. The number of standard housing units increases for each age group up to 44 years old, then decreases for older groups.

Proportion of Owners to Renters and Standard to Substandard Units by Age Group, Brazil, 2000



In the 20-year projections, the tendency is for the percentage of young heads of household to decrease. By 2020, less than five percent of all households will have a head younger than 24 years-old. Percentages will decrease four percentage points for heads of household between 25 and 34 and increase somewhat (about three percentage points) for those between 55 and 64 and 65 and older. Proportions of householders between 35 and 54 will vary slightly, but not significantly.

AGE	YEAR				
	2003	2005	2010	2015	2020
15 - 24 years old	6.86%	6.60%	5.87%	5.29%	4.81%
25 - 34 years old	22.32%	22.19%	22.37%	20.91%	18.47%
35 - 44 years old	24.43%	24.17%	22.73%	22.84%	23.74%
45 - 54 years old	19.92%	20.37%	21.16%	21.04%	20.44%
55 - 64 years old	13.51%	13.75%	14.93%	16.16%	17.39%
65 and older	12.96%	12.92%	12.93%	13.76%	15.15%
Total	100.00%	100.00%	100.00%	100.00%	100.00%

Size

More than 20 percent of all households in Brazil have one or two persons and 44 percent have three or four persons. Households with five or more persons represent over 30 percent of the total number of households. Households with three persons make up the smallest group, 21 percent of the total. Among households with one and two persons, the majority (26 percent) is in the higher income category, 12 monthly minimum wages (m.m.w.) or higher. The same happens, albeit in slightly different proportions, for households with three and four persons; however, a significant proportion of larger households (40 percent) makes less than one m.m.w. Larger households also have the highest proportion (36 percent) of those making between one and two m.m.w. In addition, most households making up to three m.m.w., 37 percent, have five or more persons.

As far as tenure and condition of the household, the proportion of owners to renters is practically constant for all household sizes, around 72 to 28. Large households make up the majority of owners in substandard housing. Only 4.7 percent of the total number of households are overcrowded.

Future trends reveal a slight increase in the percentage of households with one or two persons, less than one percent increase by 2020. Households with three and four persons will decrease slightly, but there will be a slight decrease in the number of households with five or more persons. The total number of households in the country will increase by over 20 million in the next 17 years, from an estimated 49,727,391 in 2003 to a projected 69,801,453 in 2020. The more significant increase will be of households with one or two persons. The number of households with one and two persons will increase by 44 percent in the next 17 years.

HOUSEHOLD SIZE	YEAR				
	2003	2005	2010	2015	2020
1 or 2 persons	11,336,349	11,875,763	13,365,675	14,853,829	16,292,388
3 persons	10,520,071	11,000,920	12,290,917	13,475,534	14,522,627
4 persons	11,419,445	11,956,019	13,327,732	14,640,174	15,841,149
5 or more persons	16,451,526	17,236,965	19,251,708	21,247,507	23,145,289
Total	49,727,391	52,069,667	58,236,032	64,217,044	69,801,453

Income

The largest number of households in Brazil (70 percent) earns less than six monthly minimum wages. Most low-income housing programs are for families earning less than 3 monthly minimum wages. In Brazil, 46 percent of households fall into this income category. The new housing programs that are designed for families with incomes up to 6 monthly minimum wages could benefit 70 percent of the total number of households. Programs that facilitate financing for families with incomes above 12 monthly minimum wages would benefit 14 percent of the total number of households.

TENURE	INCOME IN MONTHLY MINIMUM WAGES				Total
	up to 3	3 to 6	6 to 12	over 12	
owners standard	4,947,457	4,613,064	4,085,413	4,261,567	17,847,490
owners substandard	10,435,369	3,672,430	1,743,812	977,018	16,724,860
renters standard	2,304,689	1,810,800	1,353,384	1,097,255	6,537,562
renters substandard	3,649,750	1,091,447	437,066	209,298	5,352,258
Total	21,337,265	11,187,741	7,619,675	6,545,138	46,689,819

There is a correlation between income and dwelling condition. While 66 percent of the households with incomes below three monthly minimum wages (m.m.w.) live in substandard conditions, 82 percent with incomes over 12 m.m.w. live in standard conditions. These differences are significant for both owners and renters. While 80 percent of owners and 20 percent of renters have incomes over 12 m.m.w., those households with incomes below three m.m.w. show a predominance of substandard owners (49 percent). Therefore, it is evident that households with higher incomes have more access to ownership and are more likely to occupy standard housing.

Projections for the year 2020 indicate that there will be 2.3 million additional households with incomes below one monthly minimum wage. An additional nine million households will earn less than three monthly minimum wages. Almost five million earning between three and six monthly minimum wages will be added in the next 17 years.

INCOME IN MONTHLY MINIMUM WAGES (m.m.w.)	YEAR				
	2003	2005	2010	2015	2020
up to 1 m.m.w.	5,797,904	6,068,241	6,783,628	7,476,251	8,122,003
1-1.99 m.m.w.	9,614,213	10,063,218	11,247,552	12,391,692	13,455,617
2-2.99 m.m.w.	7,220,018	7,558,349	8,449,569	9,312,030	10,115,345
3-5.99 m.m.w.	11,965,299	12,528,738	14,009,575	15,442,909	16,778,032
6-11.99 m.m.w.	8,154,335	8,540,887	9,555,717	10,541,271	11,462,507
more than 12 m.m.w.	6,975,622	7,310,234	8,189,991	9,052,891	9,867,949
Total	49,727,391	52,069,667	58,236,032	64,217,044	69,801,453

Housing Supply

There are a total of 54,337,670 housing units in Brazil according to the 2000 Census. Of all non-occupied units, 65 percent are vacant, 29 percent are seasonal and six percent were closed at the time the Census conducted the interview. The vacancy rate for the country is 12.7 percent. Group quarters are included in this total for the reasons outlined in the methodology. They represent 0.13 percent of the total number of households in Brazil.

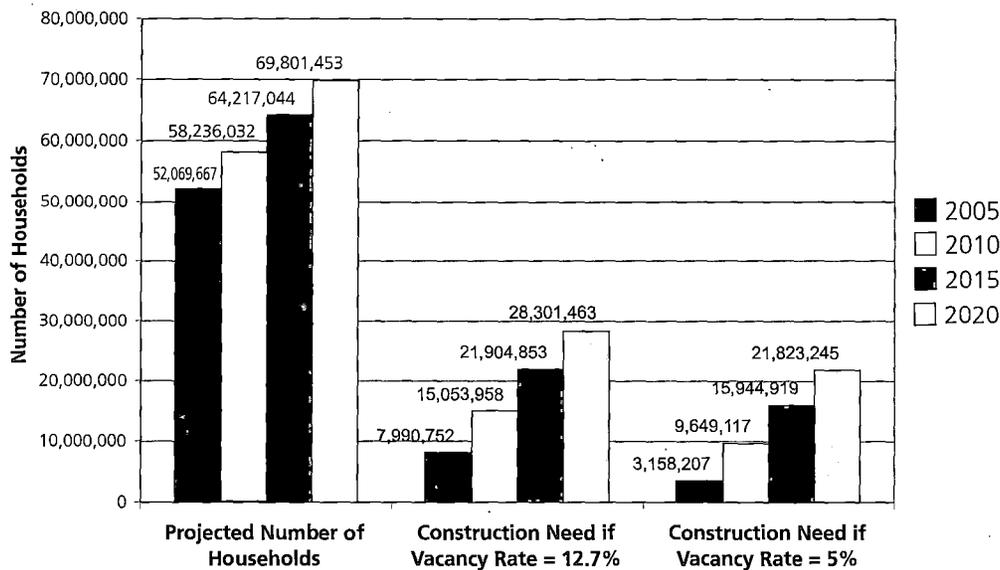
Brazil has a high vacancy rate if compared to Florida and the US as a whole. In the Florida model, the vacancy rate considered as average and used in the construction need calculations is five percent. One possible explanation for the high vacancy rate in Brazil is the lack of qualified information collected by the Census Bureau.¹⁴ The Census questionnaire does not allow one to determine whether the unit is vacant because it is uninhabitable, abandoned, for sale, or for rent; it does qualify seasonal units, and these were taken into consideration in the vacancy rate calculations.

Construction Need

Based on the 2000 housing supply and subtracting seasonal housing units, Brazil's housing stock amounts to 51,651,969 units. The estimated number of households for 2005 is 52,069,667. As explained in the methodology section, construction need is a function of demand and vacancy rates. If the current vacancy rate were maintained (12.7 percent), the total number of additional housing units needed to accommodate the projected 2005 demand would be 59,642,721, that is, an additional 7,990,752. This number of additional units is based on the 2000 housing stock, projected to 2005 and considering a 12.7 percent vacancy rate.

Since this vacancy rate is rather high and because the Census Bureau (IBGE) does not qualify vacant units, as explained in the introduction of this project, we decided to also apply a rate of five percent to the Brazil model to obtain an additional estimate for construction need. If the vacancy rate in Brazil were lowered to five percent, an additional 3,158,207 housing units would be needed by 2005.

Projected Households and Construction Need, Brazil



¹⁴ This issue is corroborated by the João Pinheiro Foundation in its study of the housing deficit in Brazil (Fundação João Pinheiro, 2005).

Projections for the year 2010 show that Brazil will need to add 15,053,958 housing units to its stock if the 12.7 percent vacancy rate is maintained. If it is lowered to five percent, an additional 9,649,117 housing units will be needed. By the year 2020, projections show a total of 69,801,453 households, which would mean an additional 28 million with a vacancy rate of 12.7 or an additional 21 million for a vacancy rate of five percent.

Metropolitan Region of Curitiba, Paraná

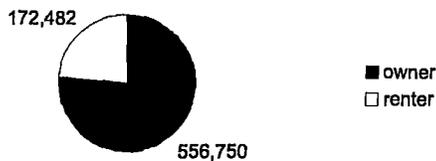
Introduction

Curitiba is the state capital of Paraná, the sixth largest state in Brazil. The Metropolitan Region of Curitiba (RMC), the eighth largest among metropolitan regions, had the highest growth rate of all regions between 1991 and 1996, even though the state of Paraná had one of the lowest growth rates in the same period. While other metropolitan regions had an average growth rate of 1.8 percent, RMC's reached 3.3 percent. Growth rates for all metropolitan regions, including Curitiba, averaged 3.6 percent between 1996 and 2000. Paraná, with 9.5 million inhabitants, has 80 percent of its population living in urban areas. Seventeen percent of the state's total population is concentrated in Curitiba, and its metropolitan region contains 32 percent of the state's urban population. The Metropolitan Region of Curitiba is highly urbanized, with 92 percent of its total population living in urban areas (IBGE, 2002).

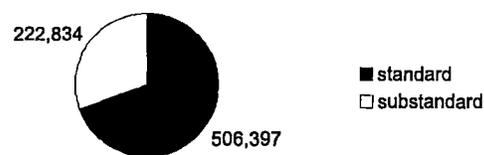
Housing Profile

According to the 2000 Census, there were 729,232 households in the metropolitan region of Curitiba, 76 percent of which were owner occupied and 24 percent were renters. Of the 556,750 heads of household who declared themselves owners, 69 percent live in standard housing.¹⁵ This proportion is the same for renters.

Number of Households by Tenure, Metropolitan Region of Curitiba, 2000

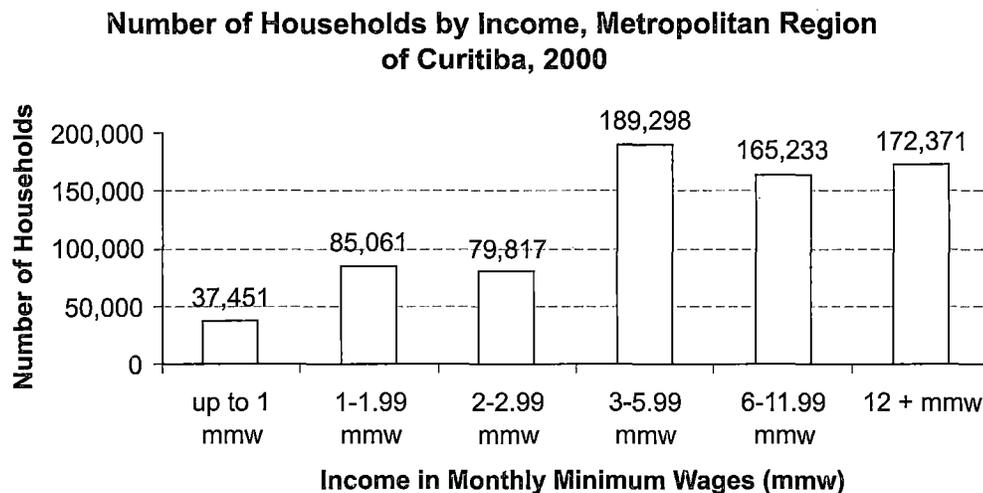


Number of Households by Condition, Metropolitan Region of Curitiba, 2000



Households with one or two persons represented 28 percent of the total, while those with three, four or five or more persons averaged 24 percent each. More than half of the households, 54 percent, earn less than six monthly minimum wages and 28 percent of the total number of households earns less than three monthly minimum wages. However, only five percent earn less than one monthly minimum wage.

¹⁵ The definition of "standard" used here is the one developed by the methodology, which is explained in detail in the first section of the report.



Although the ratio between owners and renters is constant across age categories, a higher percentage of standard owners (and lower of substandard owners) can be observed as householders age. While 63 percent of households whose head is between 15 and 24 years-old is standard, that percentage increases to 74 percent for households with heads 65 and older. For both owners and renters, the older the householder the lower the percentage of households occupying substandard housing.

Population Projections

The population projections for the Metropolitan Region of Curitiba, henceforth referred to as RMC, were developed by programmers working with the research team from state population projections to 2020 and population counts for 1990, 2000, and 2003.¹⁶

Curitiba's metropolitan region had 2,768,394 inhabitants in 2000 (IBGE, 2002). The projected population for 2010 is 3.5 million and over 4 million for 2020, which represents an increase of 50 percent in the next 17 years.

Household Estimates and Projections: the Demand-Side of Housing

The criteria developed to incorporate the need of families that were sharing a house revealed interesting facts. Based on 2000 Census data, the total number of housing units needed to accommodate the additional families spinning-off due to overcrowded conditions went from 729,232 to 749,938, adding over 20 thousand new households to the total.

Most additional households came from the owner tenure category (15 thousand families), which indicates that 73 percent of families that would potentially form a new household live in households in the owner tenure category.

Tenure

Of the total estimated number of households needed in the metropolitan area of Curitiba (749,938), 571,836 households would be owner occupied. According to the criteria developed for the Brazil model, 518,665 households are standard, and 41 percent of the households, including owners and renters, are substandard.

¹⁶ The state population projections were provided by CEDEPLAR. The population count for 1990, 2000 and 2003 were provided by IPEA through special tabulations from Census and DATASUS data.

The projection of tenure status to 2020 does not reveal a major change, nor should it, given the model assumptions. Unless there were substantive changes to the underlying age composition of the population, we would expect these relative proportions to hold true across the entire projection horizon.

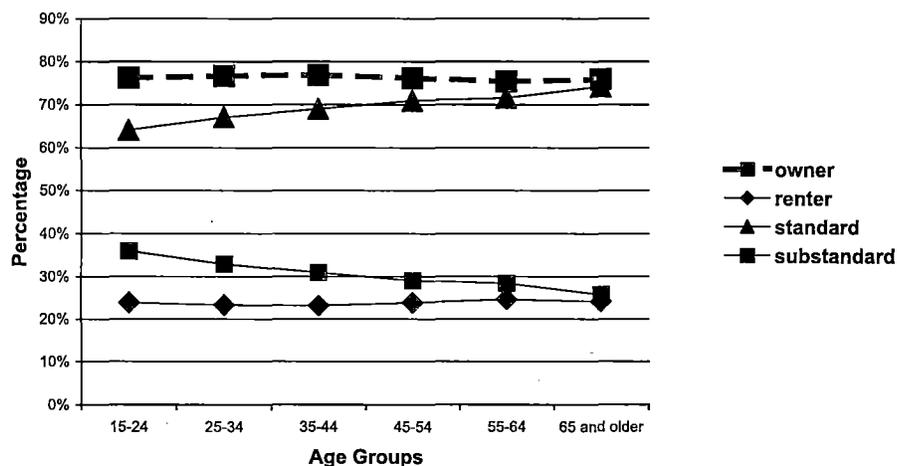
TENURE	YEAR				
	2003	2005	2010	2015	2020
owner standard	431,755	462,191	539,137	616,011	689,551
owner substandard	193,937	207,263	240,736	273,772	304,995
renter standard	135,739	145,334	169,758	194,318	218,004
renter substandard	59,598	63,690	74,031	84,179	93,666
Total	821,029	878,478	1,023,662	1,168,280	1,306,216

Age

The number of households with heads in the 15 to 24 age group is very low when compared to the other age groups, representing about seven percent of all households. The household formation rates for the age group 15 to 24 are also lower than for any other age group, which confirms the perception that young people tend to stay in their parents homes longer than would be expected. Nonetheless, the proportion of owners to renters is similar to all other age categories, about three-quarters owners and one-quarter renters. The groups with higher household formation rates are the 35 to 44 and 45 to 54 groups. The age group with the highest percentage of owners is the 35 to 44 group.

In the 15 to 24 age category, more households live in standard areas (63 percent) than in substandard areas (37 percent). The overall owner-renter proportions are similar across all age categories; however, the older the head of the household, the higher the percentage living in standard housing and the lower the percentage living in substandard housing. In the 25 to 34 age category, for example, more than half of households own a standard house. The percentage of renters decreases slightly for the 35 to 44 age category: 23 percent are renters. Also, the number of standard households increases for this age category while the number of substandard decreases.

Proportion of Owners to Renters and Standard to Substandard Units by Age Group, RMC, 2000



This trend continues into the 45 to 54, 55 to 64 and 65 and older categories. It is interesting to note that as heads of households get older their numbers increase in the standard tenure categories, which would indicate a correlation between age and opportunity to occupy adequate housing.

In the 20-year projections, the tendency is for the percentage of young heads of household to decrease. By 2020, only 4.7 percent of all households will have a head younger than 24 years old. Percentages will decrease somewhat for heads of household between 25 and 44 and increase significantly for those between 55 and 64. There is a noticeable increase for the age group 65 and older as well.

AGE	YEAR				
	2003	2005	2010	2015	2020
15 - 24 years old	6.44%	6.21%	5.53%	5.17%	4.73%
25 - 34 years old	23.96%	23.57%	23.53%	22.00%	19.93%
35 - 44 years old	26.26%	26.18%	24.50%	24.05%	24.70%
45 - 54 years old	20.49%	20.89%	21.82%	22.18%	21.43%
55 - 64 years old	12.40%	12.75%	14.13%	15.29%	16.57%
65 and older	10.45%	10.41%	10.48%	11.32%	12.63%
Total	100.00%	100.00%	100.00%	100.00%	100.00%

Size

Almost 29 percent of all households in the metropolitan area of Curitiba have one or two persons and 48 percent have three or four persons. Households with five or more persons represent 23 percent of the total number of households. These proportions do not change significantly within tenure or income categories.

Concerning the overcrowding of shared households, some interesting differences can be pointed out. Only five percent of households in the metropolitan area of Curitiba have more than one family, although 11 percent of the total number of households are overcrowded. Among standard households, nine percent of the total is overcrowded, while 19 percent of the substandard households are overcrowded. Renters present more overcrowding than owners; 17 percent of renter households are overcrowded, compared to ten percent of owners.

HOUSEHOLD SIZE	YEAR				
	2003	2005	2010	2015	2020
1 or 2 persons	237,181	253,900	296,234	338,689	379,450
3 persons	200,782	214,817	250,234	285,555	319,319
4 persons	195,663	209,335	243,876	278,219	310,920
5 or more persons	187,403	200,426	233,318	265,817	296,527
Total	821,029	878,478	1,023,662	1,168,280	1,306,216

Future trends reveal a slight increase in the percentage of households with one or two persons, less than one percent increase by 2020. Household with three and four persons will remain constant and there will be a slight decrease in the number of households with five or more persons. The total number of households will increase by almost 500 thousand in the next 17 years, from an estimated 821,029 in 2003 to a projected 1,306,216 in 2020. The more significant increase will be of households with one or two persons, which indicates that programs should target this cohort. The number of households with one and two persons will increase by 60 percent in the next 17 years.

Income

The largest number of households in the metropolitan region of Curitiba (54 percent) earns less than six monthly minimum wages. Most low-income housing programs are for families earning less than 3 monthly minimum wages. In the metropolitan area of Curitiba, 28 percent of households fall into this income category. The new housing programs that are designed for families with incomes up to 6 monthly minimum wages could benefit 54 percent of the total number of households. Programs that facilitate financing for families with incomes above 12 monthly minimum wages would benefit 24 percent of the total number of households.

TENURE	INCOME IN MONTHLY MINIMUM WAGES				Total
	up to 3	3 to 6	6 to 10	over 12	
owner standard	72,885	93,581	100,340	128,150	394,956
owner substandard	75,928	51,500	31,411	18,040	176,879
renter standard	31,127	35,479	30,926	26,176	123,708
renter substandard	30,145	14,530	6,764	2,954	54,393
Total	210,085	195,090	169,441	175,320	749,936

higher the income, the higher the percentage of owner-occupied households as compared to renters. Projections for the year 2020 indicate that there will be almost 25 thousand additional households with incomes below one monthly minimum wage. More than 130 thousand additional households will earn less

INCOME IN MONTHLY MINIMUM WAGES (m.m.w.)	YEAR				
	2003	2005	2010	2015	2020
up to 1 m.m.w.	42,742	45,697	53,180	60,579	67,603
1-1.99 m.m.w.	95,694	102,297	118,936	135,267	150,552
2-2.99 m.m.w.	90,091	96,304	111,903	127,302	141,838
3-5.99 m.m.w.	215,965	231,026	269,102	307,034	343,370
6-11.99 m.m.w.	186,689	199,760	232,728	265,563	296,880
more than 12 m.m.w.	189,848	203,394	237,813	272,535	305,973
Total	821,029	878,478	1,023,662	1,168,280	1,306,216

As it would be expected, there are more owners living in substandard conditions in the lower income categories. The higher the income, the higher the percentage of households living in standard conditions. Also, the

than three monthly minimum wages. Another 130 thousand earning between three and six monthly minimum wages will be added in the next 17 years. By the year 2020, almost 360,000 households will be earning less than three monthly minimum wages, so low-income housing programs targeting this income level will be needed to provide housing to 28 percent of households.

Housing Supply

The Metropolitan Region of Curitiba (RMC) has a total of 897,380 housing units according to the 2000 Census. The vacancy rate for Curitiba is 11 percent. Of all non-occupied units, 79 percent are vacant, 17 percent are seasonal and three percent were closed at the time the Census conducted the interview. Group quarters are included in this total for the reasons outlined in the methodology. They represent 0.11 percent of the total number of households in the RMC.

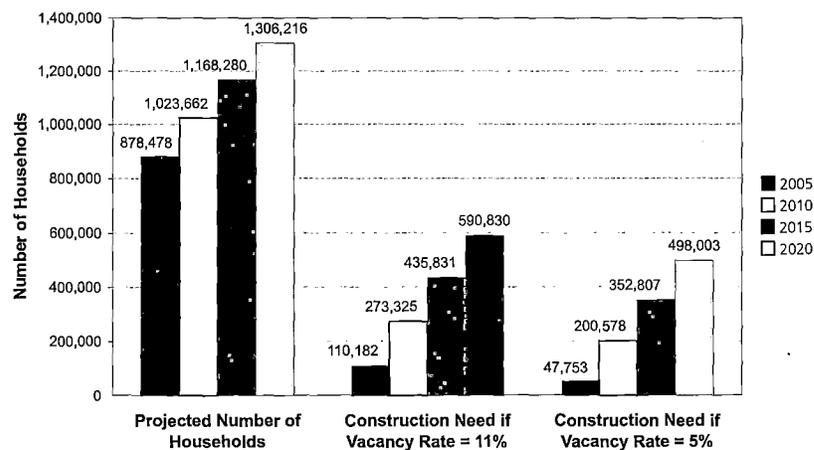
Construction Need

Based on the 2000 housing supply and subtracting seasonal housing units, Curitiba's (RMC) housing stock amounts to 876,961 units. The estimated number of households for 2005 is 878,478. As explained in the methodology section, construction need is a function of demand and vacancy rates. If the current vacancy rate were maintained (11 percent), the total number of additional housing units needed to accommodate the projected 2005 demand would be 987,143, that is, an additional 110,182.

Since this vacancy rate is rather high and because the Census Bureau (IBGE) does not qualify vacant units, as explained in the introduction of this project, we decided to also apply a rate of five percent to the Brazil model to obtain an additional estimate for construction need. If the vacancy rate in the RMC were lowered to five percent, an additional 47,753 housing units would be needed by 2005.

Projections for the year 2010 show that the Metropolitan Region of Curitiba will need to add 273,325 housing units to its stock if the 11 percent vacancy rate is maintained. If it is lowered to five percent, an additional 200,578 housing units will be needed. By the year 2020, projections show a total of 1,306,216 households, which means an additional 590,830 units with the current vacancy rate of 11 percent or an additional 498,003 units for a vacancy rate of five percent.

Projected Households and Construction Need, Metropolitan Region of Curitiba



Metropolitan Region of Recife, Pernambuco (summarized)

Introduction

Recife, the eighth-largest city in Brazil, is the state capital of Pernambuco. Its metropolitan region is the fifth largest in the country. Recife's population in 2000 was 1,422,905 (IBGE, 2002). The metropolitan region of Recife had the third lowest growth rate of all metropolitan regions between 1991 and 2000, only behind Rio de Janeiro and São Paulo, the two largest cities in Brazil (IBGE, 2002). The RMR comprises 14 jurisdictions. The population of 3.3 million is 97 percent urban and represents almost half of the State's population. The city has one of the highest densities in all of Brazil: 1,217 persons per square kilometer (Moreira, 2001).

Population Projections

Recife's metropolitan region had 3,291,349 inhabitants in 2000 (IBGE, 2002). The projected population for 2010 is 3.7 million and four million for 2020, which represents an increase of almost 20 percent in the next 17 years.

Household Estimates and Projections: the Demand-Side of Housing

The criteria developed to incorporate the need of families that were sharing a house revealed interesting facts. Based on 2000 Census data, the total number of housing units needed to accommodate the additional families spinning-off due to overcrowded conditions increased by 62,059 new households. There were 838,682 households in the metropolitan area of Recife in 2000, however, considering that the shared households that presented overcrowded conditions represented a need for a new unit, the estimated demand is 900,741 households.

Tenure

The projection of tenure status to 2020 does not reveal a major change. Owners will continue to represent about 79 percent of households while renters will account for the remainder 21 percent.

Age

In the 20-year projections, the tendency is for the percentage of young heads of household to decrease. By 2020, only 4.3 percent of all households will have a head younger than 24 years-old. Percentages will also decrease for heads of household between 25 and 44 and increase by four percent for those between 55 and 64. There is also an increase for the age group 65 and older as well.

Size

Concerning the overcrowding of shared households, some interesting differences can be pointed out. Seven percent of households in the metropolitan area of Recife are shared and overcrowded. Of the more than 62 thousand households in this condition, 47,376 are in the owner tenure category, only 24 percent are renters. Among standard households, 36 percent of the total number of shared households is overcrowded; the remaining 64 percent of overcrowded households are substandard. Renters present a slightly higher rate of overcrowding than owners; 16 percent of renter households are overcrowded, compared to 14 percent of owners.

The total number of households will increase by more than 400 thousand in the next 17 years, from an estimated 971,964 in 2003 to a projected 1,400,111 in 2020. The more significant increase will be of households with five or more persons, an additional 155 thousand households.

Income

The largest number of households in the metropolitan region of Recife (73 percent) earns less than six monthly minimum wages. Most low-income housing programs are for families earning less than three monthly minimum wages. In the metropolitan area of Recife, 51 percent of households fall into this income category. By the year 2020, more than 700,000 households will be earning less than three monthly minimum wages, so low-income housing programs targeting this income level will be needed to provide housing to half of all households.

Housing Supply

The Metropolitan Region of Recife (RMR) has a total of 1,004,198 housing units according to the 2000 Census. The vacancy rate for Recife is 11.1 percent. Of all non-occupied units, 70 percent are vacant, 22 percent are seasonal and eight percent were closed at the time the Census conducted the interview. Group quarters are included in this total for the reasons outlined in the methodology. They represent 0.09 percent of the total number of households in the RMR.

Construction Need

By the year 2020, projections show a total of 1,400,111 households, requiring an additional 602,794 units using the current vacancy rate of 11.1 percent. Since this vacancy rate is rather high and because the Census Bureau (IBGE) does not qualify vacant units, as explained earlier, we decided to produce a second estimate of construction need using a five percent vacancy rate. If the vacancy rate in the RMR were lowered to five percent, an additional 500,924 units would be needed by 2020.

Federal District Integrated Development Region (RIDE) (summarized)

Introduction

The Federal District comprises the city of Brasília plus 18 satellite cities called Administrative Regions (RAs). The Integrated Development Region of the Federal District (Região Integrada de Desenvolvimento do Distrito Federal e Entorno - RIDE) comprises the Federal District, 20 municipalities in the state of Goiás and two municipalities in the state of Minas Gerais.

Brasília and RIDE offer different characteristics from the other two metropolitan areas in this study. Because Brasília was built in the late 1950s, the evolution of its urban development followed the pattern of New Cities as opposed to Curitiba and Recife, which developed over a period of about 400 years. The RIDE was created in 1998. Between 1970 and 2000, while growth rates decreased in the Federal Districts, they increased in the jurisdictions around the Pilot Plan. The 22 jurisdictions that comprise the RIDE had a total population of 907 thousand people in 2000. Together with the Federal District's two million, it is estimated that the RIDE has a population of more than three million today. Most households in the 22 municipalities surrounding the Federal District live in precarious conditions; only 13 percent of them are connected to the sewerage network and 40 percent do not have a potable water supply.

Population Projections

The population projections for the metropolitan area of Brasília required the research team to make an exception. The three municipalities in the state of Minas Gerais were not included in the housing needs assessment for the RIDE to avoid extensive calculations that were not justified given the percentage of population they represent. The number of households in those three areas represents only 3.2 percent of the total number of households in the RIDE. The RIDE had 1,980,520 inhabitants in 2000 (IBGE, 2002). The projected population for 2010 is 3.7 million and 4.5 million for 2020, which represents an increase of almost 50 percent in the next 17 years.¹⁷

Household Estimates and Projections: the Demand-Side of Housing

The criteria developed to incorporate the need of families that were sharing a house revealed interesting facts. Based on 2000 Census data, the total number of housing units needed to accommodate the additional families spinning-off due to overcrowded conditions went from 730,134 to 762,843, adding over 30 thousand new households to the total.

Tenure

Of the total estimated number of households needed in the RIDE (762,843), 472,913 households would be owner occupied. According to the criteria developed for the Brazil model, 501,360 households would be standard, and 34 percent of the households, including owners and renters, would be substandard.

The projection of tenure status to 2020 does not reveal a major change. Owners will continue to represent about 62 percent of households while renters will account for the remainder, 38 percent. In absolute numbers, it is estimated that in the next 17 years there will be 405,467 additional owner-occupied households and 196,213 renter-occupied households. As for condition, by 2020 there should be an additional 373,637 standard households and 228,043 substandard households.

Age

The number of households with heads in the 15 to 24 and in the 65 and older age groups is relatively low when compared to the other age groups. The household formation rates for the age group 15 to 24 are also lower than for any other age group, which confirms the perception that young people tend to stay in their parents homes longer than would be expected. The age groups with higher household formation rates are the 25 to 34 and 35 to 44 groups.

The overall owner-renter proportions are similar across all age categories, increasing slightly with age. The number of standard housing units increases for each age group up to 54 years-old, then decreases slightly for older groups.

In the 20-year projections, the tendency is for the percentage of young heads of household to decrease.

Size

More than 25 percent of all households in the RIDE have one or two persons and 45 percent have three or four persons. Households with five or more persons represent 30 percent of the total number of households. The total

¹⁷ The state population projections were provided by CEDEPLAR. The population count for 1990, 2000 and 2003 were provided by IPEA through special tabulations from Census and DATASUS data.

number of households will increase by over 600 thousand in the next 17 years, from an estimated 862,731 in 2003 to a projected 1,464,411 in 2020. The more significant increase will be of households with one or two persons.

Only 4.5 percent of all households are overcrowded. Among standard households, 4.3 percent of the total are overcrowded, while 4.9 percent of the substandard households are overcrowded. Renters are slightly less overcrowded than owners; only 2.1 percent of renter households are overcrowded, compared to 2.4 percent of owners.

Income

The largest number of households in the RIDE (55 percent) earns less than six monthly minimum wages. Most low-income housing programs are for families earning less than 3 monthly minimum wages. In the RIDE, 33 percent of households fall into this income category. By the year 2020, almost 500,000 households will be earning less than three monthly minimum wages.

As income levels rise, the number of households in living in standard conditions increases and the number of households living in rental units decreases. There is also a correlation between income and dwelling condition. While 55.5 percent of the households with incomes below three monthly minimum wages (m.m.w.) live in substandard conditions, 88.8 percent with incomes over 12 m.m.w. live in standard conditions. These differences are significant for both owners and renters. While 73 percent of owners and 27 percent of renters have incomes over 12 m.m.w., those households with incomes below three m.m.w. are more evenly divided, 53 percent owners to 57 percent renters. Still, it is evident that households with higher incomes have more access to ownership.

Housing Supply

The RIDE has a total of 889,849 housing units according to the 2000 Census. The vacancy rate for the Federal District's Metropolitan Region is 12.9 percent. Of all non-occupied units, 70 percent are vacant, 15 percent are seasonal and 15 percent were closed at the time the Census conducted the interview. Group quarters are included in this total for the reasons outlined in the methodology. They represent 0.1 percent of the total number of households in the RIDE.

Construction Need

As explained in the methodology section, construction need is a function of demand and vacancy rates. RIDE vacancy rates are higher than the national average. Since this vacancy rate is rather high and because the Census Bureau (IBGE) does not qualify vacant units we decided we decided to produce a second estimate of construction need using a five percent vacancy rate. By the year 2020, projections show a total of 1,464,411 households, which would mean an additional 811,370 units with the current vacancy rate of 12.9 percent or an additional 671,199 units for a vacancy rate of five percent.

Comparative Analysis

This housing needs assessment confirms some of the stark regional differences that exist in Brazil. The metropolitan regions of Curitiba (RMC), Recife (RMR) and Brasília (RIDE) represent three very different contexts for enlightening comparisons. Although the differences among the three regions reveal interesting facts, some similarities are also revealing.

A fact that holds true for all regions is the constant proportion of owners to renters across all age categories. In the United States, the expected results would be that young households would rent and as they age and their incomes increase and household size increases, they become homeowners. However, in Brazil, the percentage of young households who own is almost the same as the percentage of older households who own. Some explanations could be considered in light of cultural aspects. First, most young people remain in their parents' homes until they have the means to acquire a house of their own. This custom is rooted in the country's Portuguese tradition of the relationship among social mobility, security and home ownership. Whereas in some countries home ownership is related to a gradual process of affluence and increasing professional stability, in Brazil the importance of home ownership also is linked to cultural values. Most people in Brazil associate paying rent with "throwing money down the drain," so the effort put into acquiring a home is intense from an early age. Second, young people have difficulty renting rooms or apartments because of legal and contractual requirements exercised by landlords. In the 1980s, some housing authorities heeded the need for affordable single-person housing units and built studios to be sold to low-income singles and childless couples, but that practice has not continued. Still, single persons under 30 years old are a majority of the households on waiting lists for low-income housing.

Another constant for all regions is income. It is noticeable that income levels do not vary significantly for the different age groups. As with home ownership, in Florida, generally, the more mature the householder, the higher the income. In Brazil, one possible explanation is that income is more related to access to education and professional opportunities than to seniority. The uniformity of incomes across age categories could be related to the lack of professional opportunities for more mature individuals and the fact that younger people with more education will have higher incomes than older people without college degrees. In addition, there are complexities related to the enormous informal economy in Brazil, which may skew official data.

One noticeable difference among the three metropolitan regions is the number of households projected to be earning less than three monthly minimum wages (m.m.w.) by 2020. This income level is significant because most low-income housing programs tie eligibility to earnings up to three m.m.w. We project that the metropolitan region of Curitiba (RMC) will have 28 percent of its households earning under three m.m.w., and therefore qualifying for low-income housing programs, by 2020. The metropolitan region of Recife (RMR) will have half of its households in that condition and the metropolitan region of Brasília (RIDE) will have one-third. This is a clear indication that housing programs targeting low-income populations will need to expand to serve households that need assistance.

Another noticeable contrast is related to the proportion of owners to renters and standard to substandard conditions. In the metropolitan region of Curitiba (RMC), the proportion of owners to renters is constant across all age categories, while as householders get older, they tend to occupy standard housing. The proportion of families living in standard housing in the RMC increases by almost 10 percentage points when comparing the youngest householders with the oldest (see graph on page 22). In the metropolitan region of Recife (RMR), ownership peaks between 25 and 34 and decreases slightly for older householders (see graph on page 31). The RMR has the highest proportion of substandard housing of all three regions. The number of households living in standard housing increases five percentage points between the youngest and the oldest age groups. However, more than half of the population lives in substandard conditions regardless of age. The metropolitan region of Brasília (RIDE) is somewhat similar to the RMC, except for

the youngest households (see graph on page 39). The number of households living in standard conditions peaks for the 45 to 54 age group, however, the proportion decreases for both the youngest and the oldest households.

The projected total demand for housing in Brazil is not simply a function of increasing demand resulting from population growth and the need to address the problem of overcrowded, shared households. High vacancy rates in Brazil as a whole and in each of the metropolitan regions included in this study also presents a challenge to policy makers. Construction need is a function of demand and vacancy rates. If vacancy rates in Brazil were lowered, construction need could be diminished. Another important factor is the substandard condition of some households, particularly in the Metropolitan Region of Recife. Construction need numbers could be reduced by addressing adequacy of housing units, including basic sanitation needs and overcrowding, without necessarily having to build a new unit. In addition, the way in which land tenure issues are addressed might modify the way in which construction need is estimated, including the manner in which the methodology for this project was developed.

Further research addressing these questions could provide policy makers with an even better picture of the need for affordable housing in Brazil. Improvements to Census questionnaires and data collection on housing condition, such as the reasons why units are vacant and land tenure status, for instance, would greatly contribute to research efforts and aid in the development of new methodologies. Additional international comparisons would also be helpful in shedding light on the issue of affordable housing assessment methodologies as they relate to population projections. For instance, drastic population changes such as the "baby boom" phenomenon, which occurred in the US in the 1950s and 1960s and in Mexico in the 1970s and 1980s, would change the linearity produced by this model. As existing methodologies are adapted to developing countries or as new methodologies are created to address the peculiarities of each system, better input can be given to governments, policy makers, housing authorities and citizens interested in improving housing and making more housing available to everyone.

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SQUATTERS NO MORE: SINGAPORE SOCIAL HOUSING

*Belinda Yuen**

Abstract

This contribution is aimed at sharing the Asian perspective. In particular, how the rapidly growing cities like Hong Kong and Singapore, have and continue to meet the basic needs of the urban poor in housing and other urban sectors. The objective is to present through this case study a basis for further urban policy research to improve pro-poor urban housing strategies.

As with Latin America and Africa, the urban population is expanding in Asia. According to the United Nations statistics, about half of the world's urban population is in Asia and growing at an unprecedented rate with consequential demands on housing and urban infrastructure. With urbanization the number of urban poor is rising fast. Some such as Brockman and Williams (1998) have estimated that Asia alone will need to invest US\$280 billion a year over the next 30 years to meet the basic housing and other urban needs of the population. Access to housing and basic urban infrastructure is recognizably an important urban agenda. The lack of such access is one of the most serious and widespread consequences of poverty in Asian cities. The immediate research issue is how poor families can access urban shelter more affordably.

In the area of housing, Singapore is often cited as a successful example of affordable housing production in Asian cities. Notwithstanding its uniqueness (small city size; particular cultural, economic and political conditions), the Singapore development presents rich case material for analysis. As many other rapidly urbanizing and globalizing cities, Singapore has its urban poor and squatters although perhaps in present numbers smaller than the more populace cities of Dhaka, Jakarta and Rio de Janeiro. According to official figures, about 4 per cent of Singapore's resident population of 3.4 million is living at or close to the poverty line in 1998 (compared to 16 per cent in Indonesia and 9 per cent in Vietnam) while less than 1 per cent is living in squatter settlements and on the streets. But in the 1960s, Singapore was no different from many of the other cities: it had one of the largest and worst slum settlements in the world.

Thus, Singapore housing policy development holds important questions for policymakers and practitioners. How did Singapore scale up and provide housing access to the urban poor? What are the key policy tools and reforms? What are the pros and cons of those policy tools and interventions? To what extent are the lessons learnt transferable? More critically, to what extent do those policy interventions improve the urban quality of life among the poor, especially when their traditional abode is changed from low-rise (2 to 3-storey) to high-rise (the tallest is presently 30-storey) living? While much may have been documented on Singapore's public housing development (Wong and Yeh, 1985; Yuen et al, 1999), few have focused on the housing and poverty context to examine the policy meaning from the perspective of the poor.

From the point of view of housing policy, it is of critical importance to monitor the performance of the housing development and understand why homelessness remains even after decades of successful public

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housing program and what are the residents' worries and concerns of high-rise living as the public housing stock rise in height with urbanization pressure (40 and 50 storey housing are under construction). The latter is the focus of my present research which aims to better understand the realities of high-rise public housing living and coping mechanisms to spatial constraint. Spatial constraint is a significant problem in modern urban living that can affect health, social adaptation and pathological behavior. The poorer residents perhaps more than any other residents are most affected in situations of spatial constraint. Singapore is not alone in building high-rise housing, more and more Asian countries including China and Korea are building taller housing for their urban residents as cities grow and become denser. As Mitlin (2001, p512) reminds, through their focus on understanding and following the realities of the poor, it might be anticipated that the housing projects and programs that emerge are those that seek to address the diverse needs of the poor in ways which are affordable. The stakes for enhancing affordable housing access to the poor for any city are considerable.

Introduction

As with Latin America and Africa, the number of urban residents is fast expanding in Asia. Asia is also home to the largest concentration of poor people in the world (Chapman et al, 1999; Montgomery et al, 2001). About a quarter of the total urban population in Asia is living below the poverty line although the proportion may be higher in some countries. India and China each holds about a third of the region's urban population with many living in relative poverty (Jacquemin, 1999). Of the 12 million people in Mumbai, for example, about 50 per cent lives in slums, dilapidated *chawls* and on pavements. In the extreme, they join the number of homeless people, estimated to be in excess of 100 million in the world (UNCHS, 1999). In one recent estimate, Asia alone will need to invest a sum of US\$280 billion a year over the next 30 years to meet the basic needs of the population in housing and other urban sectors (Brockman and Williams, 1998).

The lack of housing access is one of the most serious and widespread consequences and causes of poverty in Asian cities. The improvements in housing that are important to improving the quality of life among the poor often do not receive the attention they deserve from policy makers (Danieri, 1996). To make any appreciable improvement, substantial government spending is needed, both in the physical expansion of the city's infrastructure and implementation of poverty alleviation programs. Buttressed by the heritage of literature that argues the importance of affordable and improved housing in urban poverty reduction (see, for example, Mitlin, 2001), the immediate research issue is how poor families can access urban shelter more affordably.

By its policy interventions, the state has the power to assist the poor and uplift their situation. A review of the literature indicates two broad approaches to policy interventions in poverty alleviation (Ahluwalia, 1990; Echeverri-Gent, 1993). The first is a more direct approach comprising those policies intended to reduce the incidence of poverty to explicitly defined levels through such anti-poverty programs as self-employment and micro credit for small businesses. The latter schemes, for example, the Alexandria Business Association's micro-credit scheme for Small and Medium-Sized Enterprises (SMEs) in Alexandria, Egypt, generally offer small loans often with few collateral conditions and flexible repayment schedules. By comparison, the second approach is indirect and somewhat longer term. It involves the adoption of growth-oriented policies to make efficient use of resources to accelerate economic development and spread the benefits to the poor. Strategies include ensuring greater availability of land to the poor through land reforms and ensuring greater accessibility

to social services, particularly housing, education and health services. The Indonesian Kampung Improvement Project, the Caracas Slum Upgrading Project, and the Singapore public housing program are examples of this approach. To what extent do the poor benefit from these policy interventions?

In this paper, we investigate the public housing policy of Singapore, which is often cited as a successful example of affordable housing production in Asian cities. As with Hong Kong, the Singapore public housing policy intervention for resident population has progressively led to society-wide enjoyment of the right to adequate housing. Some 85 per cent of Singapore's 3.2 million resident population live in public housing. More than 850,000 housing units in 23 new towns have been constructed. While the poor elsewhere are homeless, the poorest 20 per cent of households in Singapore have equal access to housing resources, albeit public housing, and many are homeowners. The proportions bear witness to the realization of housing rights. How did Singapore scale up and provide housing access to the urban poor? What are the key policy tools and reforms? What are the pros and cons of those policy tools and interventions? To what extent are the lessons learnt transferable notwithstanding Singapore's uniqueness (small city size, particular cultural, economic and political conditions)? More critically, to what extent does the public housing policy intervention improve the urban quality of life among the poor especially when their traditional abode is changed from low-rise (2-3 storey) to high-rise living (the tallest is presently 30-storey and going taller)?

Given its widely recognized success, the Singapore public housing development has attracted keen research interest (see, for example, Wong and Yeh, 1985; Yuen et al, 1999) but few have clarified the public housing-urban poverty nexus. This provides the starting point for the present analysis of the performance of housing development. To set the context, we first describe the extent of poverty in Singapore followed by an examination of government attitudes and responses to the housing problem and delivery. This is followed by a survey of the key instruments for better housing for the poor. Finally, the paper will consider the reality of high-rise public housing living as the city continues to build taller housing for its growing population.

A Profile of Singapore Poverty

Singapore (land area of 690 sq km and GDP per capita of USD20,767) is ranked 25 on the 2002 United Nations Human Development Index with hardly any of its population living below the poverty line. While this may be the international outlook, closer examination points to poverty in an otherwise middle-class society. As reported by the leading local newspaper (*The Straits Times*, 29 Jan 2005), there appears to be a rising number of poor in Singapore with the present economic downturn: reviewing statistics from the Community Development Councils,¹ the number of those needing financial aid has risen from 14,300 in 2001 to 22,500 in 2002 and 31,570 in 2003 and the amount given out has increased from S\$14.6m² in financial year 2001 to S\$27m in 2003. The number of families on public assistance has similarly increased from 2572 households in Mar 2002 to 2714 households in Dec 2004. These families (means tested) receive between S\$260 per month for a 1-person household and S\$825 for households of 4 or more persons under the Public Assistance Scheme administered by the Singapore Ministry of Community Development, Youth and Sports.

¹ There are 5 Community Development Councils (CDC) in Singapore. Each headed by an elected mayor, the CDC functions as a local administration of its district with main responsibility to initiate, plan and manage community programs to promote community bonding. The CDC also provides various community and social assistance to residents in need, services delegated from the Ministries.

² Current exchange rate is approximately USD1 for S\$1.6.

As with Hong Kong, there is no official poverty line in Singapore. There is little data on the number in the 'Left-Behind Class'. If going by the recent number of street people picked up by the authorities, about 170-300 people in Singapore make the streets their home every year. Many (50%) are old (60 and above years old) and have no family, employment or skills. Others are abandoned by their own families. In one report, the Singapore Department of Statistics has released a figure of about 4 per cent of Singapore's resident population (or 120,000) living at or close to the poverty line in 1998 (*The Straits Times*, 31 May 2000). Income distribution as measured by the Gini coefficient was 0.481 in 2000. In the most recent population census (2000a), 12.6 per cent of households (116,300 households) in Singapore earned less than S\$1000 a month (average household income was S\$4943 per month). The lowest 10% of households excluding those with no income earners had an average monthly income of S\$459 in 2000 (average household size was 3.7) (Singapore Census of Population, 2001). The unofficial national definition of poverty drawn from the income qualifying criteria in various public assistance schemes seems to cover those surviving on less than S\$10 per person per day.

Singapore poverty appears miniscule in relation to countries elsewhere. Poverty data in recent poverty assessments (by urban poverty headcounts) for East Asia, for example, indicate that 16 per cent in Indonesia, 12 per cent in Philippines and 9 per cent in Vietnam's urban population is living in poverty (World Bank, 2002). According to the US Census Bureau Current Population Survey March Supplement 2000, 11.8 per cent of the US population is living in poverty in 1999. About one fifth or 1.2 billion people in the world survive on less than US\$1 a day, 44 per cent of these live in South Asia and 23 per cent in East Asia and Pacific. Many are living in informal housing, without security of tenure, and in deplorable housing conditions that can be described as life and health threatening (Roebuck, 1999; UNCHS, 2001).

By contrast, there are fewer homeless people in Singapore. The lowest income citizens are not excluded from the housing system. Data from the public housing authority, the Singapore Housing and Development Board (HDB), showed that as of Dec 2004, 37,823 households could not afford to buy their own flats or rent homes in the open market and occupied heavily subsidized 1- and 2-room public rental flats under the Public Rental Scheme. Through the HDB set up in 1960, housing is provided under the government's shelter for all policy. Over time, poor quality overcrowded housing and temporary mass self-help housing in unimproved squatter settlements has been progressively cleared and replaced by high-rise accommodations and improved facilities in public housing estates and new towns. In the process, the public housing sector has grown to become the predominant housing sector and stock of affordable housing in Singapore. This has encouraged the formulation of policies aimed at reducing the cost of housing and easing access to owner occupation in public housing, even for the lower income residents.

The proportion of the resident population living in public housing has risen to 85% (since 1985), with the majority (95%) owning the flat they occupy. As the Minister for Trade and Industry has announced in the 2000 Parliament session, many families in the poorest 10 per cent of Singapore households have significant wealth in the form of their flats and compare well with those in other countries. The government's commitment to subsidize the three basic services of housing, education and health care to make them affordable was reiterated by the Prime Minister in his 2001 National Day rally speech, "No Singaporeans should be denied these basic needs, he said, no matter how poor he is." (*The Straits Times*, 21 Aug 2001). The state commitment is a key cornerstone of the Singapore housing intervention.

Government Attitudes and Responses

To understand Singapore's housing for all policy development, it is perhaps relevant to briefly review the social and urban development context that gave impetus to the policy. As with many other cities, as the Singapore city grew in population, the pressure on housing increased (Table 1).

Table 1: Population and building density in early Singapore

Year	Population (city)	Dwellings	Building density (persons per building)
1907	250,000	20,000	12.5
1931	567,000	37,000	15.3
1947	938,000 (700,000)	38,500	18.2

Source: Colony of Singapore, Report of the Housing Committee 1947; Master Plan 1955.

The combination of low construction and war damage had resulted in a substantial housing shortage in the immediate post-war years. According to the 1947 British colonial government Housing Committee Report, by 1947, Singapore had one of the world's worst slums, 'a disgrace to a civilised community' (p. 16). About 300,000 people were then living in temporary squalid dwellings in squatter areas with no sanitation, water or any of the basic health facilities and another 250,000 in ramshackle shophouses within the city area, in neighborhoods such as Chinatown 'in which gross overcrowding was common' (HDB, 1966, p30). To give just one example, as Mr. Lim Kim San, the first HDB Chairman recalled of his visit to Chinatown in the early 1960s,

I went into a three-storey shophouse with one lavatory and two bathrooms. We counted 200 tenants living there. It was so dark and damp. It was an inhuman and degrading existence. Underneath the staircase was a single plank. A man was lying on the plank. He had rented it. That was his home! And he was lying down covered by a blanket; the thick red blanket made in China. I paused to ask him if he was sick: "Why are you covering yourself with a thick blanket?" He replied: "I am covering myself out of respect for you. I am wearing only undershorts. My brother is wearing my pants." They were too poor to afford clothing. In those days, there were shops which pulled clothing and shoes off the dead to sell them. "My God," I thought to myself, "I really must help those people." (*The Straits Times*, 9 Aug 1997).

At night, many others would sleep on makeshift canvas beds placed along street pavements (Chen, 1983). Policy interventions on housing provision during the colonial administration, 1819-1959 (Singapore was granted internal self-rule in 1959 and independence in 1965) were, however, limited. Resources were largely directed to entrepot trading and the British military complex. The housing problem was regarded as something of a transitory phenomenon that would disappear as the economy grew. Such an attitude was convenient as it provided the basis for taking little or no action on housing. In effect, the outcome was housing stress and the cumulative need for improvements was immense: in 1959, the total number of dwellings completed by both public and private agencies was 4003 when 14,000 new units were needed as summarized in Table 2.

Table 2: Housing need

New housing required	N° of units
for current housing deficit from overcrowding in urban areas	80,000
for central area redevelopment	20,000
for natural increase in population	47,000
Total new housing units required	147,000
	(14,000 new homes a year)

Source: HDB, 1966

Of the 14,000 new homes a year, the private sector had the capacity to provide some 2,500 new homes a year. Many of those dwellings would however be at price levels beyond the means of the lower income households. In the absence of alternatives, the burden of the remaining housing requirements including shelter for the poor must fall on the government. The challenge was taken up by the newly elected self-government, which had won the election on a manifesto of providing employment and housing (and has been re-elected to power ever since). Unlike many other Third World governments, which have tended to act on housing as a social problem to be addressed after the achievement of economic progress, Singapore considered the two as of equal and symbiotic importance. Two statutory agencies, the Economic Development Board (EDB) and HDB were immediately set up with reformed financial, legal, and institutional framework to promote the supply of economic growth-employment and housing respectively at the start of self-governance. The complementary between employment and housing has been extensively argued elsewhere to be an important factor in the government's continued political performance and legitimacy (see, for example, Chua, 1997; Ho, 2000).

The core objective of the public sector housing initiative is to make housing affordable and accessible to lower-income families, which until then suffered from discriminatory actions. As elaborated by the Minister for National Development in 1959,

Most of the houses will accommodate those in the lower income group, who have never been cared for in the past. The previous Government cared only for the middle class group, who can afford to pay tea money to get S.I.T. (Singapore Improvement Trust [the colonial administration housing authority]) flats. (*The Straits Times*, 19 Sep 1959).

Rejecting the popular but incremental construction of assisted self-help in low income housing, Singapore launched a comprehensive development of public housing. Following from the view that the state bears a major responsibility for organizing the conditions of growth, the government has taken a major role in determining the production and consumption of housing – in particular, by providing affordable and inclusive housing to the lowest income residents and, thus, demonstrating that often the determination to realize a political vision breaks down barriers to action and starts the path to real housing reform on the ground.

Affordable and Inclusive Housing

Central to public shelter provision is the pro-poor goal to maximize the housing options of poor Singapore residents while guarding against exclusion, exploitation, and unsanitary living conditions. Of significance

was the crystallization of two basic functions of the HDB that have set the context for adequate housing delivery and changes in housing conditions for the poor:

- provide housing of sound construction and good design for the lower income groups at rents which they can afford (HDB Annual Report, 1962); and
- encourage a property-owning democracy in Singapore and to enable Singapore citizens in the lower middle income group to own their own homes (HDB Annual Report 1964).

The first follows a traditional philosophy: the state as a provider of housing. The second strengthens homeownership and opens the possibility for the state to assume the role of facilitator and social engineer. The following illustrates how these functions have been supported by various housing policies and diverse interventions to allow the poor to select the housing type and support that is most appropriate to them. As Mitlin (2001), Rachelis (1999) and many others remind, the urban poor differs in background and needs. Thus, different groups with multiple needs fall within this income category.

Good Affordable Housing

Based on the government's commitment to achieve adequate shelter for all who lack, the policy on good housing includes interventions along two broad dimensions: 1) physical, in terms of occupancy and minimum physical requirements for housing units to improve living condition within the overall urban development of the country and 2) financial, to enable housing access and affordability.

Physical improvement

Fundamental to the housing improvement and upgrading is provision of quality self-contained flats within a functional and landscaped residential environment. At the heart of that policy are the multiple interventions for comprehensively planned housing estates and, since 1965, new towns with improved services and facilities. For each of the facilities, planning standards have been developed to ensure that a quality service environment is achieved within a general framework of growth and modernization. The trend is towards self-containment of public housing towns where household members - especially the low income - can fulfil most of their basic needs within the new town: work, shop, school, entertainment, sports and other recreational pursuits. Development in the main is based on comprehensiveness in housing.

Comprehensive approach. As the national housing authority, the HDB adopts a comprehensive approach to secure sectorwide public housing development within the country's economic and urban development framework. In strengthening effectiveness, the HDB master plans, develops³ and manages (latter until the formation of town councils in 1989) the entire production-consumption process of public housing towns and all their dwelling units and infrastructure. The construction of housing and infrastructure is contracted to the private sector. By centralizing its public housing effort under a single authority, Singapore has circumvented the common problems of duplication and fragmentation of duties, and bureaucratic rivalries associated with multi-agency implementation. Even though increasingly advocated by some housing scholars (see review in Pugh, 2001), centralized comprehensiveness has its challenges.

³ In 2003, the HDB building and development arm was corporatized in the wake of the government's long-term development plan to increase private housing and 'roll back' public housing as the society matures economically.

For example, in the area of housing supply, to build cheap and fast, a strategy of standardisation by building prototype flats and blocks was adopted. In addition, the HDB uses long-term supply contracts and bulk purchase strategies to ensure continuous supply of essential building materials at steady prices. While these pragmatic development interventions may have facilitated the rapid construction of the dwelling units and towns, standardization of building blocks had led to criticisms of cookie-cutter, monotonous townscapes of many of the early public housing town development (see Wong and Yeh, 1985; Yuen et al, 1999). Shoddy workmanship and building defects were a problem in several of the early quickly-built projects that attracted many complaints, even debate in Parliament (e.g. cracks in walls and ceilings, inferior fittings, frequent lift breakdown). Learning, modifying and innovating, the problems were quickly rectified and reforms introduced into the next cycle of construction improvement. Quality considerations were given more emphasis with the decline in housing shortage.

Under the country's recent quest for a distinctive city in the global age, attempts have been increasingly made to enhance the place identity of the towns and neighbourhoods (see Yuen, 2005). In support the HDB has devolved its estate management function to town councils comprising residents. Through the town councils, residents can get involved in the management of their towns. Experiences to date have shown that the reform of centralized comprehensive low-income housing is anything but regularized and static. It requires a dynamic problem-solving capacity, a continual process of learning and improving housing policies, and diverse interventions in order to affect significantly the target families.

Infrastructure. In the effort to provide not simply housing but good living conditions with a full complement of services, Singapore new towns have taken the form of high-rise, high-density development. Occupying an approximate land area of 650 ha, a new town typically accommodates a population of 250,000. The resulting new town density (gross) is 92 dwelling units per hectare where about half of the land is for residential development and the balance for facilities to support an improved housing environment (Table 3).

Table 3: Land use distribution and gross density of new town

land use	prototype new town (60,000 dwelling units)	
	land area (ha)	percentage
commercial (town centre and neighborhood centre)*	30	4.6
residential**	347	53.4
schools	62	9.5
open space	26	4.0
sports complex	7	1.1
institutions	15	2.3
industry***	44	6.8
major roads	89	13.7
utilities and others	30	4.6
total	650	100.0
gross new town density	92 dwelling units per hectare	

notes: * includes civic, cultural, recreational uses and incidental developments in the town and neighborhood centers

** includes private housing within the town boundary

*** non-polluting industries only

Source: HDB (2000a)

The average height of most public housing apartment blocks is 12 stories with some, the more recent development, rising to 30-40 stories. The trend is towards taller buildings with increased population growth (the private sector has recently announced plans to construct 50-70 storey apartment developments in the downtown area). The new towns are all carefully located and planned within the country's macro spatial planning (see Yuen, 2004 for more detail). The principle of planned development is crucial in the provision of housing that is taking place over a length of time. It helps to regulate land and housing development to meet demand and infrastructure needs and, in particular, to ensure on-time infrastructure provision for residents who move into completed towns.

Land acquisition. The capstone in the provision of in-time infrastructure and housing is the state policy of compulsory land acquisition. The importance of such a land policy cannot be over-emphasized. In many developing countries, the implementation of state housing has often been hampered by the shortage or unavailability of land. Without land, there would be no housing. The task of land assembly and clearance in housing development is clearly formidable even for the size of Singapore. To illustrate, in 1960, only 44 per cent of the land in Singapore was owned by the government while over 35 per cent of the population then lived in squatter settlements. Effective legislation was implemented to ensure the availability of unencumbered land to supplement the stock of state land.

In 1966, the colonial legislation on land acquisition was repealed and in its place the broader Land Acquisition Act was passed. Under the reformed Land Acquisition Act, the government can compulsorily acquire any land of private and commercial use for public interest. The Act provides for the payment of compensation, which is determined by the state. In determining the payment rate, no account is taken of any potential value for more intensive uses, only the existing use or zoned use is considered, whichever is lower. The prices paid by the HDB for the acquired lands are therefore usually much lower than the market price. This approach, described as draconian by some housing scholars (for example, Chua, 1997), has helped the government to lower the costs of housing provision and has been particularly helpful in the early phases of housing delivery. It has also furthered the dominant position of the state in Singapore's urban development —85 per cent of land is now in state ownership (Motha and Yuen, 1999) —while contributing to a 'captive' market as public housing is offered as a resettlement benefit.

In providing a better housing environment than that from which the residents come, this policy helps enhance the attraction of relocation to public housing. As borne out by early resident surveys (1968 and 1973, see Yeh and Tan, 1974/75) on public housing tenants' present and past living conditions and more recent statistics on Singapore public housing residential mobility, there is a consistently high level of resident satisfaction with public housing living: 82.5 per cent of all households living in public housing have indicated that they would be content to always live in those flats (Housing and Development Board, 2000).

From its inception, public housing is seen as a way to provide a good living environment for income groups who cannot afford the cost of renting or buying private housing. This inclusive approach puts the needs, expectations and lifestyles of its residents at the center of the housing supply and has required the provision of better housing be a dynamic process that seeks continuous improvement to meet changing consumer preference. On a day-to-day basis, the HDB (and since 1989 the town councils) is concerned with estate management and maintenance to ensure that the public housing units and towns do not degenerate into slums over time.

On a longer-term basis, instead of allowing older flats and towns to become obsolete, public flats and estates are progressively upgraded with resident participation (Lau, 1998). To enhance affordability, public housing residents

pay only a small fraction of the upgrading cost and at times not at all, depending on the scheme they elect. On average, about 10-13 per cent of HDB annual operating expenditure is spent on flat upgrading and improvements. In 2003/04, 13 per cent (S\$565 million) was spent on upgrading and improvement works (HDB Annual Report, 2003/04). The spending is justified by the Minister of Finance as a means of redistributing economic growth and government budget surpluses to increase the housing assets of Singapore citizens (*The Straits Times*, 9 Aug 1995). Apart from maintaining quality living, improvement of older homes also offers a sustainable building alternative to demolition that allows the residents to continue to live in familiar towns and build communities. All these are important factors in the consistently high public-housing resident satisfaction scores. There have been a number of studies concluding that Singapore public housing improvement has over the years become comparable to middle class housing and gained international housing awards including the UN Habitat World Habitat Award for 'innovative and successful human settlement' (Teo and Phillips, 1989; Foo, 2001).

Financial assistance

Improved housing is only relevant to the poor if it is also affordable. As Stone (1993) argues, affordable housing cannot be produced without consideration of the broader context of the households' earning power. The Singapore response is an inclusive housing delivery system that recognizes the needs of varying income and family size. From the start of the program, the emphasis is on expansion of choice: not one but a range of flat types roughly in the proportion of 30 per cent 1-room units, 40 per cent 2-room units and 30 per cent 3-room units were offered. Care was taken that the exercise of housing choice did not exclude lower-income families. This consideration is central to the system's success. It has resulted in pragmatic strategies that are inclusive. In the area of affordable housing, the strategy, was, as Teh, the Chief Architect of HDB, explained, the building of small flats to be let at low rents,

While it is generally considered that a two room flat should be the ideal minimum standard for public housing, because of economic reality that a lower income working class family is unable to afford a two room flat which costs S\$40 rental per month, the one room flat at S\$20 per month rental was introduced as the minimum standard of public housing for the lowest income group in Singapore... It is hoped that when the economic position of the people improves, the occupants of these one room flats may eventually move to the two or three room flats.' (Teh, 1961, 7)

A 1955 survey of housing applicants had revealed that 2,655 of 7,388 (35.9 per cent) applicants on the SIT housing register were ready to pay more than S\$40 a month for rental. An important factor was therefore the tenant's ability to pay. As a large proportion of the population was then lacking in adequate means to meet their needs for housing and other daily sustenance, provision was made to match affordability and to forgo the principle of charging economic rent. Instead, the policy was for low rent. In the 1960s, rents were at S\$20 per month, S\$40 per month and S\$60 per month for the 1-, 2- and 3-room flats respectively (no more than 15 per cent of the average wage-earner's monthly income). The building costs of flats were S\$3,000 each for 1-room unit and S\$4,500-5,500 each for 2-room unit (the average building cost of the flat was about S\$8 per square foot of net floor area, excluding public access and staircases).

The low rent is a 'deliberate policy of the government to improve the standard of living of the people' (HDB Annual Report 1969, p16). On social grounds, current rents have continued to remain low: S\$26-33 a month for 1-room flat and S\$44-75 a month for 2-room flat for households with monthly income of S\$800 or below, notwithstanding the increase in per capita GDP at current market prices, from S\$1306 in 1960 to

S\$39,585 in 2000. The rental costs compare favorably with those provided by the US Department of Housing and Urban Development (1995): in 1991, 33 per cent of very low income renters in USA paid more than 50 per cent of their income on housing. Whilst the HDB maintains a low rent housing policy, parallel effort has been made to grow the economy and improve family income through education and employment including industrialization (Yuen, 1989). By the 1980s, Singapore had joined the ranks of Hong Kong, South Korea and Taiwan to become one of four newly industrializing countries in Asia. Its per capita income has increased to become the second highest in Asia after that of Japan.

Over time, with economic growth and elimination of the housing shortage, bigger housing units have been built. However, price-access to rental (and home ownership) remains important in meeting the housing needs of the poor and is very much guided by affordability. As explained by the Minister for National Development, 'When we price our flats, we don't just price them based on our costs. We price them with an eye on the affordability for those who are purchasing them, and we try to keep that level of affordability the same over the years.' (*The Straits Times*, 12 July 1996). The government has announced that it would set the price of 4-room flats to the affordability level of 70 per cent of Singaporean households while the price of 3-room flats will remain affordable to 90 per cent of households. It has also been stated that should incomes not increase neither would the costs of 3- and 4-room HDB flats (*The Straits Times*, 21 Sep 1996). No one is discriminated or excluded from housing on grounds of affordability.

To further illustrate this commitment, to make them affordable, the selling prices of flats are equivalent to about 2 years' income of the purchasers. To help the lower income, flats are sold at discounted prices. Smaller flats are subsidized more than the larger flats. According to a report in the local newspaper (*The Straits Times*, 30 May 1980), each 3-room flat is subsidized by 44 per cent, each 4-room flat by 33 per cent and each 5-room flat by 27 per cent. Most Singaporeans (87 per cent of 523 adult Singaporeans) polled in the 1997 *Straits Times* opinion survey indicated that they were happy with public housing; 55 per cent said the subsidy levels for public housing are just right. Almost all (99 per cent) favored giving subsidies to buyers of 1- or 2-room flats (*The Straits Times*, 27 Sep 1997), lending support to the pro-poor goal of helping the lower income groups.

Subsidy is a central issue in the housing for the poor policy and has been argued by various housing scholars (see, for example, Daniere and Takahashi, 1999). Since housing is regarded as a public duty, not a commercial operation, and the government's core policy is one of providing homes for the people at rents they can afford, the difference between rent income and expenditure is covered by a grant from the state. The annual housing deficits are fully covered by government subsidies and the HDB starts each financial year with a clean slate. When it took office, the government had reserves of S\$322 million from which it could and did draw for housing and other key urban developments. Between 1960 and 1964, the government advanced S\$17 million in grants. In 2004, the cumulative grant since HDB inception in 1960 stands at S\$13,109 million. The amount stands witness to what Teh (1975) has observed, 'there has never been a single instance where the request for funds for the public housing programmes has not been approved by the Government' (p10). This substantial financial support represents a major commitment by the government and is an important aspect of the Singapore housing policy to improve the living condition of the lower income families.

Security Of Tenure Through Home Ownership

The second major driver of Singapore's public housing development is safety of secure tenure through the option of home ownership. Although begun as rented housing, home ownership of public housing is

encouraged as a policy since 1964 to 'enable Singapore citizens in the lower middle income group to own their own homes' (HDB Annual Report 1964, p9). The Report went on to state, 'Without this scheme the majority of wage-earners in this income group will not be able to buy their own homes because of the prevailing high prices.' (pp9-10) Aimed at preventing discrimination in housing, promoting security of tenure and promoting access to finance for affordable housing, this policy is instrumental in facilitating the participation of lower income households in home ownership in Singapore. The core instruments include a transparent flat allocation system and the home ownership scheme aimed at making home ownership more affordable by increasing popular access to mortgage finance.

Flat allocation system

Flat allocation policy is an important part of housing access. Right from the start, transparency of flat allocation and eligibility is an institutionalized aspect of the public housing system that takes pride in non-discriminatory action. As Chong et al (1985, p. 230) explain,

A major challenge of the HDB lies in the desire to devise the right schemes and policies that will ultimately place, in the hands of the deserving public housing applicants, the keys to their new homes. The need for rigorously formulated schemes and policies arises from four factors often associated with a good public housing programme. Firstly, there must be equity so that public resources ploughed into the housing programme are fairly distributed; thus, the need for rules and procedures to determine who gets a flat at which point in time. Second, it should benefit the majority of the population and thus involves the processing of large numbers. This calls for strict procedures to maintain efficiency, reduce errors and prevent abuse. Thirdly, it should offer some degree of choice in the location and type of public housing...and finally, the existence of special groups requiring priority or special assistance in obtaining public housing complicates the task of maintaining equity at the broader level.

Eligibility conditions and the flat allocation process are clearly set out and made public. Flats are allocated on the basis of need, families before singles, on a first registration basis (Tan, 1998). Through various allocation priorities, the state has promoted the values of the family institution (for example, to encourage early marriage and married couples to live close to their ageing parents). Applicants can 'walk in' to select flats from existing housing stock or wait for their appointed flats to be built on a build-to-order scheme. To help guard against exclusion and exploitation, the HDB maintains a detailed applications list that indicates the particulars of all applicants, the type of flat applied for and the geographical zone desired (Liu, 1988). The applications list serves a further function of providing the HDB with the means to better match housing demand with supply.

All Singapore citizens who do not already own homes and whose combined monthly household income falls below a specified ceiling are eligible to rent/buy HDB flats. Income ceiling is imposed on applicants of public housing to serve as a cut-off point to determine the group who is eligible for HDB flats since such housing is primarily designed to help those who cannot afford private housing. Applicants whose total household income exceeds the eligibility ceiling would thus not qualify for public housing. This is an important intervention to help low income families. Without income ceiling, higher income families may competitively raid low income housing resulting in ever under-supply situation for the poor as outlined by Pugh (2001). Table 5 gives one illustration of the prevailing eligibility conditions.

Table 5: Eligibility conditions for rental/purchase of HDB flats

Flat Type	Average Floor Area	Public Scheme	
	(Sq M)	Rent (S\$)	Eligibility Conditions
1-room	33	26-33	Singapore citizens at least 21 years of age
2-room	45	44-75	total household income not more than S\$800 per month must form a family nucleus must not own other property
buying a flat direct from the HDB			Singapore citizen at least 21 years of age have a family nucleus total household income not more than S\$8000 per month must not own any private residential property have not bought any flat direct from HDB nor enjoyed any housing subsidy

Source: HDB (2000a)

As with many other aspects of the housing delivery system, to be effective, the implementation of eligibility criteria is contingent upon regular review and adjustment. First, its effectiveness is affected by the setting of the income ceiling at an appropriate level, that it would include the intended target group without an unmanageable influx to the applications register and consequential very long waiting list. Second, the setting of the income ceiling is not a 'one-time' exercise. As with the good housing process, the income ceiling has to be constantly reviewed in the context of changing income levels, prices of private housing and the HDB ability to extend its programs. The eligibility income ceiling for home ownership has been periodically revised (from S\$1000 a month in 1964 to S\$8000 in 1996 and since) in step with economic growth to include 90 per cent of households in the community in the nation-building objective of providing housing to all who lack.

An input to the large inclusion is the housing need of the sandwich middle income class whose income is beyond public housing income ceiling and yet not sufficient to enter private housing. The bottom line is to create equal housing opportunity for all citizens and reduce the potential for socioeconomic polarization. Yet, there remains the homeless sleeping on public benches at night, albeit a small number compared to other cities. Their presence has cast reconsideration on the social exclusion of specific groups (such as the destitute) within an increasingly middle class society. Has this group of the poor been neglected in the shelter for all program as it widens to provide 'universal service' and promote ownership among a broader segment of the population? As one homeless (an odd job laborer in his 40s, an ex-convict whose family does not want to house him) shared in a newspaper interview, "Flats are very expensive, aren't they? A few thousand bucks?" (*Streets* 25 Jul 2003). As Angel (2000) reminds, a fundamental explanation for homelessness is economics—the urban housing supply has a minimum price associated with it. The reemergence of homelessness is a housing policy issue that warrants further research.

Home ownership scheme

Notwithstanding that home ownership rates are generally found to be highly dependent on income, age, marital status, family size and race (Carliner, 1974), Singapore has broadened home ownership and made it a reality to many low-income families. Under the home ownership scheme first introduced in 1964, public housing is sold to eligible households on a 99-year leasehold basis. The rationale for promoting homeownership may be glimpsed from the memoirs of then Prime Minister (Lee, 2000, pp116-7),

My primary preoccupation was to give every citizen a stake in the country and its future. I wanted a home-owning society. I had seen the contrast between the blocks of low-cost rental flats, badly misused and poorly maintained, and those of house-proud owners, and was convinced that if every family owned its home, the country would be more stable... I had seen how voters in capital cities always tended to vote against the government of the day and was determined that our householders should become homeowners, otherwise we would not have political stability. My other important motive was to give all parents whose sons would have to do national service a stake in the Singapore their sons had to defend. If the soldier's family did not own their home, he would soon conclude he would be fighting to protect the properties of the wealthy. I believed this sense of ownership was vital for our new society which had no deep roots in a common historical experience.

To happen, home ownership requires affordable housing credit. Mortgage lending has to reconcile affordability to borrowers, viability to lenders and resource mobilization for the housing sector. The policy and interventions developed are those attempting to cheapen the costs of public homeownership through pecuniary assistance with down payment and mortgage interest payments. The aim is to ease front end loading and mortgage financing problems for the potential purchasers so as to encourage renters including lower income families into owner occupation. To give one recent example of the help to lower income households to buy their first HDB flat or upgrade to a bigger flat when the family grows, the Special Housing Assistance Program introduced in 1994 offers the families,

- sale of flats to sitting tenants at a discount with 100 per cent financing;
- HDB buys back 3-room flats from the open market to sell at subsidized prices to families with monthly household income of less than S\$1500 (the subsidy is about S\$50,000 for each 3-room flat);
- sale of budget 4-room flats with slightly smaller floor area and simpler finishes (budget flats constitute about 10 per cent of total number of HDB flats offered for sale annually);
- tenants applying for 4-room flats under the Registration of Flats System are given a 6-month head start over non-tenant applicants in getting their flats. They must be first-time home buyers and have stayed in their rental for at least 5 years;
- rent and purchase scheme will allow families with a gross monthly household income of between S\$800 and S\$1500 to first rent a 3-room flat from the HDB and subsequently purchase the flat.

Within three years of its introduction, about 16,000 families had availed the program. To further assist the low-income families, as of 1994, the government has given S\$30,000 grant to households of four with a monthly household income of less than S\$1500 towards their purchase of a subsidized 3-room flat. As with

the provision of a range of housing types, the diverse interventions potentially allow the families to select the support that is most useful and appropriate to them.

The most enduring and significant assistance for homeowners is perhaps the 1968 provision under the home ownership scheme, which allows buyers of public housing to withdraw a portion of their savings in the Central Provident Fund (CPF) for down payment (20 per cent of purchase price) and mortgage payment (the remaining 80 per cent of purchase price, which can be paid in installments through a HDB assisted mortgage loan with interest rates set below the prime rate). The CPF savings are essentially accumulated funds from the worker's pay-as-you-go social security scheme to which both employer and employee make mandatory contributions of a certain percentage of the employee's monthly contractual wage (Low and Aw, 1997). On average, the flat applicant who has worked for 4-5 years would be able to pay the 20 per cent down payment using their CPF savings, thus eliminating the burden on cash outlay.

The use of CPF savings for housing is an attractive financing solution as monthly mortgage repayment for the flat is generally less than half of the individual's CPF deposit (remaining CPF savings are left for retirement while the take-home pay remains intact for other consumption). According to HDB records, the majority of first-time house buyers could pay their monthly housing loan entirely from CPF savings without the need to use their take-home pay. In addition, the CPF Board administers a low premium mortgage reducing insurance scheme to protect the ownership interest of the owner's surviving family members in the event of death or incapacitation. Thus, with the use of CPF, it became possible to own a flat for a lease of 99 years without suffering a reduction in monthly disposable income. The working and impact of CPF on wealth generation has been much examined elsewhere (see Low and Aw, 1997; Chua, 1997).

In aggregate, this mechanism has generated a rapid expansion of home ownership and the broad spreading of tenure benefits to the lower income families. To quote the Trade and Industry Minister in Parliament on 29 June 2000, many in the bottom 10 per cent of households in Singapore have significant wealth in the form of CPF savings (*The Straits Times*, 30 June 2000). In 1999, the median CPF savings for the poorest 10 per cent of households in Singapore was S\$20,000. Thus, even though housing provision is dominated by the state, a high proportion of the public housing stock is under private ownership. The proportion of home ownership public flats had increased from 26 per cent in 1970 to 92 per cent of the housing stock by 1999 (HDB, 2000b).

According to a 1992 HDB survey of 1- and 2-room rental flats, 27 per cent of those tenants had expectation of becoming house-owners on their own while another 25 per cent indicated that they would be encouraged by the provision of financial assistance to buy a flat. The popular attraction of home ownership may lie in deeper household aspirations articulated by some housing observers including Knight and Eakin (1998) as the 'American Dream' and in the Singapore context, the 'Singapore Dream' (Koh and Ooi, 1996). The remaining 47 per cent of households that intended to stay on in rented flats gave reasons of affordability, small household requirements and satisfaction with their present flats as the main pull factors. To ensure that members of the lower-income groups have continued access to public housing and are not made worse off by changes in the wider macro-economic environment, the families who cannot afford to pay for the housing are offered assistance.

The public housing legislation provides for the forfeiture (or repossession in cases of non-payment of mortgage installments) of a flat when the rental is in arrears for 3 months or more but there are few cases of forfeiture/repossession because of arrears. As the only sector of affordable housing, any eviction would leave the family homeless. Rental and mortgage arrears are part of the realities of providing affordable housing in a shelter-for-all housing policy, a management problem that may escalate in times of economic difficulties. To contain the problem, help is offered to families in financial difficulties, in terms of job search and rental assistance. During the recent 1998 Asian crisis, for example, assurance is given to public housing residents to help them ride out the crisis.

In Oct 2001, the government rolled out S\$11.3 billion package to help Singaporeans cope with the economic downturn. Of this, S\$698 million is specifically aimed at helping the poor and the unemployed. In the area of public housing, assistance is extended to service and conservancy charge rebates, reduction of utilities bills and rental assistance. Families unable to meet their mortgage payments may have their repayment scheme rescheduled or move to a flat within their financial ability. Mortgage loan reschedule schemes include:

- reduced repayment under which the home owner can apply to defer 25 per cent of his/her monthly repayments for a 5-year term. On the 6th year, the monthly installment is recalculated based on the loan balance then and the remaining loan term;
- deferment of loan repayment where the home owner can apply for deferment of his/her loan repayment for 6 months and if need be for a further 6 months;
- extension of loan term where the HDB will consider allowing an extension of the 25-year loan term up to a maximum of 30 years or until the homeowner turns 65 whichever is shorter (*The Sunday Times* 16 Dec 2001).

As the Minister for National Development assures, 'There's no question of anyone losing their flats because of this downturn' (*The Straits Times*, 21 July 2001). This position conveys the government's commitment to equal housing access rights.

Realization Of Housing Rights

The first, and perhaps most immediate, effect of the realization process is improved housing for the families. Instead of shared and unhygienic accommodation, families can look forward to unique occupation, equal access to housing and for many, home ownership. The realization process brings improved housing conditions for the housing poor, manifested in better housing, security of tenure and improved quality of life. Comparative statistics reveal a progressive improvement in housing conditions: living space per person has increased from under 3-6 square meters per person in slums and squatter settlements (Yeh and Lee, 1968) to the current average of 20-25 square meters of living space per person (Urban Redevelopment Authority, 1991). As revealed by the Singapore Census of Population 2000b, the average number of rooms per person has increased to 1.29 in 2000. Other signs of housing and quality of life improvement among HDB households include:

- The proportion of population staying in 1-room and 2-room flats declined from 13.3 per cent in 1987 to 6.6 per cent, while those staying in 5-room and bigger flats increased from 12.3 per cent to 18.3 per cent. More than one in three (36.9 per cent) of Singaporeans who were living in public housing rental flats have upgraded to better housing between 1991 and 1995.

- The overall mean household income of households living in public housing estates increased from S\$1,558 in 1987 to S\$2,653 in 1993.
- More than 97 per cent of all HDB households have refrigerators, TV sets and telephones. More than two-thirds have washing machines, video recorders and water heaters. About 50 per cent owned personal computers. (HDB, 2000b)

In a recent time-use study of public housing households to analyze residents' daily pattern of activities within the flat, we found the largest block of family time (after removing work and sleeping time) is expressive time (defined as time for leisure and self-actualization) and the primary activity is watching television (Appold and Yuen, 2003).

Housing access and affordability including home ownership is no longer the exclusivity of upper and middle income families. Of the 21,300 households that upgraded from rental flats, 41 per cent of 1-room renters and 28 per cent of 2-room renters upgraded to either bigger rental or owner occupied flats (Department of Statistics, 1995). Among the different major ethnic groups (Chinese 76.8 per cent, Malays 13.9 per cent and Indians 7.9 per cent in national population), the Malays have moved forward to register the highest home ownership among all ethnic groups in public housing in the latest population census (Singapore Census of Population, 2000b). Data from the Singapore Department of Statistics confirm the public home ownership sector as the leading housing sector in Singapore, accommodating over 80 per cent of total households from low income to middle income groups. The very low-income group (bottom 5 per cent of income groups) is accommodated by the public rental sector. Less than 0.1 per cent of the squatter settlements remain to be cleared. Even these settlements have been improved with paved roads and basic modern services. Compared to other cities, there are few homeless people on the streets. Occurring in parallel is the economic development that has significantly raised income and saw unemployment decline from double-digit in the 1960s to full employment in 1970s-1980s and 4 per cent in recent years with recession. In public housing, the mean number of income earners per household is 1.7 persons and income has risen over the years with the general economic performance (HDB, 2000c). The poor have become less poor. They are squatters no more.

While public housing has solved severe problems of housing shortage and overcrowding, it has in the process transformed the Singapore landscape from a predominantly low-rise shophouse colonial city to a modern city of high-rise, high-density living. The transformation has brought certain adjustments and concerns that are in part the realities of high-rise living. High-rise public housing has often been viewed with problems in many western cities (see Conway and Adams, 1977; Helleman and Wassenberg, 2004). In Latin America, Venezuela has initiated high-rise redevelopment in the 1950s but failed by reason of excessive costs and social shortcomings as reviewed by Pugh (2001). In Asia, Singapore and Hong Kong have similarly experimented and scored high residential satisfaction. Developments worldwide would seem to indicate that many other cities are revisiting and building high-rise (some by private sector in up-market districts) to house the growing population. What are the attractions and concerns of high-rise living? Will public housing residents consider living ever higher as urban realities push towards taller buildings? We have initiated research in an attempt to investigate these issues to better understand the living experience of public housing residents in high-rise (Yuen et al, 2003). The emergent promising lines of our enquiry in reasserting the importance of people-centered planning are beginning to lend support to the latest British premise that tall buildings can have a positive role in urban development if carefully considered (Corporation of London, 2002).

Our evidence reveals that as building height extends continually skywards, more households in Singapore are living (and preferring) higher floors now than 30 years ago, indicating that if conditions are suitably included high-rise may yet provide a satisfying living experience (Yuen, 2005). The majority of public households (54 per cent) were living on ground to 4th storey in 1973, the tallest public housing block then was 20-storey (HDB Household Sample Survey, 1973). The highest most preferred floor in 1973 was ground to 4th storey. In another more recent survey where 48.5 per cent of those interviewed (344) were living on 15th-30th floor (the present tallest public housing block is 30-storey), more people were apparently expressing a preference for higher floors—29 per cent stating 15th to 20th floor as their highest preferred floor and 52.9 per cent for above 20th floor (Yuen, 2005). Other recent work has supported a similar preference trend (Tan, 2002). It would appear that as more people become used to high-rise living, more are seemingly confident and willing to live higher.

Taking a closer look, the three common items that seemed to have consistently attracted Singapore public housing resident respondents to live high-rise are the view, breeze and privacy they can get in high-rise living—‘top of the world’ feeling. Among the worries, others have cited considerations of safety, in particular, height phobia, safety of children and elderly, ‘scared if the lifts are broken’, or ‘scared if a crime occurs in high floor’ as reasons for not wanting to live on high floors (Yuen, 2005). The importance of lift provision in high-rise living and preference has appeared in other studies (Tan, 2002; Chew, 2004/05). Just as personal inclinations may be a motivating factor, personal fears, real or perceived, would appear to detract from the high-rise experience. As summarized in Table 6, it would appear that the very high and very low floor levels were not particularly favored by most residents if the recent survey among resident

Table 6: Highest floor in which survey respondents were willing to live

Highest floor	No. of respondents (%)
1-5	0.9
6-10	11.3
11-15	12.5
16-20	22.4
21-25	12.2
26-30	25.9
31-50	13.1
Higher than 50	1.7

Note: % only includes valid responses to this question: 344.

respondents is any indication.

While many may be willing to live on the 16th to 30th floor, less than 2 per cent were willing to live higher than 50-storey. One respondent shared that she would be too afraid to hang her clothes out if it was too high (the local practice is to hang the clothes on long bamboos out of the kitchen window to take advantage of the tropical sun). Others related incidents of persons falling off while cleaning their windows (cases reported in the local press and media were mentioned) and were thus not comfortable to be living too high. The reality is that while many look forward to improved housing and view with height, there will be others who will

express concerns over the spatial constraints that come with high-rise. In the dimension of height, as one resident shared in a recent press interview,

It was quite scary at first to look down. I didn't want to live so high up—on the 10th floor—but what to do? We'd already picked this flat in the ballot (*The Straits Times*, 9 Aug 2001).

The worry will only intensify with population growth and plans to build taller housing in both the public and private sector, underscoring the need to take greater cognizance of the concerns of the residents in the planning and design of high-rise living for some such as the poor may not have the option to choose. Even as further work remains, it would appear that respondents' acceptance level of living higher is seemingly restricted to their perception. As one respondent shared with us, she was previously afraid of living on high floors but no longer after she visited a friend living on the high floor and found that the height was acceptable. The absence of living experience does not shut the possibility that when taller buildings are built and more people move to live in them, resident perception and preference may change accordingly.

As Mr Othman (aged 65) who moved from village to high-rise living in 1971 recalled, the initial adjustment to vertical living was difficult. Among others, he had to study the habits and cultures of other races (unlike village living which was largely mono-ethnic, different races live in public housing under Singapore's shelter for all policy), 'Living with many races, we have to cooperate and be understanding.'³ (HDB, 2000d, p. 151). Following early concern of decreasing patterns of neighbourly interaction in public housing, recent HDB sample household surveys indicate improvement in neighborly interaction among the residents. Its latest 2003 survey found that 97 per cent of residents polled said they know their neighbors while 90 per cent would greet their neighbors and 80 per cent would regularly have conversation with other residents in their neighborhoods (*The Straits Times*, 23 Feb 2005). Older residents especially those aged 60-69 with longer length of stay, seemed the most active in community relations. They meet along corridors and lift lobbies of the apartment block and at ground level open spaces of void decks, markets and neighborhood parks. Resident interaction need not be limited in high-rise.

Each group has apparently developed his/her coping mechanism with high-rise. The farmers, for example, who were among the first generation of residents resettled from village to high-rise public housing developed their own coping mechanism to the new spatial constraint as recounted by then Prime Minister (2000, p120),

Some were seen coaxing their pigs up the stairs! One family, a couple with 12 children, moving from a hut to a new HDB flat at Old Airport Road brought a dozen chickens and ducks to rear in the kitchen. The mother built a wooden gate at the kitchen entrance to stop them from entering the living-room. In the evenings the children would look for earthworms and insects at the grass patches outside for feed. They did this for 10 years until they moved into another flat.

Spatial constraint is a significant problem in modern urban living. Some such as Singer (1991) have persuasively argued that with the quickening pace of urbanization there is a tendency for modernity to replace tradition. Old ways gradually adapt to new form as society moves along the continuum of *gemeinschaft* and *gesellschaft*. Others such as Cooperman, et al (1981) astutely observe an element of self-selection in housing as people are likely to choose the living situation they prefer since the home is the most important physical setting for many of us. A number of other studies by Michelson (1977) and Cooper-Marcus (1995; 1999) have shown that specific kinds of people with pre-existing behavior are attracted to particular residential milieus. Cooper-

Marcus (1995), for example, has described the 'house as a mirror of self' in her exploration of the deeper meanings and relationships to the residence. However, while this may be true for many, the poorer residents perhaps more than other residents may not have the option, and are most affected in situations of spatial constraint.

As of 1999/00, 298,698 families have been resettled, more than half of those families relocated to public housing. The process of resettlement did not take place without problems. In an early sociological study, Hassan (1977) highlighted that for the poor families in the beginning, increasing household expenses and growing anxiety over such increases outweighs the advantages and facilities available in the new housing environment. As Lee (2000, p120) more recently shared,

There were enormous problems, especially in the early stages when we resettled farmers and others from almost rent-free wooded squatter huts with no water, power or modern sanitation, and therefore no utility bills, into high-rise dwellings with all these amenities but also a monthly bill to pay. It was a wrenching experience for them in personal, social and economic terms.

At times, the squatters would refuse to move and frustrate plans of redevelopment. To ease the resettlement process, the squatters were offered resettlement terms and encouraged to move, failing which action would be taken in the courts to obtain warrants for eviction. As one resident shared, the resettlement compensation was paid according to the size of the house to be demolished and other factors including the number of fruit trees and other improvement such as fish ponds, chicken houses, etc, on the land (HDB, 2000d). Eviction is the last measure and the resettlement policy is continually reviewed to provide a better deal in resettlement compensation so that "there will be no room left for pro-Communist elements to instigate the farmers and squatters against the Government" (*The Straits Times*, 7 Jan 1964). Despite the initial problems, housing scholars have variously observed the changing attitude of those affected by resettlement from resentment and resistance in the initial years of the public housing program to resignation and progressive acceptance because it has become evident that everyone in the squatter areas throughout Singapore is affected 'equally' and that land is needed for housing of the nation (Wong and Yeh, 1985; Chua, 1997). Along with the increased resettlement compensation, the comprehensively-planned new towns with improved infrastructure, utilities and housing offer the potential for home ownership and subsequent resale at market prices after a minimum occupation period (buyers must satisfy the public housing eligibility requirements for homeownership).

Conclusion

This paper has presented a perspective on Singapore housing policy for squatters and low-income families. It underscores that diverse interventions are important in housing for the poor as they allow these groups to select that which they consider most appropriate to their condition and need.

The housing problem of the urban poor, as Mitlin (2001) describes, is multi-faceted and may hold the key to improved development. As Angel (2000) further suggests, the housing problem can be broadly characterized as the presence of a large number of urban families living in what society-at-large considers to be unacceptable housing conditions or simply put, bad housing conditions. Bad housing conditions often reflect the interaction of poverty and affordability as evidenced by the early Singapore housing situation of the 1960s. In the Singapore case, it has prompted the pursuit of adequate affordable public housing as the solution. Using

comprehensive sector development of public housing as a vehicle, Singapore has distinguished those in need of shelter, assisting the poor while screening out those who could afford private housing at prices generally several times higher. Such intervention has sustained a functioning housing sector that has been translated into housing improvements internationally recognized by many (see Foo, 2001; Mitlin, 2001; Pugh, 2001).

In the process, it has worked to uplift the quality of life of the poor through increased access to housing including the creation of home ownership and a stakein society. Over 85 per cent of the resident population in Singapore is living in public housing, with the majority owning their homes, an opportunity that is not limited to those with higher and middle incomes. Many in the bottom 10 per cent of households in Singapore own their homes and have seen their incomes rise steadily in real terms. Such an achievement is not randomly produced but the result of much planning and determination on the part of the government.

In a fundamental perspective, without parallel economic development, the housing improvements would not have advanced so dramatically. Deliberate action was taken to diversify the economy and provide employment in Singapore. With economic growth, the nominal household income had increased. Real GDP had grown at an average of 8.6% per year over the 30-year period from 1965 to 1999. This had fuelled growth in real per capita GDP from S\$4000 in 1965 to S\$32,000 in 1999 (while inflation remained low, around 2 to 3% per year). At the household level, the average monthly household income increased. As Ng and Yap (2001) illustrated, from 1988 to 1998, average monthly household income had increased by 6.7% per year, leading to higher asset ownership. The proportion of home ownership public flats expanded from 26 per cent in 1970 to 92 per cent of the housing stock by 1999.

Although the Singapore challenges of affordable housing and shelter delivery are context specific, drawing on its development experience may yet show how the urban poor might be helped through housing delivery. Two chief observations are worth emphasizing. First is the degree of government commitment in helping the lower-income households. The extent to which the shelter needs of the poor can influence policy decisions will ultimately depend on the political environment within which such decisions are made. In general terms, government interventions can greatly motivate, enable and constrain housing action. To illustrate, from the outset, the Singapore government has recognized its role and accorded high priority and commitment in helping the lower income families to meet their housing needs. Diverse interventions are offered to these families to select as their needs require. They are considered important stakeholders in the new country. In all its policies, there is thus an implicit consciousness to ensure that lower-income families are not made worse off. For example, to make home ownership a reality for all, the government has introduced a home ownership scheme with an innovative self-help mortgage financial system drawn on the borrowers' CPF savings. The Singapore CPF for housing represents a lesson in housing finance.

At the same time, it demonstrates that eliminating the urban housing and poverty problems require a massive paradigm shift in thinking and acting towards the poor. Cities and societies need to envision them as assets and not problems. Like the rest of society, they should be able to select as their needs require. The positive implication of the Singapore housing program is that with commitment comes the will to change and to bring forth change. The determination to achieve change is translated into state commitment. The Prime Minister in his 2001 National Day rally reiterated the government's commitment to subsidize heavily the three basic services of housing, education and health care to make them affordable. "No Singaporeans should be denied these basic needs, he said, no matter how poor he is." (*The Straits Times*, 21 Aug 2001).

The second concluding observation concerns pragmatic program implementation. In Singapore, planning is quickly translated into housing policies and schemes. Priority is matched by resources and support (policy, organizational, legal, and financial) aimed at establishing a framework that enables the lower-income families to select the appropriate assistance to meet their housing needs. Implementation is indeed the hard part of urban development. With every successful example, there are perhaps many more unsuccessful ones. Besides resources and supporting framework, the process requires constant review and learning. Through continuous learning and policy refinement, Singapore has gradually evolved and built an institutional capacity and housing system that ensures program delivery. Institutions need not be identical. Singapore's system of housing development with a single empowered authority responsible for housing delivery may not be the model for all countries, but effective pragmatic management principles (such as inclusive housing and widening home ownership opportunity for lower-income families, directed assistance for low-income renter households and continual review of housing access) apply in most contexts. There is a growing literature that emphasizes a comprehensive approach to housing (see, for example, Pugh, 2001).

Set alongside comprehensiveness in housing, as many housing scholars remind, housing delivery is not a stand-alone issue (see, for example, Chua, 1997; Pugh, 2001; Mitlin, 2001). Housing policies pursued in a vacuum from other social and economic policies have brought disastrous consequences in some cities (OECD, 1996). There is a strong connecting thread and interdependence between housing and overall macroeconomic and national development that shows housing as anything but a 'public burden' (see Wong and Yeh, 1985; Sandilands, 1992). National and economic development in Singapore has provided the *raison d'être* and resources for its low income housing development. Its pro-poor public housing projects are to a large extent enabled by the rising affluence that comes with economic growth, which has seen the country progress from a developing country in the 1960s to a newly industrializing country by the 1980s.

Although the financing of public housing draws from the general background of the country's economic progress, Singapore's experience also demonstrates the employment-generation potential of this sector. By 2000, the HDB in providing a total housing environment for all who lack has initiated the construction of more than 850,000 dwelling units, 19,500 commercial premises, 12,800 industrial premises, more than 1460 schools and community facilities, 45 parks, 17,347 markets/hawker centers, and numerous car parks. The construction of these facilities while providing improved housing and better quality of life for the poor has created construction jobs and has a high multiplier effect. Reflecting on the economic impact, some housing scholars such as Sandilands (1992) have described the construction sector as a leading sector since its growth rates are above the rate of growth of overall GDP. Others have written about the pump priming effect of public sector housing construction (see Krause et al, 1987).

As with many other cities, Singapore's quest to provide its poor residents with good living environment is not new. Adequate shelter with the promise of a decent life of dignity, good health, safety, happiness and hope is one theme that has been repeated internationally and enshrined in successive United Nations declarations (see, for example, UNCHS, 1998; 1999; World Bank, 1993). The Singapore development experience, however, shows that public housing (even high-rise) for the lower income families need not degenerate into polarized and marginal environments. Nonetheless, the reemergence of the homeless underscores the urgency for further research. In particular, the trend towards taller housing presents challenges. The poor of Singapore do not have the alternative to opt out of this housing. In this regard, we are reminded of Mitlin's (2001, p512)

exhortation to understand and follow the realities of the poor in the continuing effort to create affordable housing that seek to address their diverse needs.

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COMMONS AND ANTICOMMONS: ROLE OF THE STATE IN THE HOUSING MARKET

*Jieming Zhu**

Introduction

In many Asian developing countries, efficient housing provision has always been hampered by supply-side constraints, one of which is the land factor. High population density, which is prevalent in Asia, makes urban land resources extremely scarce, and great land scarcity creates intensive competition for the access to land uses. Efficient land uses become a critical issue on the agenda of urban governments. Sustainability for Asian development countries, I would like to argue, hinges on sustainability of their economic growth which, in turn, relies much on efficiency of their economic development. In the developing countries endowed with highly scarce resources, social and environmental sustainability depends on efficient wealth creation in the first place. Inefficient economic development wastes resources unnecessarily, and poor quality economic growth adds to the tension in social relations.

As it is known that the land market is not perfect, and there are market failures. From the economist's perspective, failures in the land market are caused by externalities which prevent the land market from running smoothly, coordinated by the "invisible hand". Therefore, a functioning land market needs the state's constructive actions to internalize externalities. Based on the cases of Bangladesh, China, Singapore and Vietnam in Asia, this paper elaborates on the role of the state in the market provision of urban housing. Singapore is a well-recognized state with a successful state-orchestrated housing program that has sheltered people of almost all social strata (86% of total population living in the public housing). On the track moving toward markets since 1979, China has presented a mixed story in its endeavor to work out a solution to housing shortages. It is a great success that provision of urban housing has been shifted from the state to the market on the one hand. On the other hand, reliance on the market has created a gulf between the housing-rich and housing-poor. Without the participation of the state, the market-initiated provision of low-income housing proves to be sub-standard habitations where land uses are most inefficient. As a developing country fighting with the poverty, Bangladesh is struggling to develop a coherent housing program for middle-income and low-income residents. However, serious supply-side constraints hamper adequate market provision of middle-income housing, let alone low-income housing, because the state is absent from construction of effective housing markets. As a country in transition from the centrally-controlled system to a market-oriented economy, Vietnam is developing a housing market. Provision of housing has been significantly shifted from the state to the private sector. Nevertheless, a unique socialist institution of people's "land use rights" creates a haphazard private housing market where precious land assets are not used efficiently. Those cases are used to demonstrate that the state is critical in shaping an efficient housing market. Especially in the context of great land scarcity, clear property rights are essential to avoid the "tragedy of the commons" - that is, the destruction of important collective resources by the action of individual private parties. Equally important, the state must intervene to prevent the symmetrical and opposite problem - that of the "anticommons", in which "multiple

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owners hold effective rights of exclusion in a scarce resource" (Heller, 1998: 668) and, as a result, that resource tends to be under-utilized.

The state in the development of market institutions for efficient housing provision

Neo-classical economics holds that individuals behave rationally in maximizing utilities with their preference, and relative prices drive the market moving toward a long-run equilibrium. Markets should be therefore structured as the players compete by price and quality rather than in other ways. Any real market is just a sub-optimal deviation from the neo-classical ideal. The market stresses both the social and economic importance of individual initiatives, choices and consequent competition. Pro-market schools of thought believe that the market be "a system of economic freedom and a necessary condition for political freedom" (Friedman and Friedman, 1979: ix). It is claimed that transactions beneficial to two parties in exchange occur only when the exchange is voluntary. Freedom-to-choose enables individuals to cooperate with one another for the collective benefits. A competitive market forcefully facilitates efficient use of resources, and unrestrained demand-supply equilibrium mediated by free price mechanisms is an effective means of coordination for efficient production. Through the "invisible hand", free markets can maximize both individual and collective benefits, and coordinate a multitude of individual actors with complex priorities.

However, there are market failures and imperfections, and the market is not perfectly competitive. Issues like externalities, business cycles, and socially inequitable distribution are the classic examples of market failures. Non-rival and non-excludable public goods, though desired and valued, would not be provided by the market because of the free-rider problem. Olson (1965: 2) asserts that "unless there is coercion or some other special device to make individuals act in their common interest, rational, self-interested individuals will not act to achieve their common or group interests". Provision of rules to the public is as important a public good as social and physical infrastructure to the workings of the market. Economic well-being and social welfare thus cannot be secured by private, free transactions only. They also depend on public goods, law enforcement, and infrastructure provided by the state (Heertje, 1989). Rules, i.e. regulations, provide regularity with which a predictable and transparent system can reduce transaction costs, and therefore make market exchanges efficient. It is the market failures that prompt legitimate coercion of the state (Dunford, 1990; World Bank, 1992; Popkin, 1988).

Nevertheless, state intervention is not without its problems and negative implications. Although the state is the institutionalisation of sovereignty and authority that is empowered to enforce laws and attain social goals (Nettl, 1968), it likely provides the ground for potential rent-seeking (Krueger, 1974; Wolf, 1993). By regulating the market, the state likely generates rents. Regulations create opportunities for rent-seeking. Rent-seeking and rent-extracting are wasteful, which makes the market inefficient. Rent-seeking and excessive transaction costs plague many developing countries. At this juncture, market advocates claim that only the free-market forces should be able to enhance the welfare of society efficiently (Lal, 1983), and the state should be kept to its minimal role of protecting private property rights, enforcing private contract, and providing defence, order and justice (Buchanan, Tollison and Tullock, 1980).

The ideal type of *laissez-faire* markets guided by Adam Smith's "invisible hand" does not exist in reality because it is hampered by market failures. Market failures are obvious and inherent in the market of urban land because of its heterogeneity, low liquidity, high transaction cost, and location fixity. Externalities because

of interdependence between building sites are pronounced and market mechanisms alone are not able to internalise the costs/benefits of negative/positive externalities in the pricing of buildings. The adverse effects of negative externalities are not automatically compensated for through a market process and difficult to internalise without a third party to intervene, and then the community will bear the consequences. Because of free-rider problems, markets without state involvement would produce an inadequate amount of non-rival and non-excludable public goods. Public goods such as infrastructure, open space and greenery are necessary for the functional well-being of the city.

According to Block (1994), there is a single continuum regarding the state's role in the economy. "On one end of this continuum is the minimalist 'night watchman state' of classical liberalism; at the other end is a society in which the state has absorbed the basic tasks of economic production and distribution, largely eliminating the possibility for market transactions" (p. 691). Five "ideal types" of the state are identified as the public-goods state, the macroeconomic-stabilization state, the social-rights state, the developmental state and the socialist state, in a ranking from lowest to highest degrees of state control of the economy. Nevertheless, this categorization is deemed as the old paradigm. The new paradigm recognizes that "state action always plays a major role in constituting economies", and emphasizes "qualitative differences in state activity" (p. 696). Thus, the debate on issues of state versus market should be developed in the context of state constructing market. Between a truly laissez-faire minimalist state and a centrally-controlled system, there should be an option which combines independence and cooperation (Evans, 1995).

Property rights over land

Provision of public goods goes beyond the physical facet to the institutional dimension. With law and order, functioning of the land and property market is maintained and facilitated by an institutional structure that defines property rights over land assets and guarantees contracts between actors (Buchanan, 1977; Olson, 1982). Therefore, without proper order, which is provided through law and property rights, freedom-to-choose alone does not enable individuals to cooperate with one another for the collective benefits. Although there is no consensus, state regulatory intervention in the land market is well recognized as necessary in order to deal with market failures such as externalities, underproduction of collective goods, and information asymmetries. Planning controls, which attenuate the property rights over urban land by the state's control over development rights, are regarded positively in making the land market efficient, because coercive development controls provide the land market with certainties and order which are essential for maintaining market confidence (Pigou, 1932; Lai, 1999; Nelson, 1977; Brabant, 1991). By assigning rights and liabilities, the state may play a supportive role contributing to efficiency.

Efficient land-market operation is essential to maximize the potential delivery of affordable housing (Mayo, Malpezzi and Gross, 1986; Dowall, 1989). The land market is structured by institutions. Individuals and organizations behave and perform within a framework defined by institutions, which are regarded as a matrix of formal and informal rules of the game in a society (North, 1990). In a market economy, activities in the land market by autonomous firms and individuals are coordinated through prices, but functioning of the land market depends on a whole set of institutional conditions. In the East and South Asian countries, prevalent high population density suggests great land scarcity and consequent great externalities, which can generate enormous social costs. Externalities are internalized through the institution of property rights over

land. The structure of property rights has to be conducive to the achievement of land-use efficiency, or it can guide incentives to achieve internalization of externalities (Demsetz, 1967).

The subject of land transactions is not the land per se but essentially the interest in rights over the land. The structure of property rights therefore matter for the performance of land markets. Property rights are primarily a bundle of rights associated with ownership, which consists of the right to use, the right to derive income, and the right to alienate the rights mentioned above (Demsetz, 1967; Pejovich, 1990). Property rights are regarded essential in the governance of land markets (Fischel, 1985; Webster and Lai, 2003). Placing limits on the action of individuals and governments, assignment of property rights is thus crucial for the achievement of efficiency (Paul, Miller & Paul, 1994). A supportive system of property rights is imperative for development efficiency and growth where pursuing profit brings in innovation. In the case of open access to natural resources, individuals seeking personal gains will lead to a depletion of public resources as a result of over-consumption and under-investment, the so-called "tragedy of the commons" (Hardin, 1968). Nevertheless, in contrast to the commons, the anticommons is a situation where multiple owners have effective rights excluding each other from effective utilization of resources (Heller, 1998). Land redevelopment is often impeded by individual land owners' interests because of fragmented landownership. As a result, scarce resources tend to be under-utilized (Buchanan and Yoon, 2000).

Presence of fragmented land ownership: the anticommons

After many years in wars, housing, whether as social goods or private goods, is far from sufficient in Vietnam. The housing standard in Hanoi was 6 sqm per capita in 1954, and it declined to 4 sqm per capita in 1994. Thirty percent of Hanoi residents had less than 3 sqm per person (Boothroyd and Nam, 2000: 65). Vietnam has been transforming itself from a socialist centrally-controlled economy to a market oriented system since 1986 when the Doi Moi (renovation) policies were adopted. State provision of public housing has been terminated and replaced by a system of market-driven housing supply. According to a survey conducted by Hoang (2002), only 26.8 percent of the sampled households in Hanoi had inherited their housing or received public housing from the government. The remaining 73.2 percent of the households had to find their housing in the marketplace. The housing legacy left by the socialist welfare system only covers a small minority's accommodation needs. The majority of the populace has to seek shelter in an emerging market.

As a socialist country, Vietnam nationalized land resources in 1980. The 1980 Constitution stipulates that all rights in land are vested to the state, but the 1992 Constitution and 1993 Land Law changed that doctrine to 'people's ownership' and 'state management' (AusAID, 2001). What individual households obtain from the state is land use rights over the allotted land. According to AusAID (2001: 16-17), "land allotted for residential use conveys rights in perpetuity to transfer, bequeath, lease and mortgage", and "allotted land differs little from Western freehold estates". The institution of socialist land-use rights offers land holders de facto land ownership. In the context of great land scarcity, this institution creates numerous household owners of small land lots. A typical land lot in Hanoi for house construction is a 30 – 50 square-meter (sqm) rectangle, 3.5 – 4.5 meters wide and 10 – 15 meters long.

According to Table 1, households added 50 to 70 percent of total newly-built housing space in the 1990s. It seemed that developers were not able to initiate as many housing projects as to meet housing demand. Land acquisition and assembly are blocked by high transaction cost, when household's socialist land use rights

make people's ownership de facto private ownership. Resident self-built houses are usually two to three stories with 80 – 150 sqm of floor space on average. According to a survey of six major cities (Hanoi, Ho Chi Minh City, Hai Phong, Da Nang, Can Tho, Nha Trang) in the 1980s, single-storey buildings make up 75 percent of the total built-up residential area. If two-storey buildings are added, the total comes to 90 percent. The average number of stories of the stock of residential buildings was 1.86 in Hanoi (Trinh and Parenteau, 1991). Residential land resources are under-utilized in view of the high-population density.

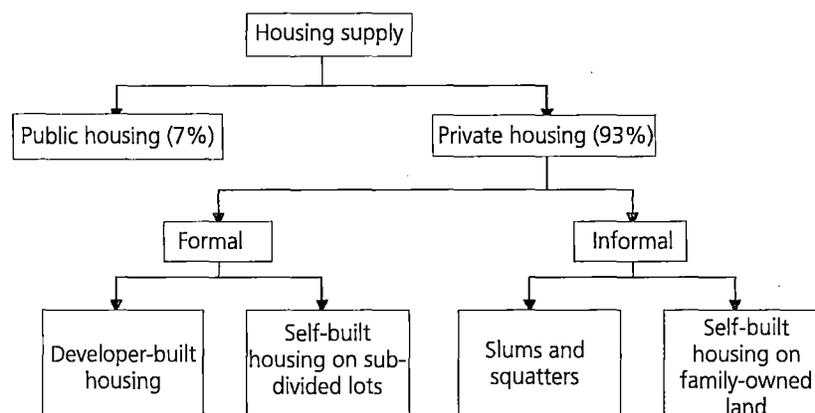
Table 1: Newly-built housing floor area in Hanoi by type of development

Type of Development	1990		1995		2000	
	m2	%	m2	%	m2	%
State-owned developer-built	44,341	34.2	9,800	3.9	82,128	13.7
self-built	66,550	51.4	165,200	65.7	410,405	68.7
joint-venture	6,010	4.6	66,849	26.6	104,977	17.6
other	12,587	9.7	9,699	3.9	0	0.0
total	129,488	100.0	251,548	100.0	597,510	100.0

Source: Hanoi Statistical Yearbook, various years

The low-income population usually suffers from housing shortages in developing countries. Because of poverty, it is reported that about one-third of Dhaka's population are squatters or live in slums. However, housing typically becomes a political issue if middle-income households can not afford decent housing of their choices, as housing is made of local materials and thus housing prices should be related to the local economy. Most of Dhaka's middle-income households do not own their housing and have to squeeze into small rented apartments usually shared with other families and the landlords. Dhaka's housing supply system (see Figure 1) indicates that public housing accounts for about 7 percent of the housing stock and the rest is private housing. However, the private housing market is dominated by small-scale self-built housing, rather than developer-built housing. Much self-built housing is often referred to as "informal housing", which does not observe building codes if there are any. "Informal housing is estimated to account for 84 percent of all residential units built in Cairo from 1970 – 1981" (Brennan, 1993: 83).

Figure 1: Housing system of Dhaka



According to a survey of Dhaka's housing development industry (Farzana, 2004), developers cited unavailability of land and high land prices as reasons for shortages of developer-built housing in the market. The majority of housing developers have to carry out development projects by forming a joint-venture with individual landlords, with the latter contributing land to the developments. The ratio of land cost to the total development cost can reach as high as 90 percent. From a survey of 150 developers' housing projects, a typical housing project is composed of 21.3 apartments on average, and 82 percent of housing projects have a site area less than 1,000 sqm (see Table 2)

Shortages of housing are caused largely by shortages of land supply. The supply of serviced greenfield land is

Table 2: land area of developer-built housing projects

Land area of housing projects (m2)	Number of housing projects	%
< 335	13	8.7
400 – 670	72	48.0
735 – 1,005	38	25.3
1,070 – 1,340	25	16.7
1,405 – 1,675	2	1.3
total	150	100.0

Source: Farzana, 2004

far less than the demand for it. The government is not able to extend infrastructure development with its paltry fiscal capacity, especially as Dhaka city is surrounded by large low lying areas susceptible to inundation. Worse, housing land in the urban built-up area that is already equipped with infrastructure and amenities is not used efficiently. Developer-organized housing developments are hampered by fragmented private land ownership. Large-sized housing projects are prevented from initiation by onerous, if not impossible, land assembly, which involves many landlords. Ubiquitous low density individual self-built housing shows that the scarce land resources are under-utilized.

In the context of high population density, fragmented private or quasi-private land ownership is responsible for rampant self-built housing in Dhaka and Hanoi. Exorbitant transaction costs make assembly of many small land lots the anticommons. The resulting self-built housing is not a sustainable mode of residential land development because of its under-utilization of land resources.

Absence of planning control: the commons

Because of small-sized land lots, self-built housing tends to ignore planning control guidelines in order to maximize built-up floor space and land utilization, which subsequently imposes externalities on the community. Self-built housing that does not observe building codes is also termed "informal housing", and is commonplace in developing countries. "Between 1992 and 1994 in Hanoi, for example, 2,700 permits were issued for housing construction, but 13,000 were being built without permission" (Smith and Scarpaci, 2000: 753). The neighborhood of informal housing is the commons where environmental amenities are over-consumed and thus land utilization is suboptimal. The commons emerges from an

absence of planning control, which generates substandard, inferior and deteriorating habitations. When the supply from housing markets and public housing cannot meet the demand, it is hard for the government to strictly implement planning control by rules imposed on the self-built housing market, which pursues maximization of individual interests. Demolishing illegal housing constructions means making residents homeless while there are severe housing shortages.

Urban Villages in China are enclaves of rural settlements within the urban built-up area, caused by rapid urbanization since the 1980s. Because of the historical dichotomy of rural and urban entities, urban land is owned by the state, whereas agricultural and village land is collectively owned, which creates considerable ambiguity in many circumstances. Urban Villages are thus the enclaves of land collectively-owned surrounded by state-owned urban built-up areas.

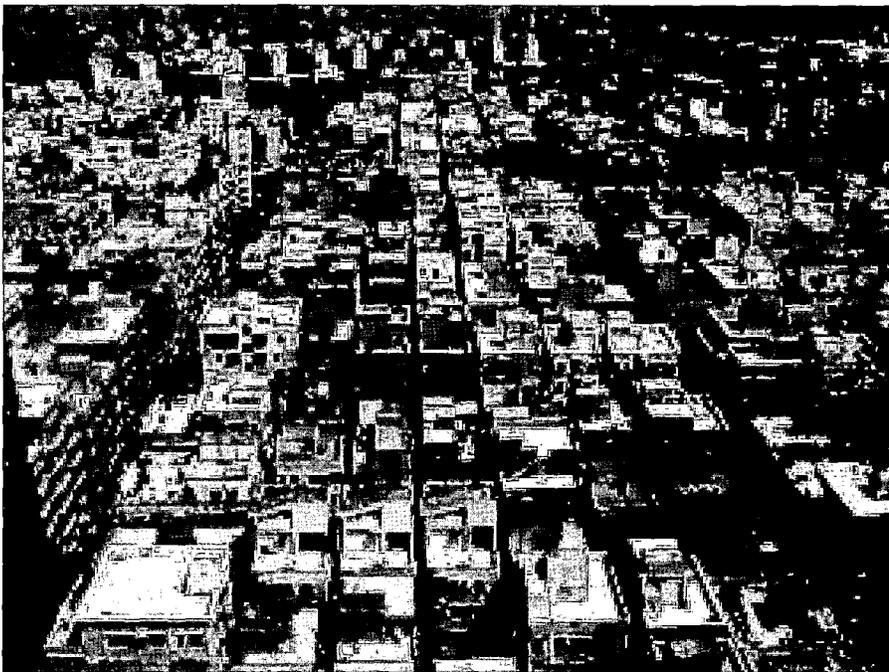
Urban Villages are composed of land parcels of "homeland" for those peasants to build houses for their own accommodation. Housing parcels are arranged and allocated in such a manner that building plot ratios should be less than 1.0, building height less than 10 meters, and site coverage less than 40 percent. Having seen a rising demand for housing from migrants who came to search for jobs in the newly opened special economic zones, villagers in Shenzhen and Shantou realized that the land they were sitting on could be utilized to build apartments. Spontaneously, villagers started to construct apartment buildings that were much bigger than their families actually needed on the parcels of "homeland", with an expectation of leasing extra housing space to the market. According to a survey carried out in 1999, 91.2 percent of 553,747 residents who were living in the Urban Villages of Shenzhen were temporary migrant tenants. In its Futian District, Urban Villages provided rental housing space accounting for 68.4 percent of the total in the rental market.

Without land use planning, or without implementation of it, building plot ratios usually reach about 3.0, and site coverage between 60 and 80 percents. Infrastructure and amenities are provided at a minimum level. Only about 10 percent of land is used for social facilities, greenery and open space, while the planning regulations require that the use of 25 – 35 percent of land in the city for those purposes. Illegal constructions encroach upon open spaces, minimizing the space between buildings. On some occasions, the distance between buildings is as short as one meter, where residents can literally shake hands across the space between two adjacent buildings. Thus, a well-known term "shaking-hands building" has been coined. Chaos and disorder arise and hazards seem ubiquitous (see Figures 2 and 3). Urban Villages are synonymous with inferior residential quarters; some are degraded to slums. Although in different settings, Urban Villages are more or less epitomized by the Kowloon Walled City in Hong Kong, which was a notorious high-density lawless slum.

Figure 2: "Shaking-hands buildings" in an Urban Village



Figure 3: Urban Villages



An important and profound question remains unanswered. Although there is a demand for low-quality, affordable housing in the market, Urban Villages could cater for a demand for good standard housing that observes building codes, as do the surrounding areas (see Figure 4). Empirical evidence shows that at similar locations where land-use planning and building codes are in force, housing prices and rentals are 3 – 5 times of those in Jingsha Urban Village. Apparently, the "highest and best use" of the village land has not been achieved.

Figure 4: A developer-built housing estate in the vicinity of Urban Village



Building excessive floor areas imposes negative externalities of deterioration of nature ventilation and reduction of sunlight exposure on the neighboring sites, but it is at little cost to the developer who owns the developed space with extra asset value. The right to avoid such negative externalities from development in the neighborhood does not exist. Possibly impeded by prohibitively high transaction cost, there are no mechanisms for collective actions such as merging neighboring sites¹ in order to maximize development potential. Having seen the individual benefit, neighbors follow suit. The similar externalities generated consequently diminish the asset value of housing space developed earlier. When everyone else follows suit in the neighborhood, negative externalities increase and worse, and the asset value of developed housing spaces drops on aggregate. The damage of negative externalities to neighboring sites is costless to the inflictor initially, which then gives incentives to all land owners to do the same. Because of the commons existing in the land development market, failure in internalizing externalities inevitably produces suboptimal utilization of land resources.

Between 1991 and 1996, roughly 300 housing blocks with total floor areas of 120,000 m² were built in Jingsha. Up to 1998, 1,067,000 m² had been constructed on sites totaling 36.3 hectares with a plot ratio of

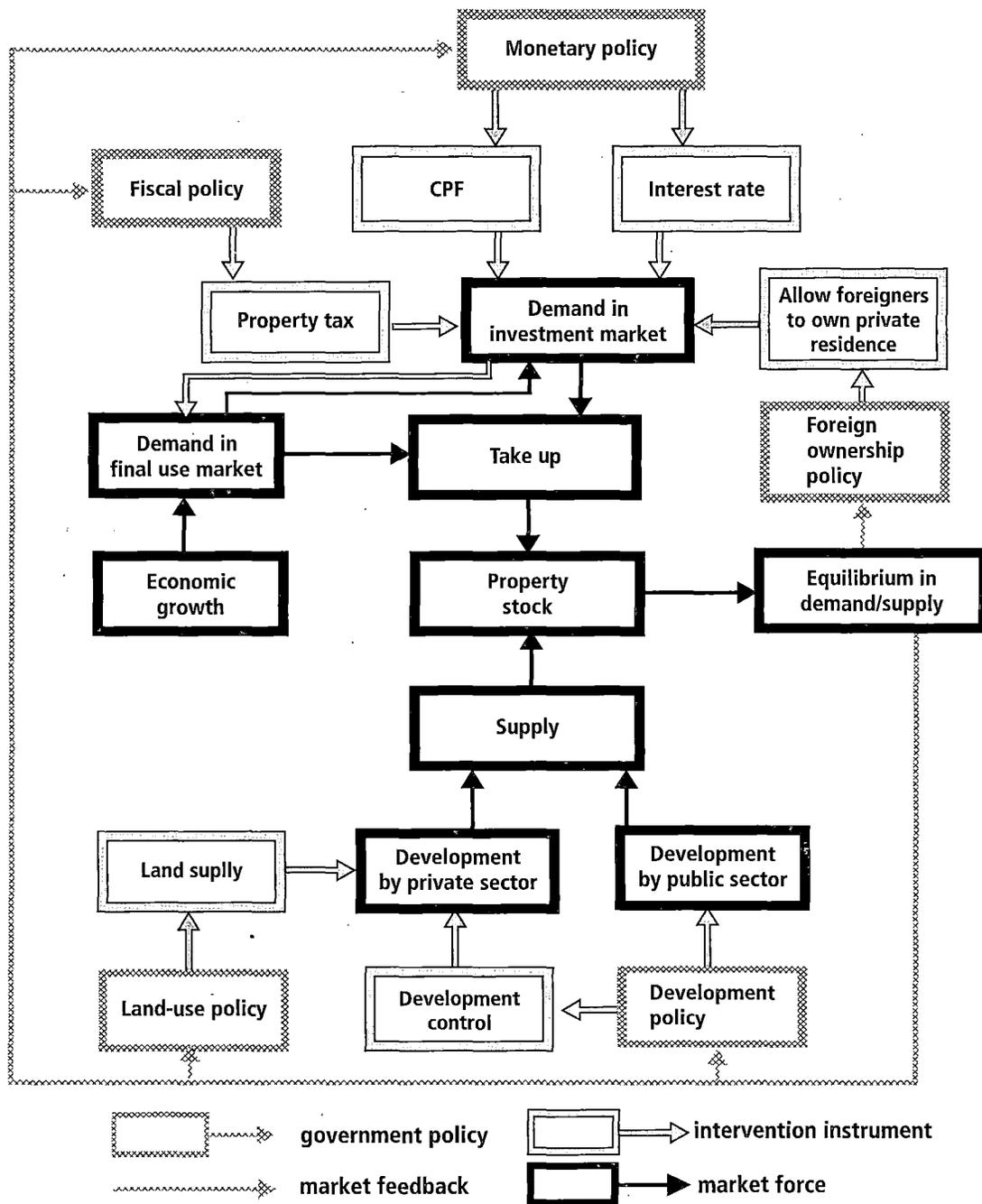
¹ Because of land scarcity, the size of "homeland" plots allocated to households is as small as 140 square meters.

2.94 and site coverage of 59 percent. Population density reached 931 residents per hectare, much higher than the record of 596 residents per hectare in the old downtown of Shantou. Over-development devalues housing spaces. Devalued housing in Jingsha cannot command rentals as high as those charged by neighbouring housing estates which are built according to planning codes. Jingsha housing owners have to cater for the lower rungs of the housing ladder. Jingsha has become a heavy concentration of low-income migrants who accounted for 52 percent of residents (1995). The high proportion of migrants contributes to social disorganization, which invites criminal activities in a disproportionate scale; 226 arrests were made of prostitutes, gangsters and drug-dealers in the year 1996 alone. In effect, the Jingsha Urban Village has virtually turned into a quasi-slum. In developing cities, there are always demands for low-quality and substandard housing because of urban poverty. Slums are therefore a product of the market. However, without a state exercising a third-party role, uncertainty in the emerging land market gives rise to myopic views of individual land "owners" and failures in coordination. . As a result, land value in Urban Villages is not maximised as it would be in well-functioning markets, and Urban Villages are reduced to seedy settlements for the urban poor. In summary, fragmented land ownership and housing shortages join to make the housing land development market the commons.

Good practices from Singapore and China

The developmental state is the paradigm dominating the phenomenal growth of East Asian economies (Johnson, 1982; White and Wade, 1988; Woo-Cumings, 1999). As "a plan-rational economy with market-rational political institutions" (Johnson, 1995: 28), the developmental state plays an active and strategic role in guiding market forces to achieve the goal of economic growth. There is the "visible hand" omnipresent in Singapore's economy. Singapore's developmental state has exerted fairly heavy controls over its economic development since 1965 when it gained its independence. The general market, as well as the land market, is profoundly constructed by the developmental state. As property rights are defined by the state in the form of statutory land use planning, compulsory land acquisition, and land leasing, the free market of housing development is heavily restrained by the government (see Figure 5).

Figure 5: Institutional framework for Singapore housing provision



Source: Zhu (1997)

Kaye (1960) described the living conditions of a typical street in 1954 Singapore as among the most primitive in the urban areas of the world. In 1953-54, 73 percent of surveyed households lived in badly overcrowded conditions (Goh, 1956). "In 1960 one quarter of a million people lived in badly degenerated slums in the city centre and another one-third of a million lived in squatter areas on the city fringe" (Teh, 1975: 5). The total population in 1960 was 1.6 million. By 1985, 84 percent of households lived in public housing estates.

The figure rose to 86 percent by 1995 when on average every housing unit accommodated 1.02 households, with 20 sqm floor space per resident.

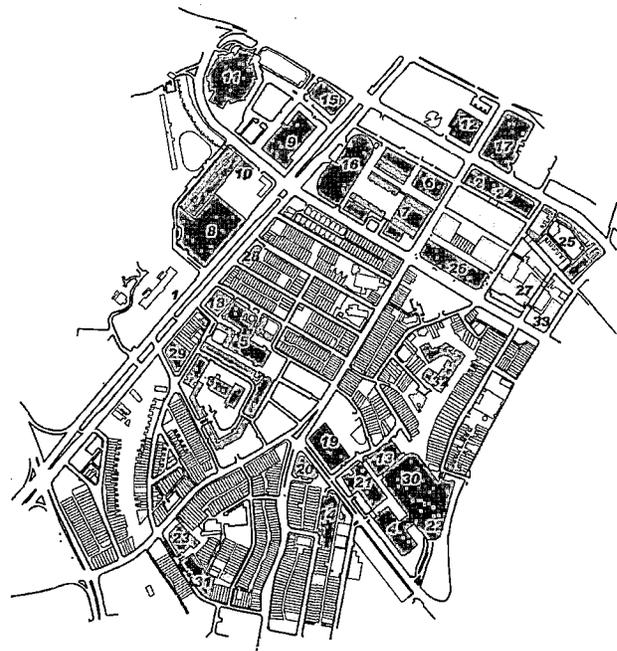
Two institutions have been important in Singapore's housing achievements: the Central Provident Fund (CPF) and Land Acquisition Act (1966). CPF started as a retirement fund. The public housing development agency borrowed funds from the CPF for its development expenditure budget in the early stage when the government lacked a budgetary surplus. Singaporeans also use their CPF savings to purchase public and private housing. Given the highly-limited stock of land - 680 sq km, potential speculation resulting from rapid economic growth, was effectively checked. Under the Land Acquisition Act, 176.91 sq km of land were acquired from the private landlords from 1960 to 1984, 27.7 percent of the total land area of the Republic (Straits Times, 18 October 1986). As the largest land owner with a capacity effectively to dominate land supply, the state owned 76.2 percent of land in 1985, up dramatically from 31.0 percent in 1949 (Motha, 1989). Land resources are thus controlled by the state to a great extent in Singapore. Compensation for acquired land before the 1990s was set at the prevailing market value as at 30 November 1973.

The redevelopment of Chinatown, Singapore, during 1960 – 2000 is illustrative. This enterprise was not merely dictated by the free market where the "invisible hand" managed the demand and supply (see Figures 6 and 7). It was also substantially regulated by the state that defined the property rights over land and buildings. There were four prominent means by which the land market was structured in its property rights: rent control, compulsory land acquisition, state sale of sites, and conservation planning.

Figure 6: Singapore's Chinatown in the 1950s



Figure 7: Singapore's Chinatown in 2002



China's economic reforms since the late 1970s have brought about tremendous changes in the country. The most significant change has occurred in the economy, which has demonstrated a remarkable growth in GDP at a rate of about 9 percent per annum on average since 1978. Market orientation and opening-up to the world are two key factors underpinning the economic miracle. As a transitional economy, China is changing from central control to market orientation. As the leading paradigm for the development of East Asian capitalist economies, the developmental state places a top priority on economic development, productivity and national competitiveness. In order to achieve these goals, the state actively intervenes in the economy by guiding, disciplining, and coordinating the market. The State's involvement in the economy and its success are ensured by rational and competent bureaucrats who are insulated from political and social interests (Evans, 1995).

During the centrally-controlled planning era, urban housing was taken as socialist welfare distributed to workers, but the government could not provide enough housing to the urban residents. State investment in public housing as a proportion of GDP averaged only 0.78% from 1949 to 1978. Acute housing inadequacy was basically, on the one hand, caused by underinvestment in housing for a long time. As the state was the sole supplier of urban housing, housing provision was at the mercy of state plans, and housing conditions would not improve as long as housing investment remained low on the government's agenda. On the other hand, an absence of housing markets, and thus prices led to inequalities in distribution because housing welfarism de-linked housing demand from affordability and excluded pecuniary contribution from tenants. Urban housing problems were exacerbated by continuous negligence and became a crisis in some places where underinvestment led to a severe housing shortage. Insufficient rental income resulted in poor maintenance of the existing housing stock, and inadequate housing investment gave rise to a widespread deterioration of housing conditions in many Chinese cities. One-third of urban households were officially categorized as being in overcrowded conditions.

Over 30 years before 1979, the housing stock in Shanghai, the largest city in China, only increased by 58 percent, despite city GDP expanding by 6.7 times and urban population growing from 4.2 million to 5.8 million. According to a population census conducted in 1982, 47.6 percent of urban households in Shanghai had housing problems to various degrees, i.e. poor housing qualities such as dilapidated structures and lack of amenities, overcrowding and homelessness. 25.1 percent of households were virtually homeless as they temporarily lived with their parents or relatives while waiting for government assignment. About half of the total housing floor areas were sub-standard without necessary facilities. As a result, urban slums re-appeared as unfortunate urban residents who were not properly accommodated by the public housing built temporary and informal shelters to cope with their basic housing needs.

The housing reforms aim to put an end to the state provision of urban housing. Housing commoditization and privatization and decentralization of housing provision are two thrusts in parallel of this significant change. The tenets of housing commoditization are to make maintenance of existing housing stock commercially viable on the one hand, and to commercialize housing development for the new supply on the other. It is recommended that housing development and maintenance be regulated by market mechanisms. Housing reforms have been proved a success. During 1953 – 1978, there were only 17.56 million sqm of housing constructed in Shanghai, whereas 85.88 million sqm of housing were supplied to the market during 1979 – 1995.

Thus, Shanghai's housing development and provision in the 1980s and 1990s are an example of success. Commoditization or privatization has resulted in an increasing share of private housing supplied to the

market over the years, and private housing has become the norm for housing supply since the late 1990s (see Table 3). State land ownership and private condominium ownership is the typical pattern of most of this development. This mechanism has allowed the state to continue to play a significant role in the evolution of real estate markets, while also fostering a functioning housing market.

Table 3: Housing provision in Shanghai central city (1982 – 2000)

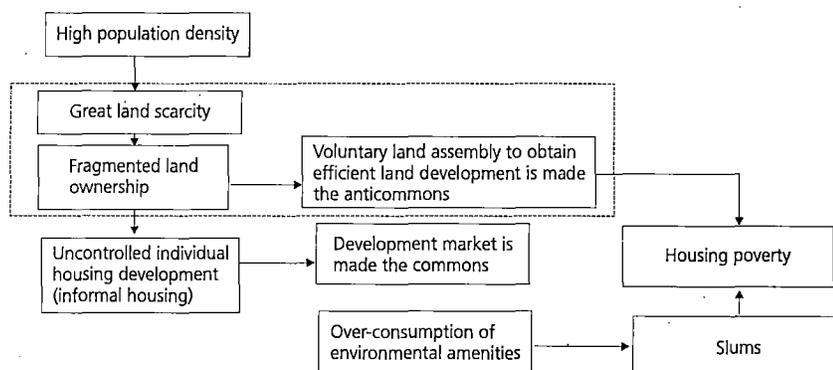
Year	Annual housing supply in floor area (1,000 square meter)				
	total	public housing	as % of total	private housing	as % of total
1982-83	7456.1	7456.1	100.0	0.0	0.0
1984-87	17750.5	17361.4	97.8	389.1	2.2
1988-91	16755.1	14065.3	83.9	2689.8	16.1
1992-95	32050.2	21059.2	65.7	10991.0	34.3
1996-99	62294.2	15897.5	25.5	46396.7	74.5
2000	14573.5	693.3	4.8	13880.1	95.2

Sources: SMBS, 1990a – 2001a; SMBS, 1989b – 2001b

Conclusion: the state is critical in the creation of a functioning market

In high-density Asian developing countries, because of the tragedies of the commons and anticommons in the housing development market, a vicious cycle locks in housing poverty (see Figure 8). The key to the breaking of vicious cycles is, from the development experience of the “Asian tigers”, to have an effective state, so-called developmental state, in the creation of a functioning housing market. In those countries of the Asian tigers, market provision of housing has become a virtuous cycle where supplies respond to demands. Public ownership of land is not a bad idea for China, Hong Kong and Singapore. Through compulsory land acquisition, the Singapore government has become the largest land owner of the country (more than 80 percent). Private leasehold and condominium ownership are the norm in Singapore and China. The state, as the third party maintaining rules and order, must be credible in the delivery of public goods and social goods in the first place. One of the preconditions for the orderly and timely redevelopment of Singapore’s Chinatown was that sufficient public housing was provided to the existing residents, which effectively reduced individual owners’ pressure to redevelop their housing lots without coordination. Thus, one of the most important roles for the state is to reform the structure of property rights over land in order to prevent the tragedies of the commons and anticommons.

Figure 8: Vicious cycle in the housing market leading to housing poverty



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Part VI

DEVELOPMENT ON THE URBAN FRINGE AND THE CITY CENTER, AND THE ENVIRONMENT

Introduction

Bruce W. Ferguson

Post Modern Urbanization and the Vulnerability of the Poor

Jelena Pantelic, Bogdan Srdanovic, and Marjorie Greene

Cities with Suburbs: Evidence from India

Kala Seetharam Sridhar

Urban Sprawl, Land Markets and Environment Degradation

In Sao Paulo, Brazil

Haroldo Torresl, Humberto Alves, and Maria Aparecida de Oliveira

Private Residential Investment Growth: Implications on Municipal

Revenues and Socio-Economic Indicators: The Case of the

Municipality of Pilar

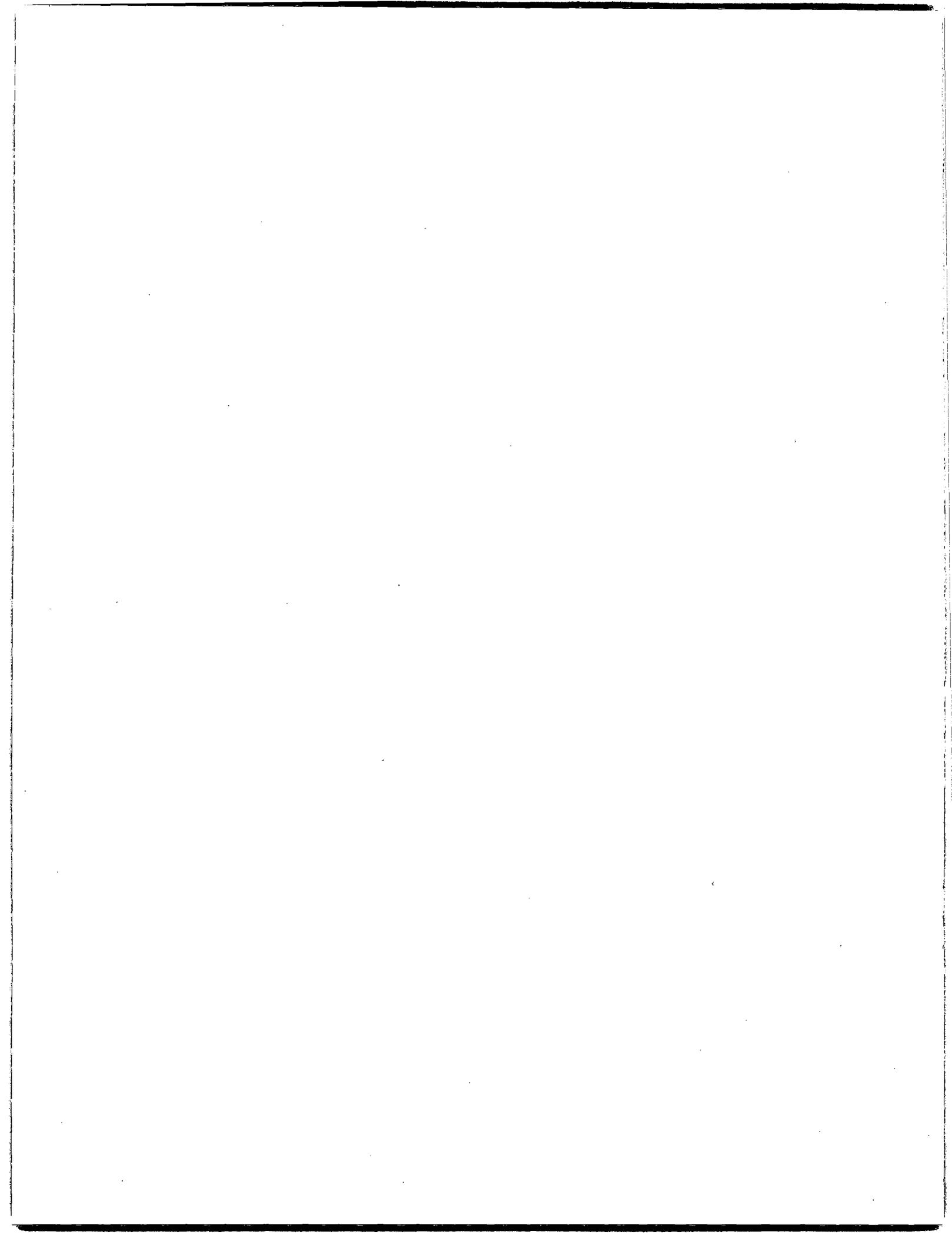
Cynthia Goytia

Urban Development in Developing Countries

Anamaria de Aragao Costa Martins

Vacant Areas in Guadalajara, Mexico: A Profile of Property and Owners

Adriana Fausto Brito



INTRODUCTION TO SECTION VI

DEVELOPMENT ON THE URBAN FRINGE, THE CITY CENTER, AND THE ENVIRONMENT

Bruce Ferguson

Virtually all net growth¹ of the world's population until 2050 is projected to occur in urban areas of emerging countries. In effect, relatively poor countries will have to build the equivalent of a city of more than one million people each week for the next 45 years (J. Cohen). This challenge involves doubling the amount of urban infrastructure investment on the planet in the next half century. After that, if population growth rates continue to decline as they have since 1970 (from 2.1% per annum to 1.2% today), world population will stabilize.

The ecological impact of this expansion of cities over the next half century forms part of a global environmental crisis that biologist E.O. Wilson of Harvard University has called "the bottleneck" – a period of maximum stress on natural resources and human ingenuity (Musser): "Depending on how we manage the next few decades, we could usher in environmental sustainability – or collapse."

The ecological impact of cities begins with their location. Many major cities were established in regions of exceptional agricultural productivity – such as the floodplains of rivers – or in coastal zones and islands with favorable access to marine food resources and maritime commerce. These sites now greatly magnify the environmental consequences of growing urban populations. Many cities – especially in emerging countries – have expanded in area rather than increased their density, using the fertile agricultural land around them. If cities double in area by 2050, urban areas will go from occupying 2% to 3% of ice-free land to 6%, thus consuming a considerable part of the 10% to 15% of the land considered arable (Musser). The rivers, seas, and – even – oceans – on which these cities sit face a growing challenge from urban waste. These sites also increase the vulnerability of large urban populations to natural disasters, which global environmental problems are making increasingly frequent.

The tendency of most cities to expand on the fringe rather than densify increases travel times and congestion, and – thus – has implications for global warming. Emissions – particularly carbon dioxide – from internal combustion engines have contributed importantly to an increase in fossil-fuel emissions (from under 1 gigaton of carbon at the start of the Industrial Revolution in the early 1800s to over 7 gigatons today – Musser). The export to and adoption of relatively high-polluting automobile technologies to China has exacerbated this problem.

The papers in this anthology's sixth and final section deal with growth on the urban fringe, densification of existing areas and redevelopment of central cities, and the environmental consequences. In the first paper, Pantelic, Srdanovic, and Greene note that the distinct features of the urbanization of the past twenty years constitute a "post-modern" period. The number and population size of the largest urban centers – the "mega-cities" – concentrated in the developing world are growing, but those of medium-sized cities are increasing even faster. The emergence of large city regions is blurring the distinction between "urban" and "rural" (Scott,

¹ With the exception of the U.S., the one developed country where population and urban growth continues at moderate rates, largely because of immigration to that country from developing countries.

Agnew, Soja, and Storper). Joined with high levels of internal migration, these trends contribute to social and spatial segregation of the rich and poor. This segregation increases the vulnerability of the poor to disasters of all types – natural (mudslides, tsunamis, earthquakes, floods, etc.) and man-made (failure of sanitation and drainage systems, unconsolidated solid waste dumps etc.). The flash floods, landslides, and mudslides in Rio de Janeiro in 1988, Algiers in 2001, and Caracas in 2001 (in which upwards of 10,000 people were buried underneath mudslides) are cases in point. The authors conclude that this spatial fragmentation and polarization of the city is causing serious breakdowns in the management of the urban system and that the city itself has become an agent of disaster vulnerability.

The second paper (Sridhar) examines the suburbanization of newly-prosperous Indian cities. Its causes resemble those of suburbanization in developed countries (U.S., Canada, Western Europe) including “flight from blight”, the desire for a piece of the countryside in town, and the natural evolution of metropolitan areas from higher to lower negative density gradients (see discussion in the Introduction to Section IV). In addition, the telecommunications revolution – of particular importance to India’s many call centers - increasingly allows companies and their employees to locate outside traditional hubs and centers and – even – half the world away from their main customers.

Torres analyzes urban sprawl in Sao Paulo and its environmental impact. Falling population growth rates of this metropolitan area had created expectations for a reduction in the needs for infrastructure spending. However, accelerating sprawl has dashed these hopes as peripheral areas continue to expand at high rates – over 5% per year – and at low densities while the city center is losing population. In contrast to the suburbanization of the U.S. and Western Europe, the poor rather than the middle and upper-class account for the great bulk of the growth on the urban fringe. This expansion threatens major environmental damage to remaining tropical forests and the watershed of this metropolitan area.

The fourth paper of this section (Goytia) examines the polarization of development on the fringe in Pilar, a municipality in the northeastern corner of the Buenos Aires metropolitan area. Pilar has recently experienced a boom in upscale development in the form of gated communities. As in the suburbs of Los Angeles, Bangalore, and elsewhere, the affluent of metropolitan Buenos Aires increasingly wall themselves off from the problems of the rest of the city. Ominously, this upscale growth has failed to increase municipal revenue, and – hence - resources for reducing gaps in services and infrastructure with the low-income areas of Pilar.

Indeed, the polarization within the societies and cities of emerging countries has reverberated through international real estate markets. Forbes Magazine notes that “a new class of wealth” from “Russia, China, and Brazil” is driving the market for the most expensive homes in London, as well as Istanbul and Hong-Kong with prices over US \$100 million – such as an English palace with 103 rooms and five swimming pools.

Thus, from many perspectives, urban policies should promote higher density and the redevelopment of central-city areas. However, such “smart growth” (Katz) is difficult in emerging countries. The final two papers of this section examine these problems. Aragao Martins investigates the redevelopment experience of Paris and Barcelona, and compares it with that of Sao Paulo. In principle, re-use of central-city areas where infrastructure already exists would seem to have lower costs than development on the urban fringe, which requires infrastructure extension and new services of all kinds. In practice, however, redevelopment is usually more costly. Under- or unused central areas are often large former industrial or commercial sites that lack a grid-iron subdivision and – thus - internal distribution lines and infrastructure networks, which must be

provided. The old existing infrastructure also often requires upgrading. In addition, these sites are frequently polluted – i.e. “brownfields” – and require cleaning and environmental mitigation. Central land values are high. As a sum result, redevelopment typically provides housing for the middle and upper class rather than low-income families, whose main option continues to be locating on the fringe or renting in dense, centrally-located informal settlements.

The final paper (Fausto Brito) examines the densification of Guadalajara – Mexico’s second largest metropolitan area. Large under- or unused parcels constitute 18% of the existing urban area – a considerable amount. However, using this land is not easy. The U.S. and Western Europe have developed institutions and a legal framework for redevelopment - from Haussman’s creation of the grand boulevards of Paris in the late nineteenth century to the redevelopment districts, tax-increment financing, and public-private partnerships that have served to capture a portion of the value created by public investment in densification and to transform many U.S. downtowns today. Such mechanisms are only at an incipient stage in Guadalajara, although some other Latin American cities (e.g. Buenos Aires, Quito, Bogota) have advanced further in downtown redevelopment.

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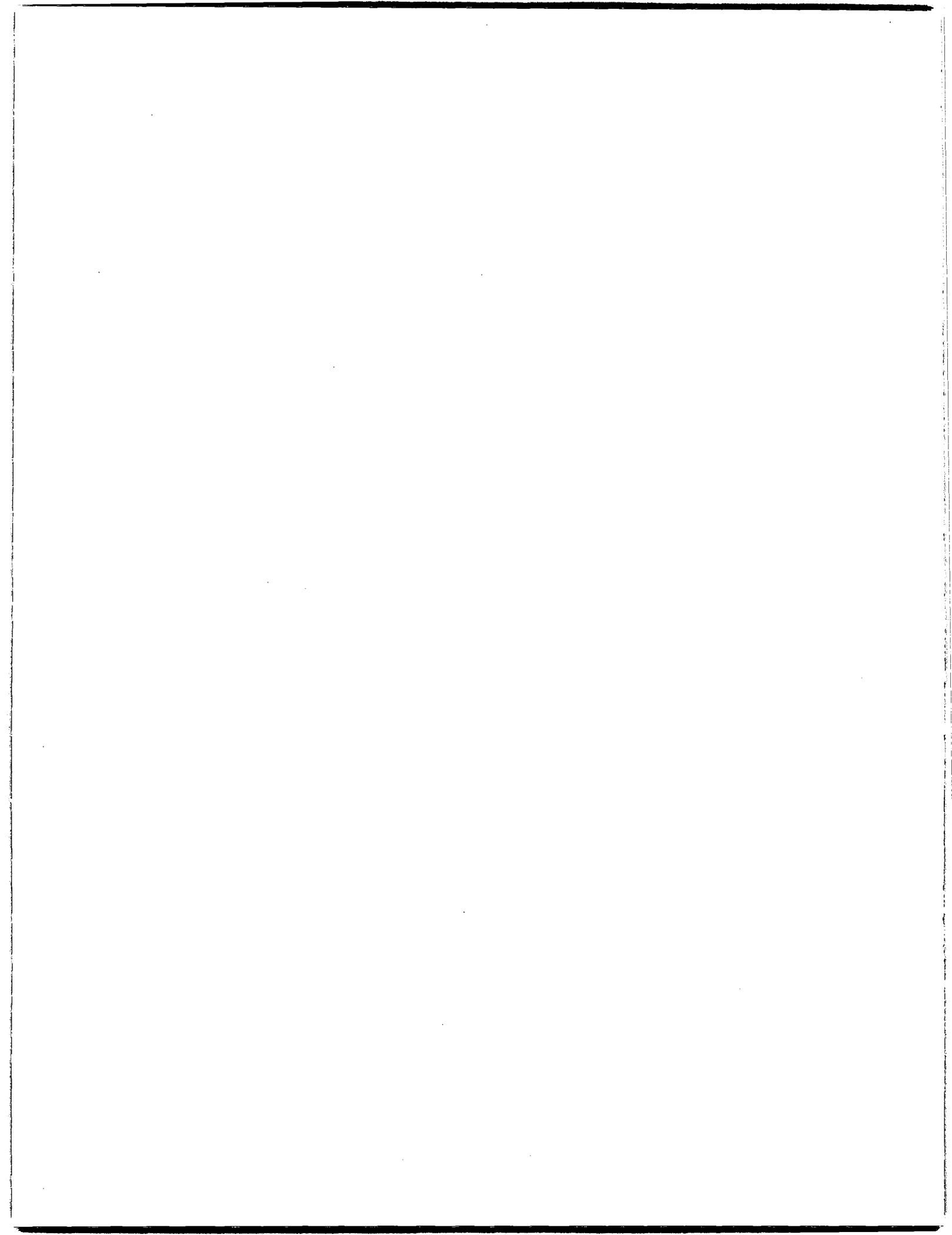
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POST MODERN URBANIZATION AND THE VULNERABILITY OF THE POOR¹

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Abstract

With globalization, industrial restructuring, and new breakthroughs in information and communication technologies, postmodern urbanization has entered a new phase. New patterns of urbanization are emerging both in the industrialized countries and the developing world, increasingly characterized by metropolitan regions. The new urban model, which bridges the distinction between the rural and the urban, is particularly important for the developing world, where the growth of cities has been the greatest. Casting a relief of sharply increasing inequality, postmodern cities bring about social fragmentation and spatial segregation of the rich and the poor. The latter live in urban slums located in hazard-prone locations, such as flood plains, hills exposed to landslides, or unconsolidated garbage dumps, and characterized by overcrowding, poor housing and drainage, inadequate access to basic services, insecurity of tenure and haphazard land-use patterns. This paper is organized around the key notions of exposure and susceptibility of people to hazards, and environmental degradation of hazard-prone areas, and shows how postmodern urbanization and its attendant fragmentation and polarization exacerbate the vulnerability of urban residents, disproportionately so of the poor. In order to contain the growing risks in the urban environment, the direction of urban development needs to be reassessed and policies and programs created to address the growing vulnerability crisis.

Introduction

Most urban researchers and practitioners agree that the urbanization of the “postmodern” period of the past twenty-odd years has entered a distinctly new phase. Under the inevitable influence of industrial restructuring, globalization and new breakthroughs in information and communication technologies, new patterns of urbanization are emerging both in the developed countries and in the parts of the world that, until recently, have been known as the Third World. Large urban centers are still growing but not as fast as the secondary cities that have seen an unprecedented growth in the past two decades. At the same time, this new global urban society is experiencing serious internal breakdowns due to the sharply increasing inequality. Social fragmentation due to extreme income disparities produces spatial fragmentation as urban elites around the world carve out their own secluded separate communities while abandoning the rest of the city to decay.

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In this paper we intend to show how this fragmented and polarized urban environment aggravates the vulnerability of its inhabitants to a variety of natural disasters. The purpose of this analysis is to draw attention to the ever-increasing vulnerability of the urban population across the world, especially of the poor in developing countries, the most vulnerable group in any disaster.

Postmodern Urbanization

Postmodern urbanization is characterized by the group of the largest urban centers of the developed world, the so-called world cities (Hall, 1966). They have been joined by a number of large Third World cities both in terms of size and their importance as command centers of the new global economy. This spatial dispersal of global cities is indicative not only of high levels of urbanization in the newly developing nations, but also of the dispersal of economic activity around the world (Sassen, 1991).

New urbanization produces not only a growing number of mega-cities but is also changing the internal structure and the dynamics of an urban area. The emergence of large conurbations or, as Scott (2002) calls them, *city-regions*, introduces new forms of urban organization distinct from the traditional center-periphery model. The rise of *edge cities* (Garreau 1991), as newly created or absorbed existing settlements, and their integration into a sprawling fabric of a decentralized urban region highlights this internal restructuring of the traditional city. Urban sprawl in many rapidly growing Asian cities has transcended the urban-rural boundaries, integrating large regions into an extensive urban network. McGee (1991) named this urban model *desakota* to underline the blurring of the differences between *desa* and *kota*, i.e. village and town, respectively in Bahasa (the national language of Indonesia).

The processes of urban and regional development we mentioned are particularly significant for the so-called developing countries, where the growth of urban areas has been the greatest. Many authors have tried to draw a distinction between two kinds of development dynamics present in the Third World. Geyer (2002) distinguishes between really "developing" and "lagging" countries where the urbanization patterns in the former mimic those of the developed world, with high concentrations of advanced economic activity in a few rapidly developing urban centers. The urbanization in the "lagging" countries is still dependent on the massive migration of the poor from the countryside, and has also been characterized as urbanization without growth (Davis 2004). It should be pointed, however, that these opposing dynamics operate in conjunction in most third world cities, and that the only difference between the "developing" and "lagging" countries' urbanization is the relative prevalence of one or the other.

The interaction between urbanization based on rapid industrialization on the one hand, and the high levels of internal population migration, on the other, usually produces high levels of social segmentation that is reflected in the spatial segregation of the rich and the poor (Scott et al. 2002). The divisions between various city quarters are becoming more pronounced as each quarter becomes more and more separated from its surroundings (Marcuse and van Kempen 2000). Such spatial divisions are not only a product of prevailing social and economic relations, as Marcuse and van Kempen point out, they help create and reinforce those divisions. Balbo (1993) describes this "city of fragments" as a place where each fragment appears to live and function autonomously with "what it has been able to grab in the daily fight for survival" (pp. 24-25). The modern public spaces of the streets are increasingly being abandoned to the homeless, while the spaces for the rich turn inwards. Describing the polarization in Sao Paulo, Teresa Caldeira (1996) observes that: "fragmentation

enforces separation and expresses not simple differences but irreconcilable inequalities" (p. 65). This is increasingly becoming the prevalent image of large cities the world over, including some of the largest cities in industrialized nations where the growing inequality and growing fragmentation of urban life reflect the ever widening gap between the rich and the poor.

While the majority of the poor populate shantytowns and slums, the upper and middle classes live in sanitized residential communities, separated from the rest of the city, surrounded by fences and frequently protected by armed guards. While this social and physical fragmentation is more visible in large cities, it is actually present everywhere, especially in the rapidly rising regional and subregional urban centers that have seen the most significant growth in the past two decades (Baeninger 2002, Richardson et al. 2002, Aguilar and Graizborg 2002, Mukherji 2002).

Agents of Vulnerability

Vulnerability to disaster usually refers to the ability of an individual or a group to prepare, respond, cope and recover from a disaster (Blaikie et al. 1994). It is determined by a variety of social, economic and political factors, which define individual's or group's status, position and power in society. It also has a distinct spatial dimension, as people with similar characteristics tend to settle in the same or similar areas (Wisner 2003). It is important to emphasize the fact that the concept of vulnerability is not simply a function of exposure to hazard risk, but also of people's capacity to deal with that risk and adapt to the changing circumstances. Therein lies the importance of and indeed the inseparability of the social and spatial dimensions of vulnerability, which, we shall argue, have been increasing as a result of the urban developments in the past decades.

The individual factors that define vulnerability cannot be identified and analyzed independently from each other. Frequently they act in conjunction with each other as evidenced in the observation by Simpson and Riehl (1981) who attribute a sharp rise in losses due to hurricanes to "the increase in the property-at-risk that has accompanied the migration of population to seashores. The lack of effective land-use regulations and building practices in coastal zones significantly increases the hurricane damage potential. In many areas, protective dune lands at the oceanfront have either been removed to facilitate land development or have become the platforms upon which small structures have been erected without the foundational support of penetrative pilings. Either action reduces natural protection afforded by the dunes and increases the potential for property losses" (pp. 21-22).

In order to systematize the review of the effects of urbanization on disaster vulnerability, we shall adopt IADB's (Charvériat 2001) concepts of the main factors that characterize vulnerability: (a) Exposure of people and assets to hazards; (b) Susceptibility of people and assets to disasters; and (c) Environmental degradation of hazard-prone areas. We intend to show that all three factors that define vulnerability have been magnified as a result of "postmodern" urbanization.

Exposure Factor

Throughout the history one of the functions of cities was to provide safety and protection to its inhabitants from the onslaught of invaders or pest and pestilence. The concentration of wealth, knowledge and power in great cities made it also possible for the construction of some of the greatest projects to protect people and property from the vagaries of nature. Drainage and irrigation were the first mitigation projects designed to

serve and protect ancient civilizations. To this day, cities have continued to employ their vast resources and greatest technological advances to protect themselves from hydrological, meteorological and geological hazards (Mitchell 1999). It is only in the past few decades that a concern has emerged that the present urbanization with all that it engenders might not be able to manage increased risk from natural and other hazards without major changes in the policy and the practice of urban management. Postmodern urbanization not only exacerbated many of the traditional urban development processes that contribute to vulnerability, such as the spread of slums and the decay of old or undesirable neighborhoods, but it also changed the way urban space is developed and managed, creating thereby new agents of vulnerability. The reality of new economic imperatives has forced city authorities to reconsider their priorities. Prudence and safety concerns have become casualties of the cost-conscious development strategies. Even in highly industrialized nations like Japan, the high cost of urban land in Tokyo encourages overcrowding, restricts open space and pushes new developments onto hazardous, low-lying land, filled and reclaimed from the Tokyo Bay (Mitchell 1999). In Kobe, the sixth largest city in Japan and, together with Osaka, one of the centers of the Hanshin metropolitan region (second in economic importance in Japan, rapid urban growth caused unprecedented demand for residential land, which led to city's expansion inland and outward into the sea. Soil was taken from the tops of the mountain to reclaim coastal land for commercial and residential development. These areas were the hardest hit in the 1995 Great Hanshin Earthquake, which devastated the city of Kobe (Ikeda and Yamaki 1998).

The concept of exposure to hazards has always been the primary and frequently the only gauge of vulnerability to disasters. It denotes the presence of people and assets in locations considered hazardous, or simply exposed to a possible hazard impact. They may include unstable slopes or floodplains, but also any urban area in proximity or in the path of possible known hazards, such as the case of coastal areas in the paths of cyclones. While all social strata may equally be exposed to the risks of some hazards, in most cases this exposure is determined by locations, which people choose or in which they are obliged to live.

In most urban centers the competition for land is fierce and socially and economically disadvantaged groups often have no other choice but to inhabit the most dangerous of urban zones. If thirty-odd years ago the observation that the poorest slum residents lived in the most precarious locations provided an insight, today it is a rule: "The urban poor ... are everywhere forced to settle on hazardous and otherwise unbuildable terrains – over steep hill sides, river banks and floodplains. Likewise, they squat in the deadly shadows of refineries, chemical factories, toxic dumps, or in the margins of railroads and highways. Poverty, as a result, has 'constructed' an urban disaster problem of unprecedented frequency and scope . . ." (Davis 2004:16-17).

Referring to the group of the least developed countries, Davis (2004) notes that 78 percent of the urban population lives in slums and that in some countries reaches well over 90 percent. Even in Mozambique, a country that has reached an enviable annual economic growth rate of 9 percent, almost 80 percent of its residents live on less than \$2 a day and have a life expectancy of 41 years. Focusing closer on the situation in individual cities, more than 50 percent of Mumbai's 16 million residents live in slums, and about 100,000 actually live in the streets (World Bank 2005a) or drainage canals built to take out excess water during monsoon months. Some of the entrepreneurial street residents rent out their makeshift shelters to other homeless as sleeping quarters during a part of a 24-hour period. Recent urban arrivals to Cairo and Phnom Penh squat or rent space on rooftops "creating slum cities in the air" (Davis 2004:13).

Indeed, the poor do tend to settle in the most hazardous urban locations, but it would be imprudent in this instance to talk about locational *choices*, even if those were determined only by the price and land availability.

Actually, the inhabitants of these areas have no choice to speak of. Having to subsist on less than a US\$1.00 per day, their choices are limited to the least adverse alternatives. Safety concerns of the poor are usually overwhelmed by the reality of having nowhere to live, almost nothing to eat, and no way to earn a living (Maskrey 1989). This is how most shanty-towns happen to sprout in the most unwelcome and frequently most hazardous locations. The new aspect of this phenomenon is the unprecedented growth of these settlements in both the largest metropolitan areas, and in the medium- and smaller-sized cities around the world. For example, between 1980 and 2000 the population of Rio's *favelas* grew from 628,000 to almost 1.1 million, at a time when the city growth had considerably slowed down. The proportion of slum dwellers thus grew from 12.33 percent in 1980 to 18.66 percent in 2000 (Perlman 2003).

The rapid growth of many cities led to overcrowding which leaves only the most undesirable locations to new migrants. Rural migration to the capital of the Dominican Republic, Santo Domingo, had swollen the city slums to the point where 64 percent of the total city population occupied only 19 percent of the total urban area (Luther 1992). In such circumstances even the most hazardous locations are settled quickly, like *barrio* La Zurza, which remained in a "state of almost total abandonment on the part of a government having no formal water supply system, garbage collection service, human waste disposal system, vehicular access, electrical energy, little or no medical [services], academic or vocational attention . . ." (Luther 1992: 212). Elsewhere, many slums in Dhaka, Bangladesh, are built on poorly drained lands, the city's low-lying areas and wetlands that have been filled in, upsetting the natural water runoff process. These urban slums, which lack the most basic of public services, and are annually flooded during the monsoon period, tend to stay under water for a long time contributing to the spread of diarrhea with its deadly effects, especially on children (World Bank, 2005c).

Uneven growth patterns and spatial polarization of cities, which are an expression of social and economic fragmentation that characterizes today's urbanization, are reflected in the abandoned and decaying urban districts and neighborhoods. In the case of Lima, inner-city slums consist of substandard building stock, including the old adobe brick houses, creating a disaster waiting to happen.

Susceptibility Factor

The susceptibility of people and assets to hazards measures the degree of their preparedness and adaptability to known risks. The concept of susceptibility includes the quality of construction of assets, the awareness of the residents to risks posed by known hazards, the presence or absence of emergency and preparedness plans and facilities, and the ability of the population to prepare and withstand the impact of a disaster. This is where social and economic status and political clout of the population play an important part, since it has been shown a number of times that the poor are disproportionately susceptible to the effects of natural hazards (Pantelic, 1991). The World Disaster Report reminds us that 97 percent of all disaster-related deaths in 2001 occurred in the developing countries (IFRCRCS 2001). Moreover, as a percentage of GNP, disaster losses in developing countries are an estimated 20 percent higher in developing than in developed countries (Anderson 2000). Only two percent of all the people who are affected by disasters every year live in highly developed countries. In contrast, about 90 percent of them reside in the low- and middle- income countries (IFRCRCS 2001). An example from a country level shows that "average asset losses were 18 percent among the poorest fifth of the Honduran households affected by Hurricane Mitch, compared with 3 percent amongst the richest quintile" (Fay 2003:1). On the city level, the same source quotes that about 20 percent of the poor in metropolitan Tegucigalpa and San Salvador suffered damage from landslides in late 1990s, and 17 and 10 percent, respectively, from floods. These figures are much lower for the higher income groups.

Under the conditions of government retrenchment and fiscal crisis on the local level, public investments in infrastructure, maintenance and other urban programs have been on the decline (Briseno-Garmendia et al. 2004). The abandonment of poor districts to their own fate also reflects the rapid social and economic fragmentation of cities. Years of poor or nonexistent maintenance is adding to vulnerability, as was shown by the fast urbanizing, overcrowded regional cities of Gujarat (India), such as Bhuj, which was leveled by an earthquake in 2001. Similar situation exists also in other parts of the world. For example, in most of the peripheral areas of the Rio de Janeiro, and in *favelas* in particular, inadequate investment in infrastructure, deferred operation and maintenance, years of neglect in management and poor, or nonexistent facility maintenance, are responsible for the deterioration and decay of the urban environment. "Drainage networks are severely blocked by silt and uncollected solid waste, and they overflow depositing garbage and raw sewage on precariously constructed squatter settlements" (Monasinghe 1991:29).

The inhabitants of the poor community of San Francisco, a slum settlement in the town of Moquegua in Southern Peru, were advised to ask the authorities to build a retaining wall and plant trees on the edge of the new development on top of the hill, in order to stabilize the slope which was threatening their self-built adobe houses below. Their request was refused and only a short time after that, a devastating earthquake of 2001 caused the collapse of the hillside burying the majority of the houses in the community (Earthquake Spectra 2003).

The susceptibility to hazards by urban poor is further underscored by their inability, and sometimes also unwillingness, to invest in permanent and safe housing. Pantoja (2002) observes that the poor are more risk averse in economic terms because they lack savings or assets, but are more "risk taking" in spatial terms. The situation in the central city slums of Santo Domingo, illustrates the point: The risk of flooding during rains varies from 45 to 6 percent, respectively, for houses located near the river and those built on higher, consolidated ground. The quality of housing construction reflects the local perception of risk of floods and the residents' willingness to spend money on shelter. Wooden shacks are thus common in the areas near the river, where they are prone to flooding and the investment is likely to be lost, but houses of durable material, sometimes several stories high, are built on a higher ground. Rents also reflect the safety of location: those on the higher ground are almost twice the amount of those near the river and the canals (Fay et al. 2003).

The reasons for this behavior are understandable, especially when the uncertainty of land tenure in most slums and other squatter settlements is taken into consideration. Fear of eviction and losing everything usually tends to override safety concerns. That is why most slum dwellers invest largely into portable goods, like TVs and refrigerators, rather than reinforcing their houses against earthquakes or hurricanes. As the housing costs rise everywhere, the acquisition of a safe house becomes even more remote. This is equally true of industrialized countries such as the US, where the poor live mostly in substandard, old and decayed buildings, or flimsy mobile homes. The vulnerability of such settlements was clearly demonstrated in 1992 in South Florida when Hurricane Andrew devastated the town Homestead, home to mostly low-income migrant workers, and destroyed the majority of its mobile and prefabricated houses.

The extent of disaster preparedness of a community speaks not only of their knowledge and awareness of risks, but also of their adaptability to change, and enormous public investments in social and essential services infrastructure. In most developing countries such investments have been minimized, if they ever existed, under the pressure of fiscal retrenchment, the most common theme of the new profit-driven urbanization.

Interestingly, the value of such public investments is demonstrated by the example of Cuba, one of the rare countries that still practices a command economy. Wisner (2001) analyzed the discrepancy in death toll and damage from Hurricane Michelle in Cuba and Central American countries affected by the disaster. Hurricane Michelle started as a category 3 storm wrecking havoc in Honduras and Nicaragua, where it killed at least 20 people and left 100,000 homeless in Nicaragua alone. Traveling northeast towards Cuba it gained strength and was upgraded to a category 4 storm. It made a landfall on Cuba's southern coast on November 4 with the winds gusting up to 220km/hr and traveled northwards destroying 2,800 and damaging 22,400 homes, many farms, agricultural and industrial facilities and infrastructure in five provinces and the capital Havana. But unlike Central American death toll, Cuba reported only 5 deaths, which Wisner attributed to Cuba's well-organized collective action in disaster prevention.

Environmental Factor

The unbridled spread of urban areas that has characterized the post-modern urbanization in the past decades was made possible at the expense of the natural environment. Conversion of agricultural land to built environment, the shrinking of open spaces and the spread of slums in the most appalling ecological conditions have all contributed to grave environmental degradation of the urban space. Similarly to the treatment of other urban problems, short-term economizing prevails over long-term planning or, as Castells put it, the future generations have been dropped from the development equation (2002).

Environmental degradation of the hazard prone areas denote all those human activities that magnify the risks of disasters, such as deforestation that enhances erosion, or destruction of coral reefs and mangrove forests that remove natural barriers against storm surges and tsunamis. In the past two decades the state of Andhra Pradesh in India's Bay of Bengal had suffered three devastating cyclones that affected mostly the coastal areas in the deltaic region of Krishna and Godavari rivers, where most mangrove forests or the so-called coastal woodland, the most valuable natural barriers that protect from cyclones, have been destroyed by commercial development and (Reddy *et al.* 2000). Poverty and proliferation of slums go hand in hand with deforestation, slope destabilization, poor maintenance of city drainage systems or absence thereof, inadequate or non-existent garbage collection in the environmentally precarious parts of sprawling cities, abundance of unconsolidated solid waste dumps that become inhabited by the poorest of the poor, as in Jakarta, with its low-lying slums located in the path of the sea tide, or in Mumbai, where the residents occupy not only the tide-prone city areas festered by sewage discharge, but also the open water-drains specifically constructed to protect the city from annual flooding. Despite preventive action taken by the municipality, tens of people are killed annually in these canals alone when high volumes of monsoon water start to flow through the drains.

In the case of the 1988 Rio flash floods and landslides, "environmental degradation — resulting from the unplanned expansion of human settlements, faulty construction, congested drainage and inadequate maintenance — contributed heavily to the event's catastrophic outcome. Inappropriate disposal of solid waste and uncollected garbage. . . became raw material for the landslides . . . burying [makeshift] homes and sweeping away hillside squatter settlements" (Monasinghe 1991:28-29). Most municipal refuse in this area goes to open dumps, which are occupied by squatters without access to other land. These unconsolidated landfills are hazardous sites for construction because of its susceptibility to runoff and erosion. Uncontrolled wastewater ends up in drains (where they exist) or directly in the unpaved streets, further degrading the

already unstable land. In La Paz, Bolivia, as a result of urbanization, deforestation contributes to the destabilization of soils. These problems are further aggravated by use of rivers for garbage disposal.

Severe floods and landslides recur with a varying degree of severity each rainy season (Kreimer and Preece 1991). Similarly, in Algiers, a poor neighborhood of Bab el Oued, was built on an erosion-prone hillside around a natural creek that had been covered and regulated by culverts and canals decades ago, but for most part was blocked by garbage deposits. When the runoff from torrential rains of 2001 was interrupted by blocked culverts the overflow created horrendous mudflows that washed away the greater part of the neighborhood along with more than 800 inhabitants.

The degradation of the urban environment is therefore the result not only of uncontrolled urbanization that swallows open spaces and agricultural land, interrupts natural drainage, patterns or denudes hillsides in pursuit of new urban land, but also of the breakdown in the ability of local populations and their governments to manage urban growth. This breakdown is the inevitable consequence of fiscal retrenchment and the restructuring of the public sector, that in most cases, leaves the poor sections of the city to fend for themselves.

Conclusions

The profound changes that have been occurring in the organization of the global economy are creating the new spatial distribution of functions within that economy. These changes affect not only the countries and regions but also individual metropolitan areas and their constituent parts. The postmodern urbanization has created the greatest cities in human history, but the costs have been tremendous. The environmental degradation that has followed the spread of urban settlements and their transport networks cannot be reversed anymore. The changing social geography of cities resulting from the changing roles of in the new globalized economy has widened the gap between the wealthy and the poor in economic, social and in spatial terms. This spatial fragmentation and polarization of the city is causing serious breakdowns in the management of the urban system. One of the most poignant examples of this breakdown is that the city itself has become an agent of disaster vulnerability. The unstoppable pressure of poor migrants that continue to flock to the city in search of a living are swelling the city slums, which are becoming unmanageable as the public investments into infrastructure and other public programs are rapidly disappearing. The vulnerability of these impoverished and decaying city districts is approaching alarming proportions. We showed how some of the most recent developments in urban restructuring have aggravated the condition of urban dwellers, and in particular, how they have turned the natural geological, meteorological and hydrological phenomena into much more serious threats than ever before. In order to contain the growing risks in the urban environment, the direction of urban development needs to be reassessed and policies and programs created to address the growing vulnerability crisis.

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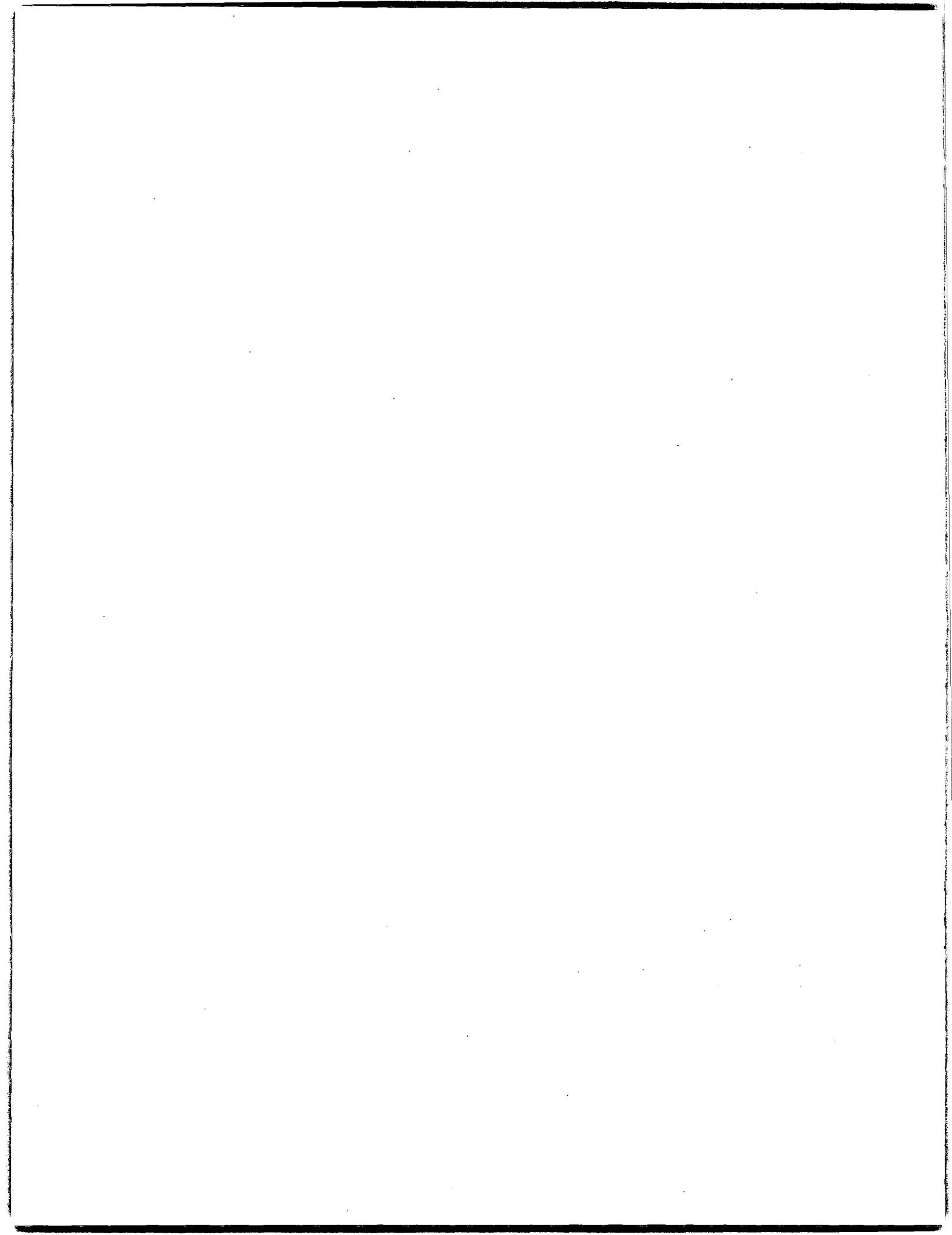
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CITIES WITH SUBURBS: EVIDENCE FROM INDIA

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Abstract

For a country such as India that contains a large number of Urban Agglomerations (UAs), suburbanisation has drawn little attention of the literature. I focus on this sparsely studied issue in this work. I calculate population, household and employment density gradients for India's UAs, using Mills' two-point technique. Next, I estimate population, household and employment gradient regressions. I find that the size of UA and lagged value of the population gradient explain population suburbanisation, as we would expect. I find evidence from the employment suburbanisation equation that it is the jobs that follow people, and not vice-versa, consistent with what has been found in the literature. In the employment sub-sector regressions, I find that the skills of the labor force are the most important factor explaining suburbanisation of manufacturing, transport, communications and trade/commerce jobs in India's urban areas. I conclude with policy implications.

JEL Classification Codes: R11, R12, R23, O18

Key Words: India, Suburbanisation, Density Gradient, Mills' two-point technique, Population gradient, Employment gradient, Household gradient, Gradient regressions, Exponential density function

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Cities with Suburbs: Evidence from India

Introduction and Motivation

The suburbanisation of metropolitan areas in countries such as the United States and Canada has drawn a lot of attention of researchers (Mills and Price, 1984; Mills, 1992; Margo, 1992; Mieszkowski and Mills, 1993; Small and Song, 1994, to cite a few examples). For developing countries, and a large country like India that contains a large number of urban agglomerations (UAs), suburbanisation has drawn very little attention, primarily due to data availability problems. In this paper, I focus on this sparsely studied issue.

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Suburbanisation seems imminent in India's UAs. The demand for real estate is rising as incomes are rising, and the middle class is steadily expanding. Further, demand for land and real estate is increasing due to the booming Information Technology (IT) and BPO (Business Process Outsourcing), and retail services sectors.¹ India caters to slightly over 60 percent of the \$1.8 billion offshore BPO market. Taking the average space requirement of 100 square feet per person, it is estimated that the additional space needs of employees would be 100 million square feet over the next five years (Economic Times report, 25 July, 2004). The space requirement follows from the additional 1.54 million IT professionals that would be employed over the next five years. This indicates that India needs to add 20 million square feet of space each year, much greater than the commercial real estate space that is developed currently.

According to Jones Lang La Salle's third Corporate Real Estate Impact Survey, India and China will receive the strongest net demand for new space over the next year.² A different Jones Lang LaSalle report for India suggests the emergence of key trends in investor preferences, the most important being the diminished importance of location, and preference for non-CBD space. This has resulted in the release of space in the CBD areas as IT firms shift to peripheral areas in campus-style developments. Other reports (for instance, the Economic Times Property Markets Survey) also confirm the continued trend of firms to shift to the suburbs. Second, decreasing interest rates on home loans and increasing real household income have increased demand for new built houses at the periphery. In the U.S., for example, suburbanization (and the loss of population of many central cities) was spurred after world war II by the impact of improved terms of mortgage finance brought partly by the federal housing administration and veterans administration mortgage insurance programs, rising real household incomes, and the construction of the inter-state and metropolitan highway systems.

For India, while systematic or time-series data on interest rates for home loans disbursed by banks and financial institutions are not available, total home loan disbursement by banks and housing finance companies increased by 76 percent in 2002-03 against a 31 percent increase witnessed in 2001-2002 (Gupta and Agarwal, 2003). This shows that the environment for home loans has recently become highly competitive.

Further, incomes have been continually increasing, more so in the urban areas. Table 1 shows that annual household income in all metropolitan areas of the country increased over 1995-98.

¹ According to a study by the international property consultant firm CB Richard Ellis, the success of retailing in India depends on three factors: availability of retail space, supply chain parameters and infrastructure such as highways.

² In a study, Jones Lang LaSalle India found a strong positive relationship between the market capitalization of IT companies and their spending on land and building. This is a clear indication of the fact that as companies grow and their market capitalization increases, their real estate spending also witnesses a directly proportional increase. This is intuitive to believe since Indian companies such as Infosys, WIPRO, Reliance Infocomm and Ranbaxy have used land as a vehicle to park their surplus funds.

Table 1: Weighted Annual Household Income in Selected Cities of India

City	1994-95	1998-99
Bangalore	\$1,426.14*	\$1,834.92
Chennai	\$1,324.31	\$1,815.40
Delhi	\$2,019.57	\$2,346.12
Hyderabad	\$1,532.85	\$1,863.73
Kolkata	\$1,662.07	\$1,959.37
Mumbai	\$1,803.43	\$2,156.24

Source: National Council of Applied Economic Research and Author's Calculations

*Data in Indian rupees (INR) in this table and through the paper are converted into US dollars by using the exchange rate \$1 = INR 45.86, the exchange rate prevailing and reported by India's central bank, the Reserve Bank of India, when this paper was being revised.

Fuelled by these reasons, partly as a result of demand for space, real estate prices have increased everywhere in the country. Further, there is a huge disparity in the rental and capital values of real estate between the Central Business District (CBD) and suburbs of most cities. Office rentals in the CBD of Mumbai³ range from INR (Indian Rupees) 75-110 (\$1.64-\$2.40) per square foot per month compared to INR 70-85 (\$1.53-\$1.85) in suburbs such as Bandra/Kurla. In terms of capital values, the differences between central city and the suburbs are even more. In the National Capital Region, for instance, CBD prime area costs INR 8,213 (\$179.09) per square foot whereas the Gurgaon prime area, capital value is only INR 3,664 (\$79.90) per square foot (Economic Times Realty Bites, 2003)! When we take residential land, the story is quite similar. So it has become relocation time for many firms and households across the country. Based on these data, it is quite plausible to believe that suburbanisation is imminent. This observation is the basis for understanding any population and employment suburbanisation that have definitely taken place in the urban areas of the country, similar to phenomena occurring in the other countries. Currently we are in darkness with respect to these phenomena in India's urban areas.

Objectives

In this paper, I examine the following

1. While the number of Urban Agglomerations (UAs) in India grew from 275 to 375 over 1991-2001, what is the extent of population, household and employment suburbanisation?⁴ While Mills' two-point method has been widely applied to cities in several countries, in this study, I calculate population, household and employment

³ This refers to erstwhile Bombay, renamed as Mumbai post-1991. Also, note that Madras was renamed Chennai, and Calcutta, as Kolkata. I use the old and new names of the metros interchangeably in the paper.

⁴ An UA, according to the Census of India (1981), is one with the following characteristics, and reports data separately for the core city (roughly the equivalent of CBD in American metro areas) and outside of the core city:

- a. A city or town with continuous outgrowth(s) the outgrowth being outside the statutory limits but located within the boundaries of the adjoining village or villages; or
- b. Two or more adjoining towns with their outgrowth(s); or
- c. A city with one or more adjoining towns with their outgrowths all of which form a continuous spread.

density gradients for all Indian UAs for which the data are available, using 1981 and 1991 Census data, the most recent available.⁵ India, being a large country, shows some variations across regions as well.

2. What explains population, household and employment suburbanisation in India's UAs?

The answers to these questions could be quite important. The extent of suburbanisation, and their determinants have implications for governmental policy variables such as unemployment rate, universal literacy programs, and their impacts. Better understanding of policy impacts enables better formulation and planning of optimal city growth.

Review of Literature

Literature dealing with suburbanisation in large and developed countries such as the United States and Canada is vast. (McDonald, 1989) provides a survey of the literature on density functions. A more recent literature review on studies of gradients is in (Anas, Arnott and Small, 1998) and (Glaeser and Kahn, 2001). Suburbanisation studies relating to Canadian urban areas are in (Bunting, Filion and Priston, 2002) and (Walks, 2004).

Broadly, one stream of literature on traditional urban models relies on the natural evolution theory and takes into account the impact of income and population on the density gradient. Standard urban economic theory shows that increases in income and population have the effect of increasing suburbanisation. The literature dealing with the natural evolution theory of suburbanisation shows that income growth in a metropolitan area leads to decreases in the gradient (Margo, 1992; Thurston and Yezer, 1994). The theory suggests that as new housing is built at the periphery of cities, high income groups who prefer larger amounts of housing settle there. Another factor that supports the natural evolution theory is that over time, increases in real income make expensive modes of transportation like the automobile more affordable. Second, larger metropolitan areas are more suburbanised than smaller ones (Mills and Price, 1984; Mieszkowski and Mills, 1993). Suburbanisation is known to occur in large metro areas because of retail services and lower land costs in the suburbs. That is, as the metro area becomes larger, households prefer to move to the suburbs to make use of shopping malls and consume greater amounts of housing than what would be available in the CBD. A second class of explanations of suburbanisation in the literature stem from the Tiebout model that relates suburbanisation to central city problems such as high taxes, poor educational attainment, racial tensions, and poor quality of public services. This literature relies on "flight from blight" and argues that central city problems are the cause of the increasing suburbanisation observed in the United States. (Mills and Price, 1984) made an attempt to look at the "flight from blight" hypothesis. However, their empirical finding was that the set of measures representing central city problems – crime, educational attainment and taxes – adds nothing to our understanding of population and employment suburbanisation.

As (Mieszkowski and Mills, 1993) point out, even if the effect of "flight from blight" is relatively small, it could have considerable effect on the margin because the measurement of gradients is on an exponential scale rather than a linear one. Thus it is an important factor affecting suburbanisation and is a key factor to whether it is considered a manageable phenomenon or a problem.

⁵ For 2001, the Census of India has not yet released land area data for UAs. Based on my discussions with them, it could take them time ranging from a few months to a year, to release this data.

(Jordan, Ross and Usowski, 1998) measure and analyze differences in rates of suburbanisation during the 1980s among U.S. metropolitan areas, that fit a monocentric urban model. (Glaeser and Kahn, 2001) study the decentralization of employment in American cities. They find that employment is highly decentralised in American cities, as may be seen in their finding that less than 16 percent of total employment was located within a 3-mile radius of the city center. They also find evidence that decentralization is more common in manufacturing employment than they are in services.

(Sridhar and Sridhar, 2003) study the impact of telecommuting, made possible by technology, on suburbanisation, using data for U.S. metropolitan areas. They use the population and household density gradients as measures of suburbanisation. For telecommuting indicators, they use data from the Survey of Income Program and Participation (SIPP). They find support for the natural evolution theory of suburbanisation. They find that large cities (those with large populations) are likely to be more suburbanised than their smaller counterparts, when we control for the influence of central city fiscal and socio-demographic characteristics. Further, they find that telecommuting contributes to centralization, not suburbanisation, of metro areas, and conclude that technology could be a complement, not a substitute for face-to-face interaction, consistent with (Gasper and Glaeser, 1989).

I concur with the literature and assume that the natural evolution and fiscal-social problem approaches are both important in explaining suburbanisation in the Indian context as well.⁶ Unlike in the USA, Urban Agglomerations (UAs) in India have a loose description, and the Directorates of Census enjoy a high degree of discretion in designating an area as a UA. There are several instances where outgrowths, shown as parts of UAs, have political and speculative overtones. This is a caveat to be noted so that the phenomenon of UAs is not mistaken as a purely demographic-cum-economic occurrence.

(Mills and Tan, 1980) compare density functions for developed and developing countries. They find that the negative exponential density function is a good description of data from vastly different countries. They note that while urban decentralization is a continuously occurring phenomenon in the developed as well as developing countries, central city densities are extremely high in large urban areas of developing countries when compared to the developed countries. They find average density gradients for 12 Indian cities to be 0.652 for 1960 (summarised in their Table 19), quite high when compared to that for cities in Brazil (0.17, for 1960) Japan (0.46 for 1965), and 0.34 (for Mexico), and 0.20 for USA (for 1960). Only the Korean

⁶ A fundamental question could be whether India's urban areas are likely to evolve following the competitive model applicable in the US, or whether India's institutional framework could lead to a different evolution since there stronger land use controls. Land use controls such as the Urban Land (Ceiling and Regulation) Act, 1976 existed in India. While this law was used to build an adequate stock of urban land for 'public interest' purposes such as road widening, development of open spaces and other 'public' facilities. This law was repealed with effect from January 11, 1999, the law continues to be in force in a handful of states (Maharashtra and Bihar). Further, rent control in Indian cities has thwarted the effective development of the land market by limiting property owners' incentives to maintain and renovate property.

It is likely that sometime in the near future, real estate in India could be freed of these controls. It is quite plausible to believe that Indian UAs are likely to evolve as in the competitive model of the US. One example is: although land use controls exist, free rural-urban migration is causing migrants to locate at the periphery of cities, and though not immediately, they are gradually annexed into the city limits, increasing the city's geographical boundary and of course its burden of public services.

There are however, natural limits to their growth (optimum city size, as we know from general equilibrium models of city growth), and this could be reached much faster in Indian cities due to rent control (restrictions on supply of housing). This does allow the competitive model of individual migration decisions to determine city growth when land use controls exist. In fact a few Indian cities are specifically adopting a laissez faire approach to city growth. This somewhat lends support to the idea of usin

g the natural evolution factors and flight from blight factors, in the suburbanisation regressions, and variables that indicate the 'jobs follow people' or the 'people follow jobs'.

average density gradient (for 12 cities) was higher than (being 0.70 for 1960) for India. Quite rightly as they point out, any modest income increases in the developing countries certainly induce people to move out. And, there is an intense conflict between suburban development and rural land uses. They point out that more research should be done on the determinants of land use patterns in developing and developed countries. Due to data constraints, however, suburbanisation in the context of developing countries - especially a large country like India that has a large number of Urban Agglomerations - is sparse. Only one study by the Census of India (Jain, 1993) studies the emerging trend in the suburbanisation of India over 1971-81. The study does not analyze suburbanisation as much as it analyzes changes in the composition of Standard Urban Areas. It also does not perform any more systematic analyses than calculating trends. Further, in Indian UAs, the process of mergers of suburbs with cities has just begun for better and integrated metropolitan governance. For instance, Delhi cantonment and Mahipalpur were not part of the city in 1981, but they were respectively merged with the Delhi Municipal Corporation (DMC) (now called Municipal Corporation of Delhi (MCD)) in 1991. South Suburban, Garden Reach and Jadavpur municipalities were merged with Calcutta Municipal Council in 1991. Such mergers have just begun, and it is not clear, whether a systematic body of literature has developed regarding this phenomenon as yet.

Suburbanisation is quite important to address in India's context since it could have implications for the large number of retail and Business Process Outsourcing (BPO) firms that are much starved for adequate space in the CBD of many Indian cities.

Measurement of Suburbanisation

Suburbanisation is the process where the percentage of population living in the suburbs rises. In the standard urban model, employment is concentrated in the central business district (CBD) and the locational choice of households is modeled solely on access to the employment center.⁷

In urban economic theory, the gradient is used as a measure of population suburbanisation. There are several criteria that are needed for an appropriate measure of suburbanisation (Mills, 1992). I use the gradient as a measure of suburbanisation because it has several advantages. The first is that the gradient approach is relatively simple. As (Mieszkowski and Mills, 1993) point out, the exponential density function is a reduced form equation of a simple and robust model of metropolitan spatial organization (see also Brueckner, 1987).

The gradient shows how population density (number of persons per square mile) changes with distance from the CBD. Suburbanisation is the process that occurs when the absolute value of the gradient falls.

There are two ways of measuring the gradient. We can either estimate it, or calculate it using Mills' two-point gradient technique. Data that are required to estimate density gradients pertain to population (household or employment) density (per square mile) for census tracts (wards) and their distances from the city centre. The gradient is the coefficient in a regression of density (for census tracts) on distance from the city centre, as in the following negative exponential form of the equation:

⁷ It is easy to conceive cities that have multiple employment centers. However, as long as employment density in the CBD is greater than it is in the suburbs, the monocentric urban model holds good. Also, following the literature (for instance, Small and Song [14]), I use 'monocentric' to mean any distribution which is approximately circular and symmetric around a single center, not in the more restricted meaning of all employment being in the CBD.

$$D(r) = D_0 e^{-br} \text{-----}[1]$$

where $D(r)$ is the relevant density r miles from the center, e is the base of the natural logarithm, and b (the gradient) and D_0 are constants estimated from the data, if the data are available at such a disaggregated level (usually census-tract level). In this approach, as may be clear, this regression is required for every city.

As should be clear, estimation of gradients is a very data intensive process requiring population density and land area data at a very disaggregate level (usually census tract or block group or ward). (Mills, 1972) demonstrated, through a two-point method, that from data on just two points in the city, CBD and metro area, we can calculate rather than estimate the gradient.

Theory

As (Brueckner, 1987) points out, standard models of population distribution provide the theoretical rationale for the exponential population density function. From the theoretical exponential density function in equation [1], the ratio of LC to L is derived as given below:⁸

$$\frac{L_c}{L} = \frac{1 - e^{-bR_c} - bR_c e^{-bR_c}}{1 - e^{-bR} - bR e^{-bR}} \text{-----}[2]$$

In equation [2], LC and RC respectively refer to population (households or employment) and land area in the inner cities (usually called the central business district in U.S. cities) of UAs in the country. L and R respectively refer to population, (households or employment) and land area, of UAs. Given data on LC, RC, L, and R, we may calculate the gradient b in [2] for all Indian Urban Agglomerations (UAs).

I calculate population, household and employment density gradients for Indian UAs for 1981 and 1991, using expressions derived above. In the next step, I estimate the population, household, and employment density gradients and explain what determines suburbanisation in the Indian context.

⁸ Equation [1] is $D(r) = D_0 e^{-br}$. Since $2\pi r$ is the circumference of a circle, expressions for L_c and L are derived as follows:

$$L_c = \int_0^{R_c} 2\pi r D(r) dr$$

Substituting for $D(r)$ from [1], we get

$$L_c = \int_0^{R_c} 2\pi r D_0 e^{-br} dr$$

Integrating the expression above yields

$$L_c = \frac{2\pi D_0}{b^2} [1 - e^{-bR_c} - bR_c e^{-bR_c}]$$

Similarly for L,

$$L = \int_0^R 2\pi r D(r) dr = \int_0^R 2\pi r D_0 e^{-br} dr = \frac{2\pi D_0}{b^2} [1 - e^{-bR} - bR e^{-bR}]$$

Data required for estimation of density gradients is quite intensive. It requires data at the census tract level or at the block group level. In India's Census, although data on population are readily available at the census tract, even at the ward level, detailed data on land area are not available in a centralised fashion, requiring one to go to each of the 375 UAs to obtain the land area data, by census ward! And, there are hundreds of such census wards in each city. This means that it is extremely difficult to obtain population density and land area data at such a disaggregated level for the 375 UAs of the country, making it a near-impossible proposition to estimate density gradients for India's UAs.

Using Mills' technique, and using the standard exponential density function, I derive the ratio of central city population to total UA. Using this equation [2] (that does not have a closed form solution), I calculate population, household, and employment density gradients for India's UAs. Further, using these gradients, I estimate and explain population, household and employment suburbanisation for India's UAs for 1991. At the time research for this paper was completed in 2005, the Census of India had not yet released the land area data for all UAs for 2001.

Methodology, Model and Data Sources

First, I obtain data on the land area, population, households, and employment, along with other socio-demographic characteristics for the various components of all UAs in the country for 1981 and 1991 respectively from the 1981 and 1991 Census of India, General Population Tables A-4. I then aggregate various components of UAs separately for the central city and the UA. In order to arrive at RC and R (land areas of central city and UA respectively), I make the assumption that UAs are circular.⁹ This assumption is quite realistic as India's UAs have what are called ring roads and outer ring roads, similar to the outer loop in the U.S. metropolitan areas, reinforcing the circular nature of these agglomerations. Based on these data, I calculate RC and R,¹⁰ LC and L (population of central city and UA respectively) for 1981 and 1991, HC and H (households in central city and UA respectively), and EC and E (employment in central city and UA respectively), for 1991. Further, I calculate employment density gradients for several sub-sectors including mining and construction, manufacturing, trade and commerce, communications, and other services, all for 1991.

I calculate the population, household, employment, and various sub-sector gradients¹¹ for 1981 and 1991 for Indian UAs¹² for which the gradient was calculable.¹³

⁹ The area of a circle is πR^2 , R (radius of circle) can be solved for.

¹⁰ In the case of almost all the states, I called the state census offices to get land area data for UAs, where they were not available, or to verify them with what I had obtained from the 1991 data CD ROM. State governments in India get land area data from their local governmental units and then compile and pass them along to the central Census of India office in New Delhi that disseminates it.

¹¹ The available data for 1981 enable me to calculate only the population gradient for 1981. Data on households and employment by sub-sector were not available separately for central city and rest of central city for the UAs in 1981. For 1991 these data are available and all the gradients reported in the text are calculated.

¹² There were 221 UAs in the country in 1981, but their number had grown to 375 in 1991. Note the following caveats, however:

- a. A large number of UAs in the north Indian state of Punjab for 1991 had to be left out due to the lack of disaggregated land area data, bringing the 1991 UA sample to about 340.
- b. There were a large number of UAs in 1981 that were no longer enjoying the UA status in 1991, since they were de-classified. And, obviously enough, a large number of new UAs had developed by 1991. This is to claim that there were only about 80 UAs for which both 1981 and 1991 data were available, and gradients could be calculated and compared. This also explains why the sample for all regressions that include the lagged value of the population gradient is small. But yet, a substantial part of the explanatory power in all models comes from lagged values of the population gradient.

¹³ The gradients were calculated using Visual Basic. Out of the 340 UAs, gradients were calculable for roughly 150 of them, due to the nature of land area data. For instance, whenever the central city and UA land area data were not very different, the gradient could not be calculated. I changed the tolerance limits to greater levels, even then, some of them were not calculable.

In the next step, I perform regressions of the population, household, total employment and the various sub-sector gradients by ordinary least squares. I estimate these density gradients as in the standard literature. The following models are used:

$$b_{ij}^* = f_i(y_j) + \xi_{ij} \text{-----} [3]$$

As in previous literature, b_{ij}^* is the equilibrium value of the gradient b for i (population or employment) and UA j . It is assumed that the actual gradient (observed) eventually adjusts to the equilibrium value of the gradient, b^* with a lag, and y_j is the vector of explanatory variables. As always, ξ_{ij} is the random error term.

The empirical versions of the estimated population (and household) and employment density gradient functions respectively are:

$$b_{Pj} = \alpha_0 + \alpha_{\text{PPOP}} \text{POP}_j + \alpha_{\text{PY}} Y_j + \alpha_{\text{PJS}} \text{JS}_j + \alpha_{\text{PN}} N_j + \alpha_{\text{PUN}} \text{UN}_j + \alpha_{\text{PSCST}} \text{SCST}_j + \alpha_{\text{PLIT}} \text{LIT}_j + \alpha_{\text{PLAG}} \text{PLAG}_j + u_j \text{-----} [4]; \text{ and}$$

$$b_{Ej} = \beta_0 + \beta_{\text{EPOP}} \text{POP}_j + \beta_{\text{EN}} N_j + \alpha_{\text{EW}} W_j + \beta_{\text{ELF}} \text{LF}_j + \beta_{\text{ESCST}} \text{SCST}_j + \beta_{\text{ELIT}} \text{LIT}_j + \beta_{\text{EPLAG}} \text{PLAG}_j + \beta_{\text{EPS}} \text{PS}_j + e_j \text{-----} [5]$$

where, b_{Pj} and b_{Ej} = Population (or household) and employment density gradients in UA j ;

POP_j = Population of UA j (scaled and divided by 10,000);

Y_j = Annual household income in UA j ;

W_j = Wage cost (workers' emoluments as proportion of value of output) in the state in which UA j is located;

JS_j = Proportion jobs suburbanised in UA j ;

N_j = Number of local governments in UA j in 1981;

LF_j = Labor force as proportion of population in UA j ;

UN_j = Ratio of unemployment rate in the central city to that in the suburbs in UA j ;

SCST_j = Ratio of minorities (Scheduled castes and/or scheduled tribes¹⁴) as proportion of total population in central city to that in suburbs, in UA j ;

LIT_j = Ratio of literacy rate, which is computed as a proportion of population above 6 years of age, in central city to that in suburbs, in UA j ;

PLAG_j = Lagged value of population gradient (for 1981).

As in the standard literature, the population variable is included to test for the natural evolution effect on suburbanisation. It is well-known that larger metropolitan areas are more suburbanised than smaller ones (Mills and Price, 1984; Mieszkowski and Mills, 1993). Suburbanisation is known to occur in large metro

¹⁴ Scheduled castes (SC) and scheduled tribes (ST) in India have been traditionally socially repressed, so it is possible to believe that their presence would deter the location of 'higher-caste' population and households in a given area.

areas because of retail services and lower land costs in the suburbs. That is, as the metro area becomes larger, households prefer to move to the suburbs to make use of retail services and consume greater amounts of housing than what would be available in the CBD.

I include annual household income in the population and household suburbanisation equations to test for the natural evolution theory of suburbanisation. That is, whether to study if richer UAs are any more suburbanised than poorer ones, since their households can afford the automobile that makes living farther away more plausible. In fact, we do find that in the National Capital Region (consisting of Delhi), for instance, that a large number of households live in the suburbs of Gurgaon (where land is much cheaper as summarized earlier, and relatively more abundant when compared to that in Delhi) and commute to work in Delhi. Such suburbanization has occurred in Delhi and other cities of the country because of households' increased need for space and automobile ownership.

The annual household income data are taken from the National Council of Applied Economic Research (NCAER, 2002) publication India Market Demographics Report 2002. These data are such that within every state, the estimated distribution of households by income groups, are provided for all town groups classified by population.¹⁵

As explained earlier, a second class of explanations of suburbanisation in the literature stem from the Tiebout model that relates suburbanisation to central city problems. This literature relies on "flight from blight" and argues that central city problems are the cause of the increasing suburbanisation observed in the United States. The various ratio variables included in the population and employment density gradient equations – ratio of SCST proportion in the central city to that in suburbs (SCST), ratio of literacy rate in central city to that in suburbs, and finally, ratio of unemployment rate — are meant to test the flight-from-central-city-blight hypothesis.¹⁶

The number of local governments in the UA is indicative of competition prevalent with respect to the provision of public services. This variable (N_j) has been included to test for the Tiebout effect for both

¹⁵ The town groups are: Over 500,000 population; 200,000-500,000 population; 100,000-200,000 population; 50,000-100,000 population; 20,000-50,000 population; and <20,000 population. The annual incomes for 1996-97 are in 1998-99 prices –The income groups used by NCAER are: Up to INR 35,000; 35,001-70,000; 70,001-105,000; 105,001-140,000; Above 140,000. I take the mid-point of income for each of these categories, and calculate a weighted average of household income, where the weights are the estimated number of households in every income category. UAs' income vary depending on their population and their state of location. So all UAs above 500,000 population within any given state would have the same average annual household income. This works well in most cases, not well in some others. But this is the only resort since income data at the city level are not available in any other data source.

¹⁶ Another possible candidate for indicating relative attractiveness of the central city is the property tax rate by UA (at this point, it is impossible to think about central city and UA ratios for property tax rate, based on data available). The property tax is the only one levied at the local level in India, apart from the octroi on businesses where they exist. The ratio of the property tax revenue to the taxable value of property would give us a measure of property tax rate. Let alone in a centralised fashion for all 375 UAs in the country, although data on property tax revenue are available (not in centralised manner), data on the assessed value of taxable property is unavailable even for Delhi. This is because most cities in India continue to follow the annual rateable value (ARV) method of property valuation that is very subjective, when compared to the unit area method, which is more objective and makes property valuation and assessment depend on characteristics of the property. Delhi has taken steps to move towards unit area method very recently. This means that the property tax base is subjective and is best not shared with public. A number of states in the country have recently abolished octroi on businesses, as it is distortionary, distorts prices of goods and gives rise to a number of discretionary practices that become breeding ground for corruption, and its high cost of collection.

Because of these considerations, the tax base of cities in India is much less buoyant than it is in countries such as the United States and tax rates are less likely to be a factor influencing suburbanisation. However, the level of public services could be a factor influencing suburbanisation, and the number of local governments in the UA is indicative of the extent of competition in local public service delivery.

population as well as firms. (Jordan, Ross and Usowski, 1992) include this in their model of suburbanisation. Note that the current number of local governments in the UA could be endogenous. Because of this, the number of local governments in the UA in 1981 was used, note that while the number of local governments in the UA in 1991 could be endogenous, the number of local governments in 1981 would be exogenous to the model.

The proportion of jobs suburbanised is included in the population gradient equation to test whether people follow jobs, as this is a question that remains unresolved in the literature (see (Partridge and Rickman, 2003) for some recent evidence). In the various employment gradient equations, lagged value of the population gradient has been included to test for the 'jobs-follow-people' hypothesis.¹⁷ There is another reason for including the lagged value of the population gradient in both equations, as (Mills and Price, 1984) point out. It is included to test whether the actual value of b adjusts to its equilibrium value with a lag. While the extent of employment suburbanisation is crucial for households, population suburbanisation is important for firms, since it indicates the availability of skills.

The proportion of the population in the labor force speaks for the work ethic of the population. The CBD of many UAs in India (for instance, Jamshedpur is built around Tata Iron and Steel) are built around specific industries or firms. Labor force as a proportion of population in these UAs would be high. If this proportion were spatially concentrated (very likely, since such towns have large campus-style developments), there would be some impact on employment suburbanisation. This implies that the employment history of a city could be important, and hence needs to be accounted for when studying employment suburbanisation.¹⁸ The proportion of population in the labor force is calculated as the total number of full-time workers plus workers looking for work as a proportion of population for every UA.

For wage cost data, I use data on the total emoluments as a proportion of the total value of output for Indian states, published in the Annual Survey of Industries, for 2001-02, by India's Central Statistical Organization, of the Ministry of Statistics and Programme Implementation, Government of India.

All other data for variables used in all the estimations are from the (Census of India, 1981) and (Census of India, 1991).

As should be clear, the population (household) and employment gradient equations [4] and [5] are both econometrically identified.

¹⁷ In the Indian context, this is important since BPO, call centres and other IT-enabled services depend heavily on the quality of manpower available.

¹⁸ As mentioned earlier, employment gradients for 1981 could not be calculated for inclusion because of the lack of such disaggregated data for 1981.

Findings from Data

When we study the proportion of population that is suburbanised (21.33 percent), the average Indian UA is not any more suburbanised in 1991 than it was in 1981 (20.67 percent). See Table 2.

Table 2: Suburbanisation of Population, Households and Jobs in India, 1981 and 1991

Statistic	% 1981 Population	% 1991 Population	% 1991 Households	% 1991 Employment
	suburban	suburban	suburban	suburban
Average	20.67	21.33	22.02	21.76
Maximum	92.52	92.31	93.56	92.85
Minimum	0.18	0.05	0.12	0.12
Std.Dev	20.08	20.14	20.41	20.11
Observations	233	374	374	374

On average, a slightly higher proportion (22.02 percent) of households and employment (21.76 percent) is suburbanised than is population (21.33 percent). We expect households to be more suburbanised than population because household decisions to locate are much more dependent on characteristics such as discrepancy between central city and suburban literacy levels.

Table 3 shows suburbanisation of the 21 UAs in the country with million plus population (including the four metropolitan areas) during 1991. While the suburbanisation of population, households and jobs is not different across the million-plus UAs, note that the proportion of population, households and jobs suburbanised are systematically lower in the 21 million-plus UAs (Table 3), when compared to the sample including all UAs for 1991.

Table 3: Population, Household and Employment Suburbanisation in India's Million-Plus UAs, 1991

Variable	Mean	Std.Dev.	Minimum	Maximum
% Population suburban	18.26	16.22	0.86	60.08
% Households suburban	18.93	16.60	1.03	60.23
% Jobs suburban	18.36	16.04	0.98	56.81

Number of observations = 21

Table 4 summarises this data for the four metropolitan areas. This table shows that the population, households or jobs in suburbs of the metro areas is much higher than they are for all UAs or for the UAs with million plus population, quite consistent with what we expect.

Table 4: Population, Household and Employment Suburbanisation in India's (4) Metropolitan Areas, 1991

Variable	Mean	Std.Dev.	Minimum	Maximum
% Population suburban	30.31	21.22	10.82	60.08
% Households suburban	30.87	21.12	10.69	60.23
% Jobs suburban	28.99	20.11	9.93	56.81

When we look at the trend of population suburban over 1981-91 (Table 5) for the metro areas, Madras is more suburbanised in 1991 than in 1981. Delhi has remained more or less the same over this decade whereas Calcutta actually had less of its population suburban by 1991.

Table 5: Population Suburbanisation in India's Metropolitan Areas during 1981-91

Metropolitan Area	% Population	% Population
	suburban, 1981	suburban, 1991
Delhi	10	11
Kolkata	64	60
Mumbai	NA*	21
Chennai	24	29

*Not available. Mumbai was not a UA in 1981, so separate central city and suburban data are not applicable.

Table 6 summarises the population, household and employment density gradients for India's UAs, and for the metro areas. Although not apparent from the proportion suburban data (Table 2), when we examine the gradients, on average, India's UAs have certainly suburbanised over the decade as may be seen in the declining value of the density gradient. This is consistent with what is observed in cities in other countries, where density gradients have been declining in general (see Mills and Tan, 1980). The density gradients for Indian UAs, however, are larger compared to that for developed countries. For instance, the average density gradient reported by (Jordan, Ross and Usowski, 1998) for 77 US metropolitan areas for 1990 is 0.16, whereas the gradients for Indian UAs (Table 6) are much higher (average is 0.47). As (Papageorgiou and Pines, 1989) point out, we expect higher central densities and larger density gradients in countries of higher overall population densities because of the rising opportunity cost of land.

Table 6: Summary of Population, Household and Employment Density Gradients

Statistic	Population density gradients		% Change	HH density gradient	Employment density gradient
	1981	1991	1981-91	1991	1991
Average, all	0.4933	0.4669	-5.35%	0.4533	0.4621
Maximum	0.9910	0.9983	0.74%	0.9879	0.9871
Minimum	0.0102	0.0072	-29.41%	0.0049	0.0194
Std.Dev	0.2649	0.2697	1.79%	0.2624	0.2601
Observations	94	154	77	161	160
Average, metros	0.2467	0.1963	-20.44%	0.2306	0.2578
Max, metros	0.3475	0.2995	-13.81%	0.2933	0.3473
Min, metros	0.1870	0.1244	-33.48%	0.1693	0.1818
Std.dev, metros	0.0878	0.0745	-15.08%	0.0629	0.0794

(Mills and Tan, 1980) summarise gradients for 12 Indian cities. When I compare them with those I find in this study, gradients for 6 cities are comparable.¹⁹ Table 7 compares the gradients summarised by (Mills and Tan, 1980) and the gradients calculated in this study for the six comparable urban areas.²⁰ Of these six cities (Poona, Madras, Jamshedpur, Hyderabad, Bangalore, Bombay), I find Bangalore, Hyderabad and Pune suburbanised in the intervening period from 1961-91. The others in fact presumably centralised over the period, a finding that is not unusual.

Table 7: Comparison of Density Gradients

Urban Area	Density gradient, Mills & Tan [6], for 1961	Density gradient calculated in this study for 1991
Bombay	0.102	0.194
Madras	0.235	0.299
Bangalore	0.528	0.380
Hyderabad	0.324	0.303
Pune	1.072	0.234
Jamshedpur	0.232	0.274

As one would expect, the metropolitan areas are more suburbanised (lower absolute value of the gradient) in 1991 than when all the UAs are taken into account. Further, on average, population suburbanisation over 1981-91 in the metro areas has been at a much greater pace than in all the UAs, again consistent with our expectation (Table 6).²¹

Surprisingly, household and employment density gradients are not very different from each other for the UAs and the metros (Table 6). In general, when we take only 1991, and examine population, household and employment density gradients, households are the most suburbanised as we would expect, as presumably they would be in need of more land and housing. India had 340 UAs in 1991 for which all data on central city land area and population, and metro land area and population were available. But gradients were calculable only for a sub-sample, this is reported in Table 6. The most suburbanised UA in the country in 1991 was the Belgaum UA in the south Indian state of Karnataka that had only 8 percent of its population in suburbs.²² The most centralised UA is Singur U.A. in the eastern Indian state of West Bengal that had 13 percent of its population suburban in 1991. The one with the lowest value of the household density gradient in 1991 is Arcot UA located in another south Indian state Tamilnadu. This is, interestingly, the UA that had the lowest value of the population gradient in 1981 as well (its population gradient for 1991 was unfortunately not calculable).

¹⁹ The other 6 cities that Mills and Tan [6] summarise gradients for 1951 and 1961, are either not UAs any more, or gradients were not calculable for them.

²⁰ Note that gradients summarised by Mills and Tan are estimated, whereas those in this study are calculated.

²¹ Household and employment density gradients or the proportion of households and employment suburban could not be calculated for 1981 as analogous data were not available. For 2001, the Census of India has not yet released land area data for UAs.

²² A lower value of the gradient is consistent even with a small proportion of population living in the suburbs. Recall the gradient refers to the slope of the density function with respect to distance from the CBD. This implies that in this UA, not only is the proportion suburban small, but also that the UA has a very flat density function, that is, the density is declining very slowly as we move away from its CBD.

When we study the employment density gradient for 1991, the UA that is the most suburbanised is Alapuzha UA in another south Indian state, Kerala, that had 16 percent of its employment suburban in 1991. The most centralised in terms of employment density is Alipurduar UA in the east Indian state, West Bengal.

The observation that most of the UAs that are the most suburbanised are located in south Indian states suggests that density in the UAs of these states declines very slowly as one moves away from the CBD. This suggests that these UAs are all spatially quite well covered in terms of density of population. That is, in states of the southern region, it is difficult to come across vast stretches of UAs that have low densities. To examine this further, Table 8 summarises the population, household and employment gradients by region. Table 8 shows that the northern region's population is more suburbanised than the eastern, southern or western counterparts in 1991, although UAs in the southern region were much more suburbanised than those in all the other regions in 1981. In terms of household and total employment suburbanisation, UAs in the northern and southern regions are much more suburbanised than their counterparts in the eastern and western regions that continue to be more centralised.

Table 8: Population, Household and Employment Density Gradients by Region

Region	Population density gradients		HH density gradient	Employment density gradient
	1981	1991	1991	1991
Average, Southern region*	0.4569	0.4583	0.4121	0.4266
Average, Eastern region**	0.5225	0.4587	0.4834	0.4833
Average, Northern region***	0.5075	0.4140	0.4036	0.4239
Average, Western region****	0.5008	0.5493	0.5361	0.5004

*Karnataka, Kerala, Andhra Pradesh, Tamilnadu, Pondicherry

**Orissa, West Bengal, Bihar, Manipur, Meghalaya, Assam

***Delhi, Haryana, Uttar Pradesh, Chandigarh, Madhya Pradesh, Himachal Pradesh

****Maharashtra, Goa, Rajasthan, Gujarat

Table 9 summarises employment gradients for various employment sub-sectors. In general, gradients were calculable for a larger number of UAs in the case of manufacturing, but for much less number of UAs in the other sectors. This is partly because of the concentration of employment in manufacturing, and much smaller employment in other sectors, in most of the UAs. Table 9 shows that on average, mining and manufacturing employment are much more decentralised compared to services (transport communications, trade and commerce, and other services), consistent with what (Glaeser and Kahn, 2001) find in American metro areas. The finding is intuitive for India as much as for other countries because mines and manufacturing jobs are most likely located much further away from the CBD than the other jobs. The most centralised sector in terms of employment is trade and commerce services, easy to imagine since these are mostly office (white or blue-collar) jobs. The manufacturing density gradient is flattest (most suburbanised) in Kanhangad UA in the south Indian state Kerala, with the most centralised manufacturing employment in a UA in Gujarat (Dohad), a west Indian state. So in general, employment and population in UAs in the southern region are more decentralised compared to the eastern or western regions of the country, something that has got to do with their GDP growth as much as suburban growth. All states in the southern region have higher per capita GDP compared with their eastern and some northern counterparts.

Table 9: Density Gradients for Employment Sub-sectors

Gradient Type	Mean	Std.Dev.	Minimum	Maximum	Observations
Mining & quarrying	0.4568	0.2593	0.0020	0.9708	81
Manufacturing (household and non-household industry) and Construction	0.4590	0.2839	0.0191	0.9971	151
Transport, Storage and Communications	0.4965	0.2621	0.0109	0.9777	126
Trade and commerce services	0.5080	0.2587	0.0403	0.9996	111
Other services	0.4613	0.2652	0.0024	0.9337	136

With a view to distinguish between different kinds of Urban Agglomerations (UAs), I have reported gradients for the following categories:

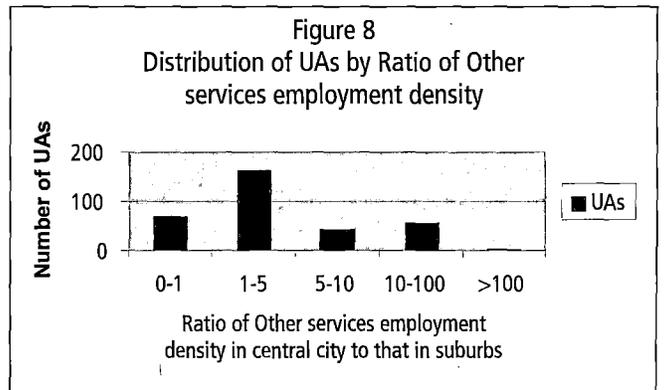
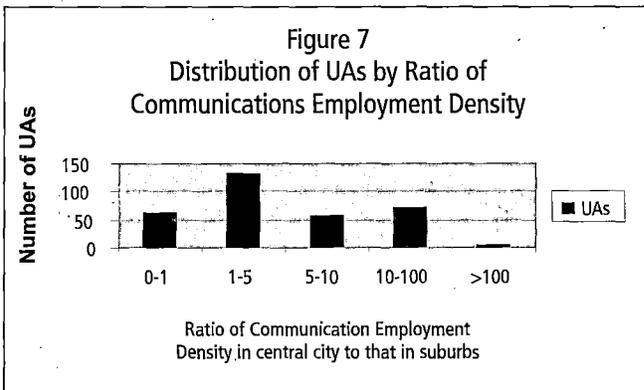
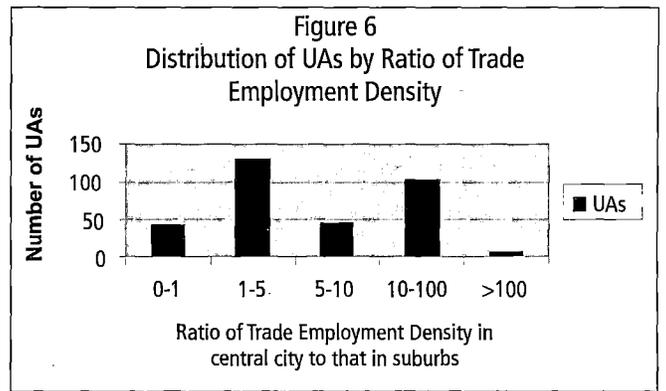
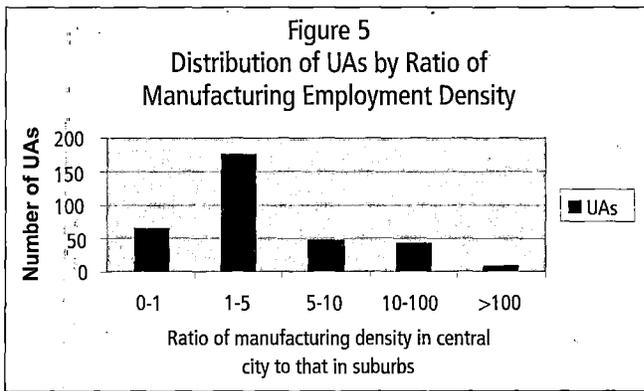
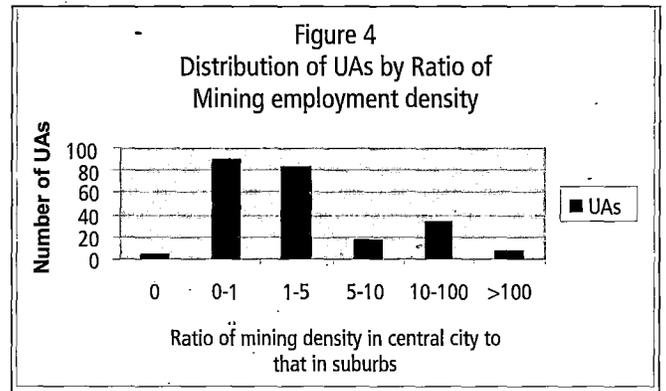
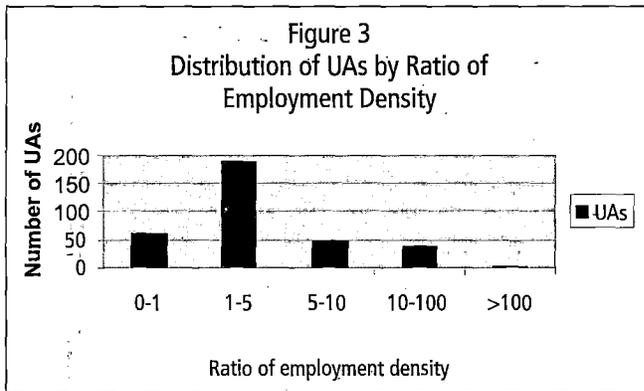
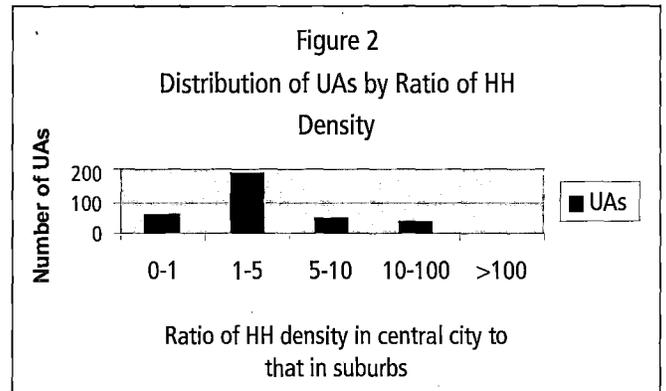
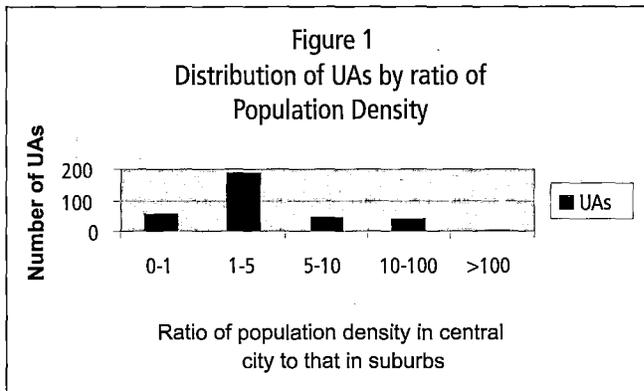
- (a) UAs which have high densities at the core and low at the periphery;
- (b) UAs with medium or low densities at the core and comparable densities or higher densities at the periphery; and
- (c) UAs with unrelated densities at the core and periphery.

Such a distinction between the different kinds of UAs helps us to better appreciate the policy implications, instead of treating all of them as homogenous entities.

Tables 10-13 report population, employment, household and various sub-sector gradients for UAs classified by the ratio of population density in the CBD when compared to that in suburbs. Tables 14-17 report the various gradients for UAs classified by the similar employment density ratio. For these classifications, four categories are used:

- a. UAs for which CBD population (or employment) density is less than that for the suburbs (Tables 10 and 14);
- b. UAs for which CBD population (or employment) density is more, specifically 1-5 times more than that for the suburbs (Tables 11 and 15);
- c. UAs for which CBD population (or employment) density is 5-10 times more than that for the suburbs (Tables 12 and 16);
- d. UAs for which CBD population (or employment) density is more than 10 times than that for the suburbs (Tables 13 and 17).

Figures 1-8: show the distribution of UAs classified by the ratio of the relevant (population, household, or employment sub-sector) density in the CBD to that in the suburbs.



When we examine the population gradient, the gradient progressively keeps getting bigger whenever the CBD population density is higher compared to that in the suburbs (Tables 10-13).

Table 10: Gradients for UAs with CBD Population density less than that in suburbs

Gradient Type	Mean	Std.Dev.	Minimum	Maximum	Observations
Population gradient	NA	NA	NA	NA	0
Household gradient	0.02	0.02	0.00	0.06	4
Employment gradient	0.05	0.03	0.03	0.07	2
Mining gradient	0.39	0.27	0.02	0.79	9
Manufacturing gradient	0.32	0.28	0.03	0.76	12
Communications gradient	0.28	0.16	0.10	0.49	7
Trade & Commerce gradient	0.44	0.28	0.08	0.87	14
Other services gradient	0.38	0.20	0.07	0.73	12
Population gradient, 1981	0.36	0.36	0.01	0.85	7

For instance, on average, the population gradient is only 0.44 for UAs with population density in CBD 1-5 times greater than that in the suburbs (Table 11), but it is 0.81 for UAs that have population density in their CBD greater than 10 times than that in their suburbs. This is what we would expect, since the higher the CBD population density, the more centralised would UAs be. A similar story holds good for household and employment gradients as well, when UAs are classified by ratio of population density. That is, households and employment in UAs with population density in CBD lower than that in the suburbs, are also suburbanised. As example, on average, the employment gradient in UAs with population density in CBD lower than that in suburbs is only 0.05 compared with an average of 0.78 in UAs where population density in CBD is also several times higher than that in suburbs. This is true in the case of all other employment sub-sector density gradients, with the exception of mining. This reinforces the notion that jobs follow people.

Table 11: Gradients for UAs with Population density in CBD 1-5 times more than that in suburbs

Gradient Type	Mean	Std.Dev.	Minimum	Maximum	Observations
Population gradient	0.44	0.26	0.01	1.00	138
Household gradient	0.44	0.25	0.01	0.99	140
Employment gradient	0.44	0.25	0.02	0.99	139
Mining gradient	0.46	0.24	0.01	0.97	54
Manufacturing gradient	0.43	0.27	0.02	0.99	118
Communications gradient	0.48	0.26	0.01	0.98	103
Trade & Commerce gradient	0.50	0.26	0.04	0.99	87
Other services gradient	0.44	0.26	0.00	0.92	101
Population gradient, 1981	0.48	0.25	0.01	0.99	77

Table 12: Gradients for UAs with Population density in CBD 5-10 times more than that in suburbs

Gradient Type	Mean	Std.Dev.	Minimum	Maximum	Observations
Population gradient	0.64	0.25	0.30	-0.97	12
Household gradient	0.60	0.24	0.27	0.96	13
Employment gradient	0.64	0.22	0.28	0.93	15
Mining gradient	0.43	0.35	0.00	0.93	10
Manufacturing gradient	0.64	0.26	0.21	1.00	16
Communications gradient	0.61	0.23	0.33	0.96	10
Trade & Commerce gradient	0.54	0.19	0.38	0.90	6
Other services gradient	0.58	0.29	0.03	0.93	19
Population gradient, 1981	0.70	0.24	0.35	0.96	8

Table 13: Gradients for UAs with Population density in CBD >10 times than that in suburbs

Gradient Type	Mean	Std.Dev.	Minimum	Maximum	Observations
Population gradient	0.81	0.09	0.70	0.90	4
Household gradient	0.80	0.07	0.70	0.86	4
Employment gradient	0.78	0.07	0.70	0.86	4
Mining gradient	0.56	0.25	0.13	0.83	8
Manufacturing gradient	0.76	0.18	0.53	0.93	5
Communications gradient	0.80	0.08	0.68	0.89	5
Trade & Commerce gradient	0.89	0.08	0.84	0.99	3
Other services gradient	0.85	0.05	0.81	0.90	3
Population gradient, 1981	0.56	0.04	0.53	0.59	2

Conversely, Tables 14-17 confirm that UAs, whose CBD employment density is lower than that in the suburbs, are more suburbanised in terms of their population. Similar is the case with household suburbanisation. Households are more suburbanised where the employment density is also higher in the suburbs when compared to the CBD. A similar story holds good for all other employment sub-sector gradients. Employment in the various sub-sectors is more suburbanised where total employment is suburbanised and vice-versa.

Table 14: Gradients for UAs with CBD Employment density less than that in suburbs

Gradient Type	Mean	Std.Dev.	Minimum	Maximum	Observations
Population gradient	0.10	0.13	0.01	0.26	3
Household gradient	0.19	0.36	0.01	0.84	5
Employment gradient	NA	NA	NA	NA	NA
Mining gradient	0.30	0.25	0.02	0.63	8
Manufacturing gradient	0.31	0.26	0.03	0.76	14
Communications gradient	0.27	0.15	0.10	0.49	6
Trade & Commerce gradient	0.42	0.27	0.08	0.87	14
Other services gradient	0.39	0.20	0.07	0.73	11
Population gradient, 1981	0.37	0.35	0.03	0.85	7

Table 15: Gradients for UAs with Employment density in CBD 1-5 times more than that in suburbs

Gradient Type	Mean	Std.Dev.	Minimum	Maximum	Observations
Population gradient	0.45	0.26	0.03	1.00	136
Household gradient	0.44	0.25	0.00	0.99	141
Employment gradient	0.44	0.26	0.02	0.99	145
Mining gradient	0.47	0.24	0.01	0.97	55
Manufacturing gradient	0.45	0.28	0.02	0.99	118
Communications gradient	0.48	0.26	0.01	0.98	105
Trade & Commerce gradient	0.50	0.26	0.04	1.00	87
Other services gradient	0.43	0.26	0.00	0.92	107
Population gradient, 1981	0.49	0.26	0.01	0.99	78

Table 16: Gradients for UAs with Employment density in CBD 5-10 times more than that in suburbs

Gradient Type	Mean	Std.Dev.	Minimum	Maximum	Observations
Population gradient	0.65	0.26	0.30	0.97	12
Household gradient	0.62	0.26	0.27	0.96	12
Employment gradient	0.63	0.25	0.28	0.93	12
Mining gradient	0.48	0.34	0.00	0.93	12
Manufacturing gradient	0.61	0.26	0.21	1.00	15
Communications gradient	0.63	0.23	0.33	0.96	11
Trade & Commerce gradient	0.54	0.19	0.38	0.90	6
Other services gradient	0.68	0.22	0.30	0.93	14
Population gradient, 1981	0.69	0.26	0.35	0.96	7

Table 17: Gradients for UAs with Employment density in CBD >10 times than that in suburbs

Gradient Type	Mean	Std.Dev.	Minimum	Maximum	Observations
Population gradient	0.79	0.09	0.70	0.87	3
Household gradient	0.78	0.07	0.70	0.84	3
Employment gradient	0.77	0.08	0.70	0.86	3
Mining gradient	0.51	0.27	0.13	0.80	6
Manufacturing gradient	0.81	0.15	0.61	0.93	4
Communications gradient	0.83	0.06	0.79	0.89	3
Trade & Commerce gradient	0.89	0.08	0.84	0.99	3
Other services gradient	0.85	0.05	0.81	0.90	3
Population gradient, 1981	0.56	0.04	0.53	0.59	2

Explaining India's Suburbanisation

I present the results from the estimation of population, household and employment (total and for certain sub-sectors) suburbanisation in Tables 18-20. The equations are estimated by ordinary least squares. First, note that the population and employment equations are adequately identified.

The size of the UA (indicated by population) and the lagged value of the population gradient (for 1981) significantly affect population suburbanisation (Table 18). Specifically, larger UAs are more suburbanised than smaller ones, as is clear from the negative sign on the variable. As metro areas grow bigger, people move farther out to make use of more land. The lagged value of the population gradient adds significantly to the model's explanatory power. The lagged population gradient is positive and significant, implying that UAs are likely to continue their historical suburbanisation trends. Consistent with what (Mills and Price, 1984) find, much of the explanatory power of the models comes from lagged values of the population gradient.

In the household suburbanisation equation, in fact, it is only the lagged value of the population gradient that is significant. This implies that the gradual convergence towards the equilibrium value of the gradient is indeed significant. By and large, it is also because of the lagged population gradient that the sample size is a little smaller than otherwise. However, without this variable, the explanatory power of all models is rather poor (0.07 or so) so I refrain from reporting those results. Overall, the explanatory power of the model is slightly better for the household suburbanisation than for population suburbanisation. This shows that the standard urban model is as much a model about households rather than merely about population.

To examine the impact of automobiles on suburbanisation, I separately estimate population and household suburbanisation equations with the number of motor vehicles per 1,000 population included along with variables in equation [4], since this data is available only for 21 of the UAs.²³ Even here it is the lagged population gradient that is significant in explaining population as well as household suburbanisation. In addition to this, another finding of interest in this estimation is that when controlled for the motor vehicles per 1,000 population, the literacy rate ratio has a negative impact on the gradient. This implies that when

²³ These estimations were based on only 15 observations.

ownership of the automobile is controlled for, population and households locate in the suburbs even when the literacy rate there is low relative to the central city! Another big difference is that when the motor vehicles per 1,000 population is added to the equations, the explanatory power increases to 0.83 (value of adjusted R-squared for population suburbanisation equation and 0.80 for household suburbanisation). Part of this is attributable to the fact that these estimations make use of only 15 observations and the model provides a good fit for the small sample. Apart from this, there could be little in the motor vehicles variable itself that explained suburbanisation, since it is not significant.

Table 18: Estimation of Population and Household Density Gradients, 1991

Variable	Population suburbanisation		Household suburbanisation	
	Coefficient (Standard Error)	Mean for relevant sample	Coefficient (Standard Error)	Mean for relevant sample
Constant	0.2769 (0.2267)		0.1831 (0.2054)	
Population/10,000	-0.0006 (0.0003)*	80.99	-0.0005 (0.0003)	80.99
Income (in Indian Rupees)	0.0000 (0.00)	63,290.62	0.00 (0.00)	63,290.62
Lagged population gradient	0.5280 (0.0979)***	0.47	0.5252 (0.0886)***	0.47
Proportion jobs suburbanised	-0.1836 (0.1104)	0.29	-0.1087 (0.1000)	0.29
Ratio of unemployment rate in central city to that in suburb	0.0070 (0.0082)	1.51	0.0065 (0.0074)	1.51
Ratio of proportion SC/ST population in the central city to that in suburb	-0.0550 (0.0701)	0.80	-0.0559 (0.0635)	0.80
Number of governments in UA, 1981	0.0058 (0.0039)	6,33	0.0042 (0.0035)	6,33
Literacy rate ratio (central city to suburb)	0.0122 (0.0914)	1.05	0.0098 (0.0828)	1.05
Mean, dependent variable		0.42		0.39
Adjusted R²	0.38			0.40
Number of observations	76			76
F	6.67			7.12

* Significant at 10 percent level of significance.

***Significant at 1 percent level of significance.

When we estimate employment suburbanisation, it is the lagged value of the population gradient, that explains a substantial part of employment suburbanisation in India's UAs (Table 19). This shows that jobs follow people, but not the other way (recall that jobs suburbanised did not have a significant impact on population or household suburbanisation, Table 18). This is consistent with the findings of (Mills and Price, 1984) for American cities. This implies that, in India's cities, it is not the current population or size of the UA, but it is the pool of labor force that is pre-existing, that impacts employment suburbanization. When the lagged value of the population gradient is included, the model explains 31 percent of employment suburbanisation.

Table 19: Estimation of Employment and Manufacturing Density Gradients

Variable	Employment suburbanisation		Manufacturing Suburbanisation	
	Coefficient (Standard Error)	Mean for relevant sample	Coefficient (Standard Error)	Mean for relevant sample
Constant	0.3578 (0.1934)*		0.3681 (0.2574)	
Population/10,000	-0.0004 (0.0003)	82.20	-0.0005 (0.0003)*	95.34
Wage costs in state (Emoluments as % of output)	0.4916 (1.4624)	0.06	3.4507 (1.7326)*	0.06
Number of governments in UA, 1981	0.0026 (0.0034)	6.45	0.0043 (0.0036)	7.06
Ratio of proportion SC/ST population in the central city to that in suburb	-0.0725 (0.0678)	0.80	-0.0119 (0.0960)	0.75
Literacy rate ratio (central city to suburb)	-0.0165 (0.0901)	1.05	-0.1874 (0.0983)*	1.06
Lagged population gradient (1981)	0.4886 (0.1003)***	0.48	0.4636 (0.1136)***	0.47
Proportion population in labor force	-0.3995 (0.5508)	0.30	-0.4987 (0.7701)	0.29
Mean of dependent variable		0.41		0.42
Adjusted R²	0.31		0.31	
Number of observations	74		63	
F	5.62		4.98	

* Significant at 10 percent level of significance.

***Significant at 1 percent level of significance.

When I estimate manufacturing employment density gradients, some interesting new results emerge. Table 19 shows that the size of UA, wage costs, literacy rate ratio of central city when compared to that in suburbs, and lagged value of the population gradient are important and significant in explaining manufacturing suburbanization in India's cities. This implies the following:

- a. Manufacturing jobs follow people with specific skills for which literacy rate is only a proxy.
- b. Manufacturing moves away from high-wage areas.²⁴
- c. Manufacturing activity requires large amount of land and has to locate away from high density areas such as the CBD,

²⁴ Note that wage costs (as measured by emoluments as percentage of value of output) are not available in a disaggregated fashion for central city and suburbs, but are for the state in which the UA is located.

All these explanations are consistent with what we know about cities that have large manufacturing bases. Finally, I estimate suburbanisation of communications jobs and trade & commerce service jobs (Table 20). When we take the former, the factors that explain manufacturing suburbanisation also explain suburbanisation of communication jobs, with the exception of wage costs, that are not important for communications. In the case of communications, large UAs are more suburbanised than are smaller UAs. These jobs follow people again, as may be evident in the continued significance of the lagged population gradient. As with manufacturing jobs, if the ratio of literacy rate in the central city is high relative to that in suburbs, these jobs are centralised, if not, they are suburbanised. This again reinforces the importance of a variety of skills for these jobs as well, of which literacy rate is just one measure.

Table 20: Estimation of Density Gradients, Employment Sub-sectors

Variable	Transport and Communication suburbanisation		Trade and Commerce Suburbanisation	
	Coefficient (Standard Error)	Mean for relevant sample	Coefficient (Standard Error)	Mean for relevant sample
Constant	-0.0259 (0.2534)		0.2456 (0.2431)	
Population/10,000	-0.0005 (0.0003)*	95.99	-0.0005 (0.0003)*	110.40
Wage costs in state (Emoluments as % of output)	-0.9152 (2.1707)	0.05	-5.4337 (1.9031)*	0.06
Number of governments in UA, 1981	0.0035 (0.0039)	7.17	0.0049 (0.0036)	7.74
Ratio of proportion SC/ST population in the central city to that in suburb	0.0145 (0.0946)	0.80	0.0229 (0.0877)	0.80
Literacy rate ratio (central city to suburb)	0.1848 (0.1076)*	1.05	0.2001 (0.0963)**	1.06
Lagged population gradient (1981)	0.4302 (0.1244)***	0.46	0.4640 (0.1290)***	0.41
Proportion population in labor force	0.6684 (0.7498)	0.30	0.5690 (0.7061)	0.29
Mean of dependent variable		0.50		0.51
Adjusted R²	0.27		0.38	
Number of observations	60		51	
F	4.16		5.37	

* Significant at 10 percent level of significance;

** Significant at 5 percent level of significance;

*** Significant at 1 percent level of significance.

Finally, the suburbanisation of trade and commerce jobs follows a similar pattern as with manufacturing jobs. That is, larger UAs have more suburbanised trade and commerce employment. Further, they follow people as well (lagged value of population gradient), and follow people with certain skills (at the minimum, the literacy rate). So if there are more literates in the suburbs, these jobs are suburbanised, and vice-versa. The wage costs are as important in determining the location of trade and commerce jobs, as with manufacturing jobs. The higher the wage costs, the more likely that trade and commerce jobs move away.

Discussion and Implications

When we take all results together, we find that in India, larger UAs are in general more suburbanised. Population gradients converge gradually to their equilibrium value, as rightly pointed out by (Mills and Price, 1984). This is evident in the robustness of the lagged population gradient in the population and household gradient equations. Further, jobs follow people as may be seen in all the employment (total as well as sub-sector) gradient equations. Various jobs closely follow people for the skills they have to offer of which literacy rate is only one indicator. Manufacturing and trade/commerce jobs are sensitive to wage costs as well. This indicates that 'right to work' laws may have to take precedence over minimum wage laws.

In India's context, these results are quite important. This is because a number of business process outsourcing (BPO) firms are looking to make use of labor force with 'employable' skills. Thus policies to attract population flows with certain skills may be more successful than specific policies or incentives to attract these firms. This result is quite important in the light of competition among states for various kinds of firms. This implies that state and local governments are better off focusing on improving skills of their population with universal literacy and vocational training programs. For instance, call centre firms look only for training in English speaking, and whether employees have a neutral English speaking accent.

Recently, BPO firms in India classified various cities in India based on how much training of labor force is needed in every city category. See Table 21, which has been reproduced from India's leading business newspaper, The Economic Times (October 5, 2004), for purposes of illustrating how important skills are in this booming industry in India. This is just an example of the specific skills communications firms require.

Table 21: Search for Talent: Classification of Towns for Locational Decisions

Type	A City	B City	C City
Locations	Delhi, Mumbai, Bangalore, Chennai, Gurgaon, Faridabad, Noida, Pune, Thane Satellites: Hyderabad, Kolkata, Ahmedabad, Baroda, Trichy, Kochi	Chandigarh, Jaipur, Kota, Goa, Nagpur	Meerut, Jodhpur, Bhopal, Patna, Nasik, Guwahati, Vizag, Pondicherry, Coimbatore, Gwalior -----
Talent pool availability	High	Medium	Low
Costs	High	Medium-low	Less than 10%
Attrition	Very high (45%-50%)	Less than 15%	High training required
English accent	Very little training required	Training required	

Source: The Economic Times, October 5, 2004.

It may be asked that if companies are making their judgments regarding talent pool availability, is this research relevant. The research here shows that over and above BPO and call centre firms, traditional firms such as transport, communications, manufacturing, trade and commerce firms are also sensitive to availability of workforce with specific skills. This is probably nothing new as well. The research and the database developed in this paper can be a useful warehouse of information for all these firms regarding where the population has suburbanised, and where they have not. Further, urban local governments in UAs where literacy rates are low can gear up to improve their public services so that they are able to attract and retain skilled labor force.

Concluding Remarks

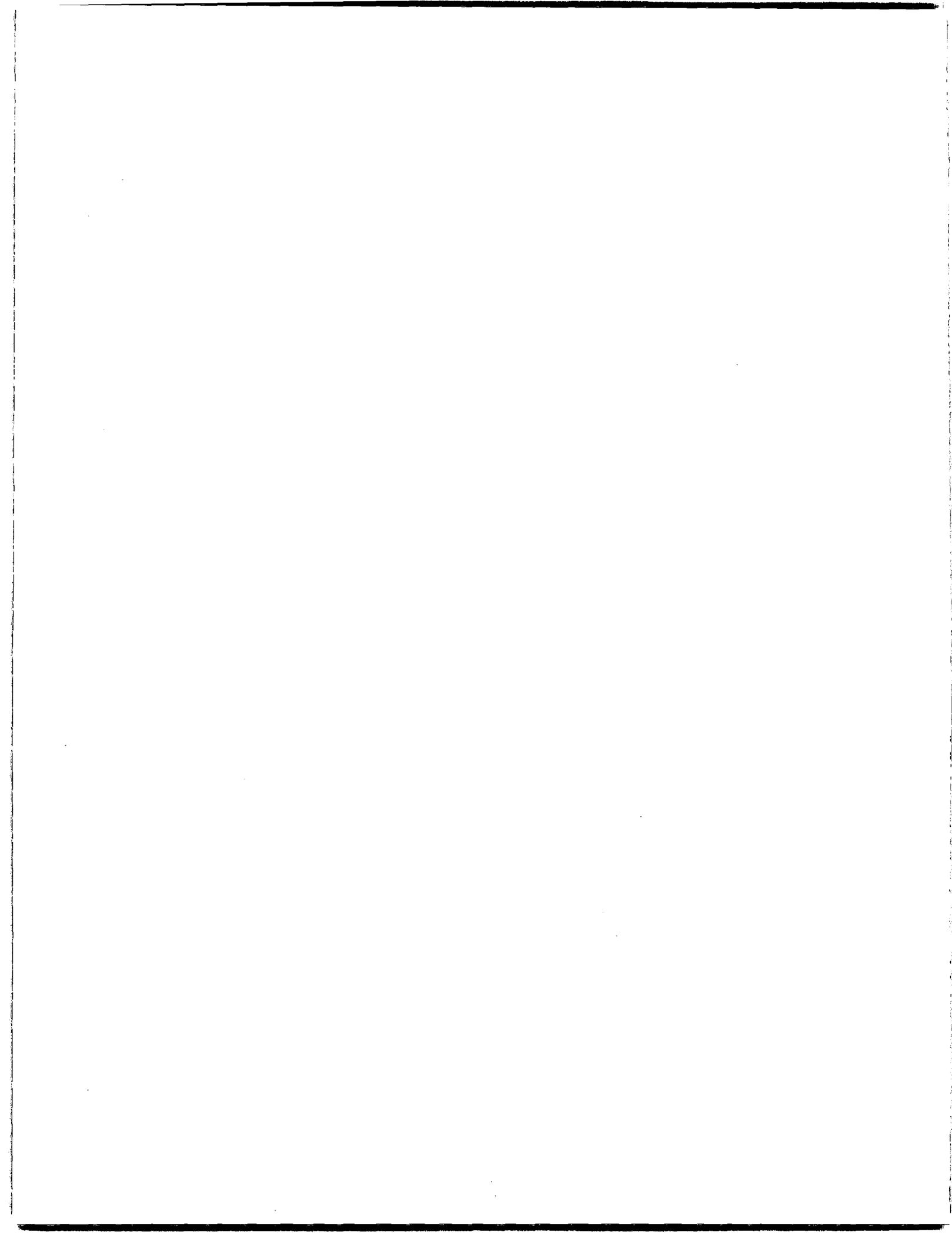
This study has examined population, household and employment suburbanisation in India's UAs, a topic that has received comparatively less attention in the literature. The findings of interest are that population, household and employment suburbanisation has certainly taken place in India's UAs. Persons have suburbanised as urban agglomerations have naturally evolved, and persons as well as households suburbanize, consistent with historical trends. Employment suburbanizes in response to availability of labor force with specific skills one measure of which is the literacy rate. In addition, manufacturing and trade/commerce jobs are sensitive to wage costs.

The logical question to ask is: does increasing suburbanisation of urban agglomerations imply that individual UAs can suburbanize forever? As (Mills and Tan, 1980) note, there is an intense conflict between suburban development and rural land uses in the context of developing countries. It is likely that suburbanisation in the Indian context implies conversion of a large number of rural areas into urban areas (increase in the number of UAs phenomenon, for instance, over 1991-2001, there has been an increase in the number of UAs from 275 to 375 in India). If this trend continues, India is more likely to have a more extensive rather than intensive urbanization phenomenon. That is, more number of cities rather than more growth of existing cities. That way, suburbanisation means that the rural hinter-lands of the country would benefit from urbanization, public services and overall growth.

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URBAN SPRAWL, LAND MARKETS AND ENVIRONMENT DEGRADATION IN SÃO PAULO, BRAZIL

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Abstract

The decline in the rate of the population growth of São Paulo's Metropolitan Area was expected to produce a highly positive impact on this metropolis, reducing its need for public investment in urban infrastructure and social policies. However, it has now become clear that such expectation was somehow misguided. While the center of the city is significantly losing population, the peri-urban areas are still growing very fast. As a result of this dynamic, the region continues to demand strong public investments in transportation and other urban infrastructure, with considerable environmental impacts.

In view of these elements, this paper aims at understanding the reasons for such intra-urban dynamic by comparing spatial patterns of population growth and real estate investments. We intend to show that – surprisingly – the city is losing population exactly in the same places where real estate investments are growing more significantly. We also intend to explore some of the environmental consequences of this pattern of urban sprawl, particularly by presenting data on forest coverage reduction.

Introduction

Between the 1970s and the 1990s, the rate of population growth declined remarkably in the São Paulo Metro Area, going from 4.5% per annum to the national average of 1.7%/year. Different demographic projections, such as the one produced by the Bureau of Statistics for the State of São Paulo (Seade), indicate that the Metro Area is likely to present stable population figures in the near future (Waldvogel, 2003). Such prospects have generated great expectation that the decline in the rate of population growth would positively impact the metropolis, reducing the need for public investment in urban infrastructure and social policies. To some extent, this local hypothesis relates to the so-called “urban transition theory”, which assumes that with the long-term reduction of rural-urban migration, cities could achieve a more sustainable pattern of development (Livi-Bacci and De Santis, 1998; Martine, 2001).

However, the expectations of a more sustainable development have not been fulfilled in the case of São Paulo. This happened because while the center of the city is significantly losing population, the peri-urban areas are still growing very fast (more than 6% per year between 1991 and 2000), with the population living in such areas rising from 19% to 30% of the Metropolitan Area. As a result of this urban dynamics, the region still

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demands strong public investments in terms of transportation and other urban infrastructure, followed by considerable environmental impacts.

Overall, the most general argument presented in this paper is that the connection between population growth and urban environment should not be considered in an abstract form, as if all urban environments and institutional contexts were the same. The interplay between population and environment must be considered in “concrete territories”, with all their social and environmental diversity and their institutional complexity. In the case of Brazilian Metropolitan Areas, we propose that particular dynamics of the land market – affected by land use regulations, as well as public policies (i.e., transportation and housing) – strongly influence the urban sprawl dynamics and its environmental impacts.

Considering these elements, the first objective of this paper is to understand the evidence on urban sprawl and present an operational definition of peri-urban region, discussed in section 1. In section 2, we intend to argue that such sprawl is producing an important land-use transformation, inducing the destruction of the natural environment around the Metropolitan Area and the contamination of water sources. Additionally, urban sprawl leads to the occupation of parks and environmentally protected areas, such as the Atlantic Forest Biosphere Reserve and Billings/Guarapiranga Water Reservoirs in the South of São Paulo’s Metropolitan Area, or the Serra da Cantareira’s Forest Reserve in the Northern part of the city.¹

In section 3, we discuss the reasons for this intra-urban dynamic by comparing spatial patterns of population growth and real estate investments. We intend to show that – surprisingly – the city is losing population exactly in the same places where real estate investments are growing most significantly.² Finally, we also present a brief conclusion to explore the arguments presented here from the point of view of urban policies.

Urban sprawl and peri-urban areas in São Paulo

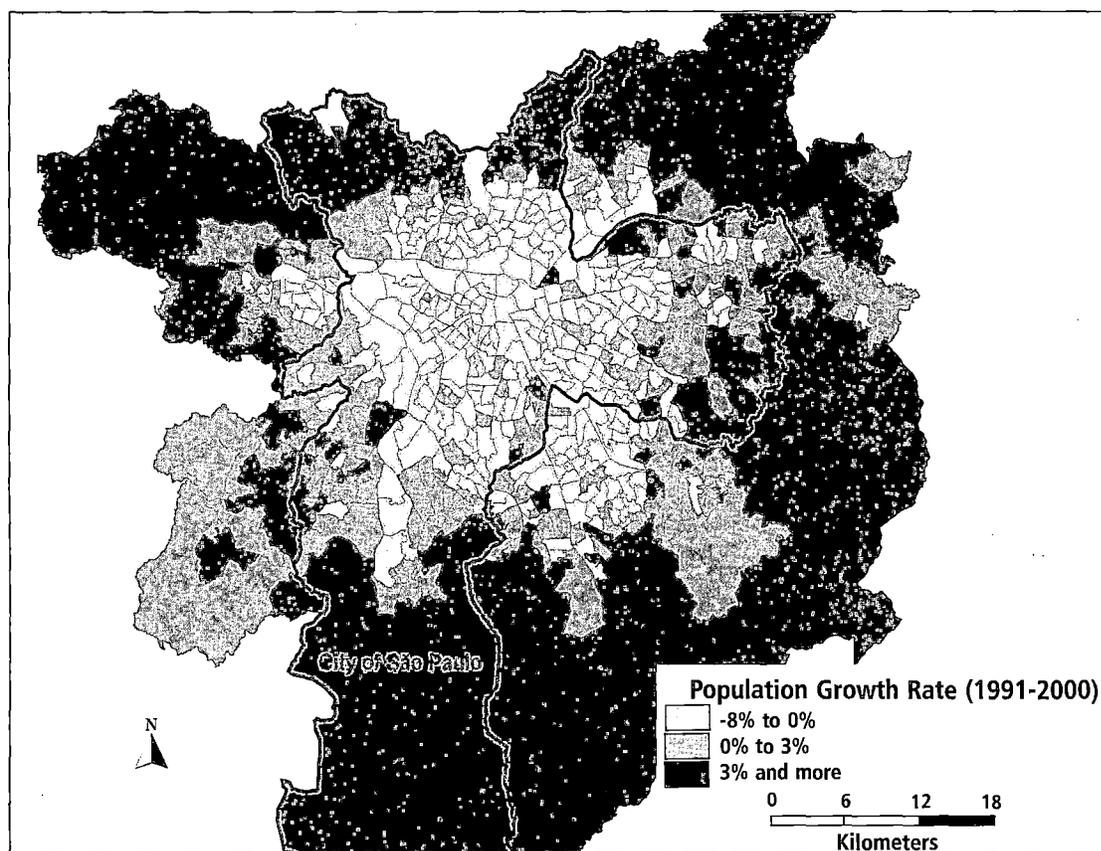
Map 1 below presents the spatial distribution of the population growth rate of the census survey areas (áreas de ponderação) of the urbanized area of São Paulo comprised by 21 municipalities.³ It is possible to observe that the demographic growth of this region has been very unevenly distributed in the past decade. While the central areas of the most important municipalities of the region – including São Paulo (Downtown), Guarulhos (Northeast), ABC (Southeast) and Osasco (West) – have lost population in absolute terms, some areas located in the outskirts of the city have grown very fast.

¹ Satellite images (Landsat TM 1991, Landsat ETM 2000 and SPOT 2004) are used to build urban environmental indicators – i.e., vegetation index and land cover changes (forest coverage reduction, urban sprawl) – at a local scale (districts, census tracts and census sample areas). See Annex 1.

² Most of these analyses benefit from the GIS database developed at the Center for Metropolitan Studies (CEM-Cebrap), where census data (1991, 2000), satellite images, real estate data, etc. are all available in GIS format. The authors used Maptitude, Envi and Arcview as their GIS software. See,

www.centrodametropole.org.br

³ The Metropolitan Area of São Paulo is an official definition that includes 39 municipalities. The 21 municipalities considered here are the ones that form a continuous urban area accounting for 92% of the total population of the Metro region.. The Census Survey Areas are the spatial units of the 2000 Census that allow tabulations for the Census Survey.

Map 1: Rate of Population Growth of Census Survey Areas (1991-2000). São Paulo Urbanized Area.

Source: IBGE, 1991 and 2000 Census.

The areas located in the external ring of the region presented a significant growth rate, often higher than 5% a year. We can also observe that there are practically no census areas in the central portion of the city that present positive growth.⁴ In operational terms, we are assuming that the peri-urban region corresponds to the census areas that presented a rate of demographic growth of over 3% a year between 1991 and 2000. The peri-urban region could have been otherwise defined by alternative variables, such as the presence of sanitation or built area per inhabitant. Demographic growth rate was chosen as a defining variable due to the important role it plays in indicating the dynamics of urban transformation over time.⁵

In contrast with typical U.S. medium- and high-income urban sprawls (Duany, Zyberk and Speck 2000), the demographic growth of the Brazilian peri-urban region results from the extension of existing poor areas, almost all located in the suburbs in the case of São Paulo (Torres, 2002). Most “traditional” poor areas now present low demographic growth. From the point of view of public policies, the distinction between poor areas of fast or slow growth is critical. While peri-urban areas must build their infrastructure – i.e., streets,

⁴ The only exceptions are the areas where the shantytowns of Paraisópolis and Heliópolis – the largest of São Paulo – are located.

⁵ The level of 3% is arbitrary, but reasonable if we intend to characterize areas of strong growth. This percentage is twice the growth rate of the population of the area considered here (1.4% per year).

schools, healthcare facilities and basic sanitation – “old” poor suburbs have much of this equipment already in place. In those areas, social policy refers to other elements, such as the improvement of local education and housing, as well as better access to labor markets and credit.

Regarding medium- and high-income areas of the city, most are losing population, with Alphaville and Vila Andrade in the western part of the region as the only exceptions. This connection between population growth rate and average income in different areas of São Paulo is not necessarily universal, but related to recent demographic trends of the city (Torres, 2004).

In aggregate terms, the recent demographic change of São Paulo may be considered rather awkward. While the region as a whole was growing in moderate terms (1.4% a year in the 1990s), the central negative-growth areas were losing population quite fast (-1.3% a year). In contrast, peri-urban fast growth areas were growing at the impressive rate of 6.3% (Table 1).

Table 1: Population and Rate of Population Growth According to Groups of Areas. São Paulo Urbanized Area, 1991-2000

Date	Population (thousands)				Growth Rate 1991- 2000			
	Negative growth areas	Slow growth areas > 0 & < 3%	Fast growth areas > 3% a year	Total	Negative growth areas	Slow growth areas > 0 & < 3%	Fast growth areas > 3% a year	Total
1991	6738	4909	2792	14433	-1.30	1.27	6.35	1.39
2000	5992	5495	4860	16347				

Source: IBGE, Demographic Census, 1991 and 2000.

As a consequence, the population in negative growth areas has decreased from 6.7 to 6 million inhabitants between 1991 and 2000. In slow growth areas, it has increased from 4.9 to 5.5 million, while in the peri-urban (fast growth) areas it rose an impressive 2.1 million inhabitants (from 2.8 to 4.9). In 2000, this area represented 30% of the total population of the region. Without growth in the peri-urban areas, the urbanized region of São Paulo would have kept its population stable in the 1990s.

As mentioned, intense demographic variations of this kind have important consequences for public policies. The expectation that a slower population growth rate would reduce the pressure to supply public services is only partially true. The persistent horizontal growth of the city requires a continuous extension of the network of public services to the peri-urban areas, even when the infrastructure located in the central areas is not used to its full potential. It is also important to notice that this region corresponds to an average extension of 70x60 km and the transportation system is crowded and expensive. In other words, it is not realistic to imagine that peri-urban residents would easily access services only available in central areas (Torres, 2002a). Besides having the highest population growth rates of the city, the peri-urban areas also unsurprisingly present the worst socioeconomic indicators, with high levels of poverty, illiteracy and unemployment. Table 2 shows that the average family income in the slow growth areas is more than twice the one observed in the peri-urban areas, with the income per capita of the average family almost three times higher. This table also shows that such income differentials are associated with high levels of unemployment and illiteracy. This poor and illiterate peri-urban region also concentrates the largest share of the black population (44%). Sanitation indicators, such as water supply, and garbage and sewage collection are also lower in the peri-urban areas.

Table 2: Socioeconomic and sanitation indicators of the Urbanized Area of São Paulo, 1991-2000

Indicators	Groups of Areas			Total
	Negative growth areas	Slow growth areas > 0 & < 3%	Fast growth areas > 3% a year	
Average family income (*)	14.62	10.53	6.52	10.42
Family income per capita (*)	4.65	3.04	1.74	3.86
Unemployment rate (**)	15.06	20.39	24.25	19.41
Illiterate heads of household	3.56	7.12	9.89	6.47
Proportion of blacks (%)	19.54	34.44	43.97	31.81
Water (%)	99.82	98.84	93.18	97.67
Sewage (%)	95.84	84.65	64.96	83.69
Garbage (%)	99.81	99.25	97.58	99.01

Source: IBGE, Demographic Census of 2000.

Notes: (*) In minimum wages (–US\$100 in 2005).

(**) It does not correspond to official unemployment estimates because the Brazilian census employs a different methodology.

This urban sprawl also has significant environmental consequences in terms of transportation and pollution. On the one hand, peri-urban housing means longer journeys and an increase in air pollution; on the other, poor peri-urban areas are also characterized by lack of sanitation and the consequent pollution of rivers and streams (Torres, 2002a), as well as deforestation and destruction of the natural landscapes that still surround São Paulo. We further discuss this issue below.

Urban Sprawl and Environmental Degradation

One of the most significant environmental impacts of the urban sprawl of São Paulo involves the massive destruction of the green belt of the Atlantic Rainforest surrounding the city. The Atlantic Rainforest is one of the most endangered ecosystems in the world. Different studies on deforestation estimate that less than 10% of the original forest is left in Brazil, and the rate of destruction is still high (Fundação SOS Mata Atlântica, 1998).

São Paulo's Atlantic Rainforest greenbelt has been partially preserved – especially on its Northern and Southern parts – mainly because the topography of the remaining areas does not allow for its agricultural exploitation. The South Region is part of a water sources protection area, and its already high population growth has intensified in the last decade. More recently, the North of São Paulo has also been growing fast around the fringes of the Serra da Cantareira, a mountain range that limits that side of the city.⁶

The so-called “law of water sources protection” of 1975 has not been able to limit the urban expansion around the major lakes and forest remains in the Southern part of the metropolis. On the contrary, the law has produced a decrease in land prices, which led to a rise in illegal occupation, with the consequent pollution of water sources, and to deforestation (Marcondes, 1996). In a buffer of 1km around the two major lakes

⁶ The expansion of such areas relates to both illegal occupation (i.e., shantytowns) and illegal developments, and legal settlements (small farms and industries) (Marcondes, 1999).

(Guarapiranga and Billings), for instance, the population has grown from 554 thousand in 1991 to 881 thousand in 2000, or 4.3% a year.⁷

The most important preserved remnants of the Atlantic Rainforest are located in the southernmost portion of the Metro Area. In the North, the public parks of Cantareira and Jaraguá – established by the State government – also include important remnants of native forest with medium to advanced stages of forest succession. Both the Western and Eastern areas of the city are less protected by the presence of parks and reserves (PMSP, 2002).

A recent green coverage study conducted by the government of the city of São Paulo using satellite images indicated that the city has lost 53.4 km² of its green coverage in the past decade (PMSP, 2002). The greatest part of this deforestation (56%) was concentrated in only 10 of a total of 96 districts, all located in the poor suburbs, where a high rate of population growth also occurred.⁸

In other words, the urban sprawl was followed by a significant destruction of the remaining forests in the Metro Area, with little respect for the restrictive environmental legislation that forbids deforestation of the Atlantic Rainforest – Bylaw 750/93 (Marcondes, 1999). Those green areas are included in the “Atlantic Forest Biosphere Reserve”, which is part of a UN initiative (Lino, 1992), and serve as ecological corridors and routes for migratory species. They also play a fundamental role in the conservation of water sources.

Not surprisingly, the city has an important deficit of public spaces and green areas, a situation unlikely to be reversed since in the most consolidated portions of the city there are very few public areas available for building new parks. Available green coverage maps show that half of the city districts present no significant forest coverage, there included both the trees planted along the street network and parks or squares (PMSP, 2002). In poor suburbs, several public areas that could have been otherwise used as green spots were invaded and turned into shantytowns and illegal settlements.⁹

In 1991, the municipalities of the Metropolitan Area considered in this study still presented forest coverage of 1.23 thousand square kilometers, or 35.7% of its total, which was mostly located in preserved and strategic sites for the protection of water reservoirs. By 2000, the remaining forest in the same municipalities accounted for 1.17 thousand square kilometers (34% of the region). Surprisingly, such data indicates that the São Paulo Metropolitan Area still presents significant forest coverage.

However, this data also indicates an important net loss of forest cover (57.2 square kilometers) during the 1990s, at a rate of -4.7% in nine years.¹⁰ Although such deforestation is not very high when compared with the rate of destruction of other Brazilian areas such as the Amazon (PRODES-INPE, 2004), as mentioned, it is quite important for São Paulo because of both the previous loss and the strategic services it provides for the metropolis in terms of protection of water sources and reduction of the air pollution.

In Map 2 we present the distribution of forested areas in São Paulo in 2000, highlighting the areas that suffered higher levels of deforestation during the 1990s (more than 2% of its area within the decade). In

⁷ Data calculated with the use of a Geographic Information System (GIS).

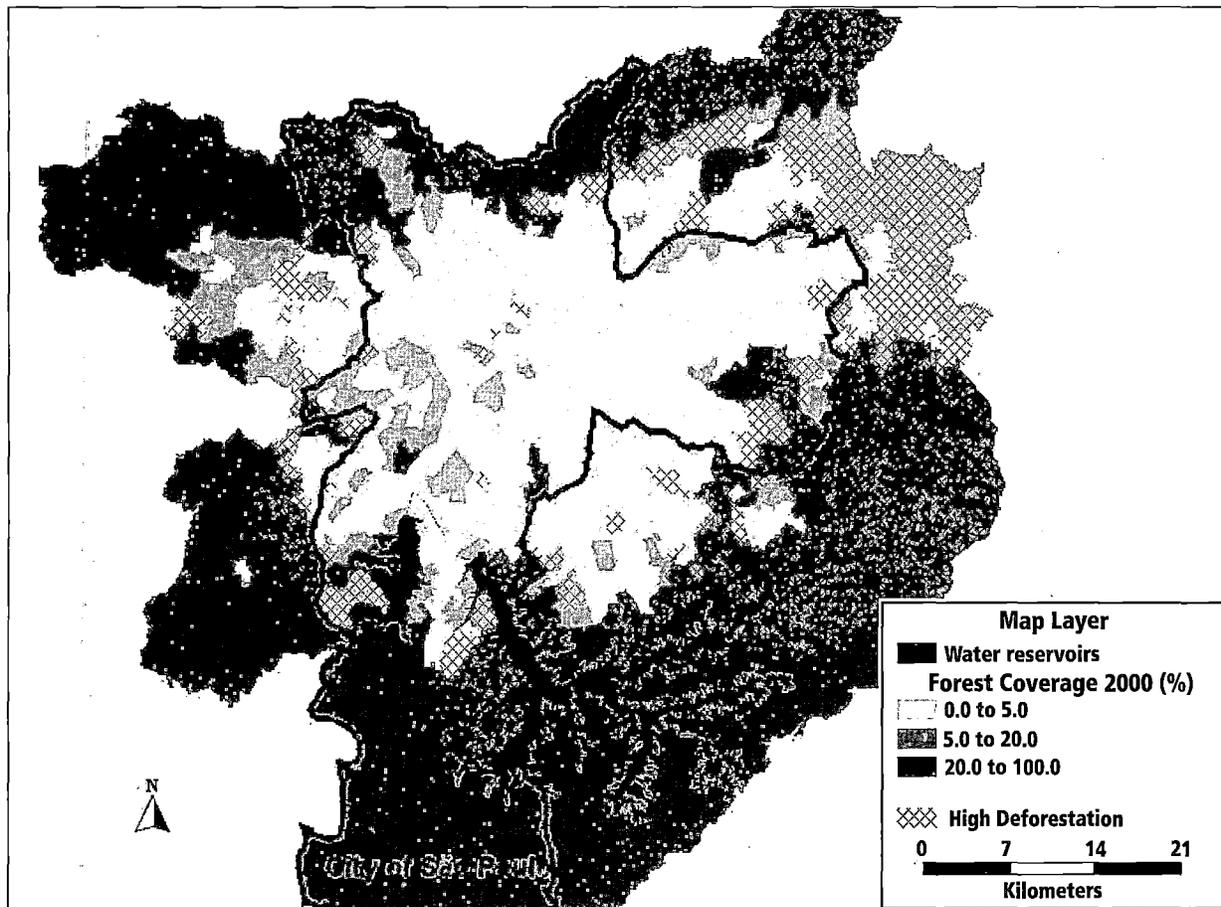
⁸ Those districts include Jardim Ângela, Parelheiros and Grajaú in the South; Tremembé, Perus, Anhanguera and Jaraguá in the North; and Iguatemi, Cidade Tiradentes and São Rafael in the East.

⁹ See section 3.

¹⁰ Such estimate simply subtracts the forested areas accounted for in 1991 from the ones in 2000, and therefore also includes forest plantation and regeneration.

geographic terms, most of the deforestation took place in the same far suburbs that had grown significantly in that same decade.¹¹

Map 2: Forest Coverage and Areas with High Level of Deforestation. Urbanized Area of São Paulo, 2000



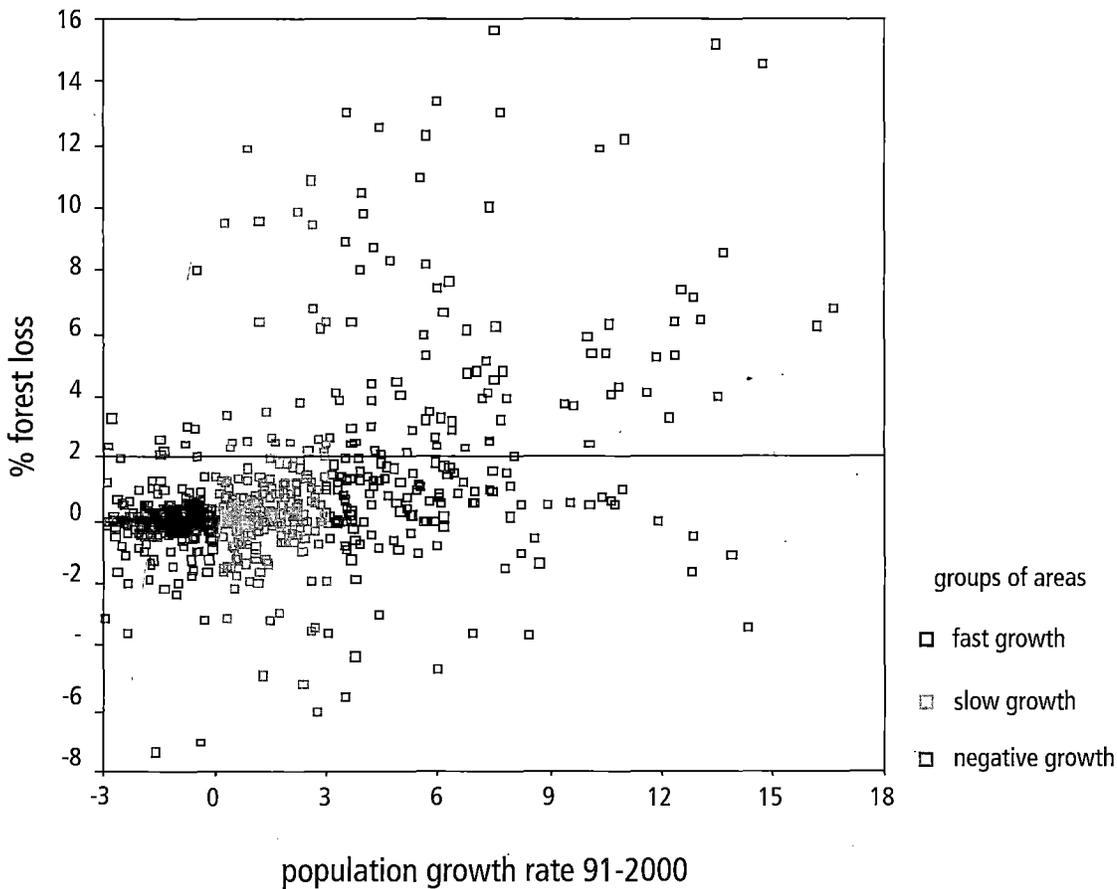
Source: CEM-CEBRAP. Satellite images (LANDSAT TM 1991 and LANDSAT ETM 2000). See, Annex 1.

It is possible to observe that the center of the city is almost completely deforested, while large parts of the suburbs are still covered with their original vegetation. We did not consider in this account pasture or grassland, although secondary and reforestation areas are also included in this estimate. It is also important to notice in Map 2 that the areas highlighted – those with more than 2% of deforestation in the 90s – showed a total population of 1.7 million in 1991 and 2.8 million in 2000, a rate of growth of 5.3% a year. Although this kind of ecological data may not precisely establish the connections between population growth and deforestation, it is clear that most of the deforestation occurs in areas with a very fast growth rate (see figure 1).¹²

¹¹ See Map 1.

¹² We are trying to test such arguments using a space regression model (Anselin, 1996), but we still have to complete the data set for variables related to the existence of parks and reserves. As a preliminary exercise, we present in Annex 2 a regression showing that population rate growth and deforestation are significantly correlated even when using controls for other variables, such as 1991 forest coverage ($R^2 = 36\%$).

Figure 1: Relationship between Population Growth and Forest Loss in the Urbanized Area of São Paulo, 1991 and 2000.



Source: IBGE, Demographic Census of 1991 and 2000 and Satellite Images.

- Notes:**
- 1) Each point refers to a census survey area.
 - 2) The percentage of forest loss was calculated for each area.
 - 3) Pearson correlation coefficient $r = 0.426$

The figure shows that a high rate of forest loss rarely occurs in negative and slow growth areas, and that almost all deforestation has happened in the fast growth (peri-urban) areas. However, it is also important to consider that not all peri-urban areas present high rates of deforestation, with some of them even showing forest regeneration. In this context, public intervention should consider a targeted approach, focusing on the Eastern portion of the city, for instance, which concentrates an important share of forest loss.

At table 3 below, we interpret this forest data employing the same geographic divisions previously used for analyzing these demographic trends.¹³

¹³ See Annex 1 for technical procedures.

Table 3: Changes in Land Cover between 1991 and 2000. Urbanized Area of São Paulo.

Indicators	Groups of Areas			Total
	Negative growth areas	Slow growth areas > 0 & < 3%	Fast growth areas > 3% a year	
Area (excluding lakes)	630.54	739.14	2,075.14	3,444.82
Urban area 1991 (km ²)	533.06	342.6	275.53	1,151.21
Forest coverage 1991 (km ²)	22.33	155.07	1,051.23	1,228.63
Proportion of urban land 1991 (%)	84.54	46.35	13.28	33.42
Proportion of forested land 1991 (%)	3.54	20.98	50.66	35.67
Urban area 2000 (km ²)	538.85	389.84	375.08	1,303.77
Forest coverage 2000 (km ²)	22.85	147.03	1,001.54	1,171.42
Proportion of urban land 2000 (%)	85.46	52.74	18.07	37.85
Proportion of forested land 2000 (%)	3.62	19.89	48.26	34.01
Change in urban area 1991-2000 (km ²)	5.79	47.22	99.55	152.56
Change in forested area 1991-2000 (km ²)	0.52	-8.03	-49.70	-57.21

Source: CEM-Cebrap. Satellite images (Landsat TM 1991, Landsat ETM 2000).

In 2000, almost 50% of the fast growing (peri-urban) areas are still forested, particularly in the North and South. In slow growth areas, 20% of the territory presented forest coverage, while negative growth areas showed a forest coverage of only 4%. Ironically, the rate of population growth is strongly positive in the forested areas and negative in the denser urban areas. Furthermore, more than 85% of all forest coverage of São Paulo's Urbanized Area is located in peri-urban areas, with more than one thousand square kilometers.

Between 1991 and 2000, the peri-urban areas presented a net loss of almost 50 km² of forest coverage, which represents a reduction of 5% of the original 1991 coverage. In other parts of the city, such loss was less significant, and even include a small increase in the forest area of the central parts of the city (negative growth areas). As a whole, almost 5% of the forest coverage that existed in 1991 was destroyed by 2000, a trend that will most likely persist in the near future.

In map 2, it is also possible to see that the region in which the most important water sources for São Paulo are located – the reservoirs of Billings and Guarapiranga in the South of the city – also presents both significant deforestation and rapid population growth. As mentioned before, the consequences of such dynamics are a concern extensively discussed in the local press. The annual investment needed to preserve such reservoirs is daunting. The alternatives would imply, for instance, bringing water from Vale do Ribeira, located further down South. Such an expansion of the water network would demand huge public investment due to the distance and the topographic difficulties involved.

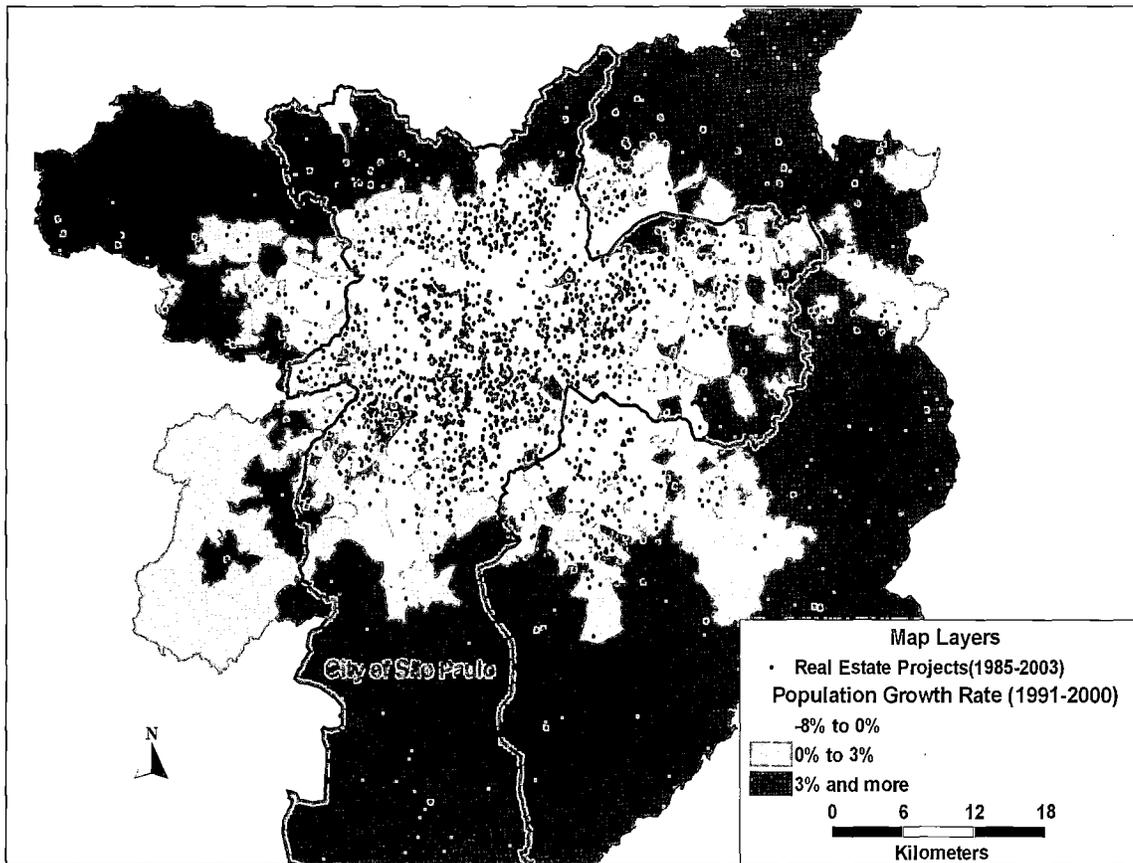
Most of these appalling trends are related to the land market rationale. Should population growth occur in denser areas, much of the current damage could be reduced. In our view, only a significant change in the dynamics of local land markets could allow a more sustainable pattern of growth. We discuss this issue below.

Urban sprawl and land markets

Between 1995 and 2003, there was significant residential real estate investment in São Paulo, with private companies launching more than 7,500 residential developments, including nearly 400,000 residential units, 3 million square meters of area and almost 10 billion US dollars in private investments.¹⁴ Such projects refer to those by private companies only, and exclude investments made by families and individuals themselves. Surprisingly, the bulk of such investment happened in areas that lost significant amounts of population between 1991 and 2000, as shown in Map 3.

In other words, there seems to be limited connections between the housing developments by private companies and the dynamics of strong population growth in the distant suburbs. The residential units built by private companies were offered almost exclusively to medium- and high-income families. Only 11% of such projects involved houses or apartments of less than 50 square meters of residential built area, which could be considered more cost effective for low-income families. And even those small apartment buildings were mostly located in rich neighborhoods and sold as hotel flats. Overall, private companies' developments were never intended to be sold to poor dwellers, since their lack of income made them unaffordable for both acquisition and rental purposes.

Map 3: Real Estate Investment (1985-2003) and Rate of Population Growth of Census Survey Areas (1991-2000), São Paulo Urbanized Area



Sources: IBGE, 1991 and 2000; Embraesp, 1985-2003.

¹⁴ See Embraesp 1985-2003, which register all new real estate investments advertised in newspapers.

Although we have limited individual data to support such an argument, in this case the ecological data presented here can also be considered evidence, since there are almost no private companies investing in the fast-growing poor suburbs. Table 3 summarizes the data available on this issue.

In fact, this data shows that the rich areas (those that are losing population) receive the largest amount of private investment (70%), with the poorest areas (that are growing more than 3% a year) receiving only 6% of the total investment between 1985 and 2003. In other words, there is virtually no private investment by developers in poor areas, especially considering the size of the population and its growth rate. These trends also indicate an increase in the already high level of residential segregation (Torres, 2004).

Table 4: Indicators on Private Companies' Housing Investment (1985-2003) According to Groups of Census Survey Areas, Ranked Following Their Population Growth Rate (1991-2000). Urbanized Area of São Paulo.

Groups of areas according to population growth rate, 1991-2000	Number of occupied households 2000	Population density (Pop./ km ²)	Average family income (1)	New private investment in residential area per household (2)	New investment per household (3)	Investment per group of areas (%)
-8 to -1.5%	622918	7484	22,90	12,84	5,55	37,51
1.5 to 0%	1213558	10749	15,15	7,17	2,49	32,80
0 to 1.5%	916966	10836	11,17	7,09	1,63	16,19
1.5 to 3%	605315	10943	9,54	3,57	1,16	7,60
3 to 5%	466761	7961	6,97	3,26	0,60	3,04
5% and more	801623	8715	6,23	1,98	0,33	2,86
Total	4627141	9526	12,42	6,16	1,99	100,00

Sources: IBGE, 1991 and 2000; Embraesp, 1985-2003.

Notes: (1) Expressed in number of monthly minimum wages of 2000. In 2004, one minimum wage corresponded to approximately 90 dollars.

(2) Total residential area (square meters) built between 1987 and 2003 divided by the number of households in 2000.

(3) Total investment (US\$) between 1987 and 2003 divided by the number of households in 2000.

In the 1990s, the Metro Area received an additional 96,000 households every year¹⁵, while on average the investment provided by private companies – as presented above – accounted for only 23% of such increase. Since public housing projects were almost insignificant,¹⁶ most of the new housing units were built by families and individuals in very distant suburbs. This indicates that the pattern described in the 1970s – that of poor urban dwellers living in self-built houses in the so-called “peripheries” of the city – remains true for São Paulo in the 90s (Kowarick, 1979).

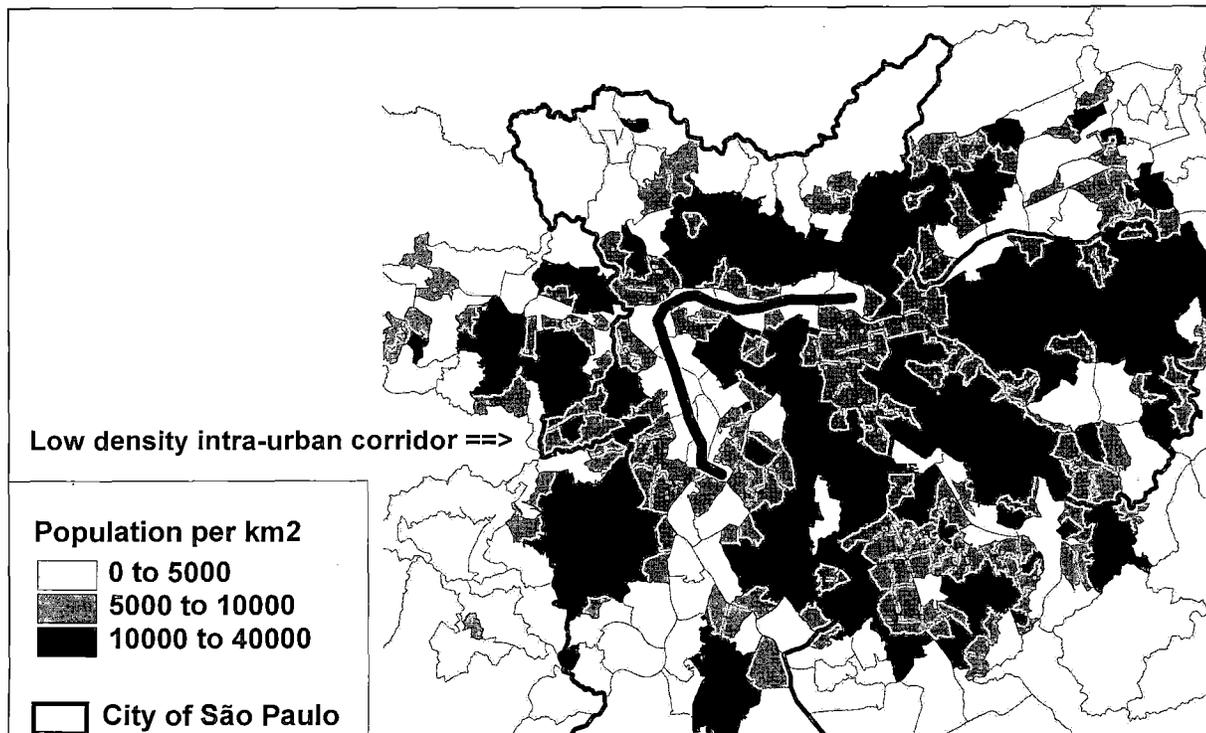
Although private and public housing projects represent less than 30% of the supply of new housing units in the 1990s, it is not necessarily true that this pattern of growth – with all the city growth happening in the

¹⁵ The total number of households (occupied or not) reached 3.8 million in 1991 and 4.7 million in 2000 in the 21 municipalities considered in this analysis. It represents a growth rate of 2.3% a year.

¹⁶ The data available is quite controversial and incomplete. When considering only the city of São Paulo (which accounts for 60% of the population of the Metro Area), the average production of new households by the city government was less than 4 thousand per year between 1989 and 2003 (Marques and Saraiva, 2004). This amount does not include investments in urban regularization and shantytown urbanization.

“periphery” – must continue.¹⁷ There is now a significant amount of unoccupied land in central parts of the Metro Area – especially in the old industrial belt and along some railroad corridors, as shown in Map 4.

Map 4: Population Density, Urbanized Area of São Paulo, 2000



Source: IBGE, Demographic Census, 2000.

This land has not been occupied because of both high prices and lack of public policies that could redirect such available land to low-income dwellers and housing projects. Taxation, for instance, could be more extensively used to stimulate vertical building and punish vacant lots. Current zoning regulations also prohibit tall buildings in large, high-income, low-density neighborhoods, significantly restricting the feasibility of other families to live in areas that have full infrastructure.

In other words, in the case of São Paulo, it seems quite clear that the urban sprawl shows a stronger relation to land market dynamics (and the role of the government) than to the demographic dynamics per se. Quoting Sabatini (2001), who studies segregation patterns in Chile, his claim that “the land market is in the eye of the storm” can also be applied to São Paulo.

The Role of Informal Markets

Informal settlements are yet another important dimension of this process. Due to the lack of affordable housing, the poor population ends up living in different types of informal settlements, such as slums, irregular developments

¹⁷ The remainder ~70% represent self-building initiatives by the low income population, as well as commissioned construction by higher income families.

and shantytowns. A recent study by the Secretariat for Housing of the city of São Paulo estimates that at least 25% of the city's existing households are located in either shantytowns or illegal developments (Sehab, 2003). However, illegality and/or informality in São Paulo should be even higher, since a more complex arrangement of land use regulations that include building norms, environmental constraints for land occupation, infrastructure regulation on neighborhood development, zoning, and property rights plays an important role in defining what is legal and formal in the city's built area (Figure 2).

Figure 2: Types of Regulation and Housing Occupation in São Paulo

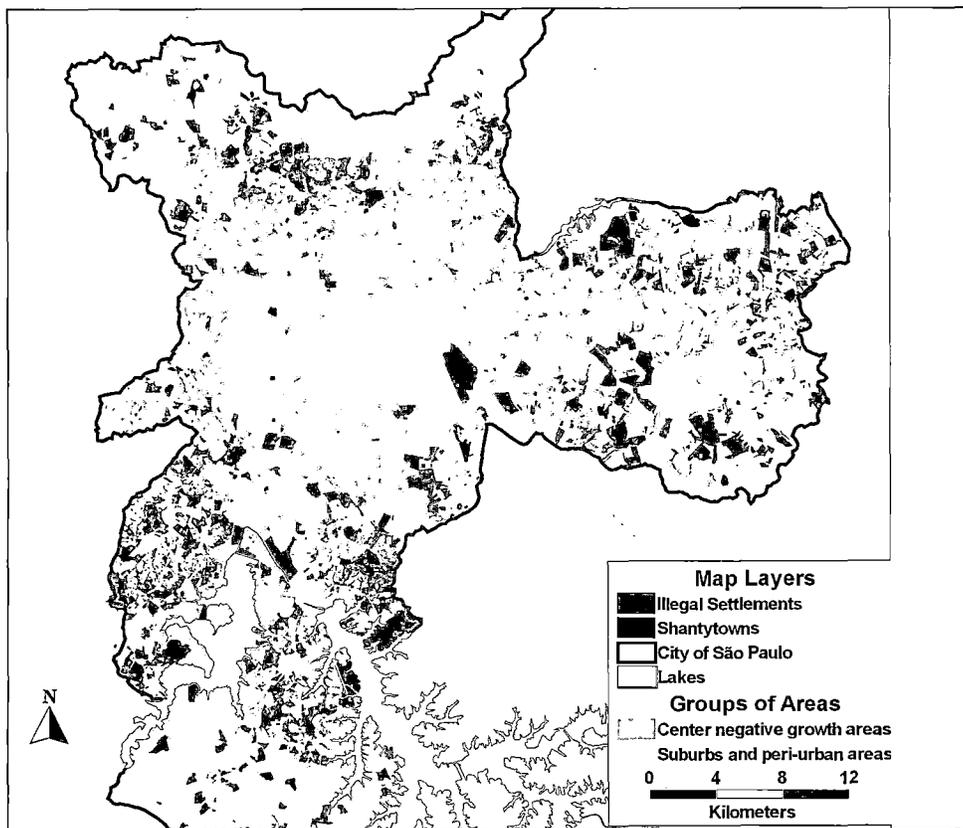
REGULATIONS ON LAND USE, ENVIRONMENT AND INFRASTRUCTURE	Regulations on property rights		
		Legal	Illegal
	Legal	A Regular housing areas	B
Illegal	C Illegal settlements	D Shantytowns	

Source: Adapted from lim (1995: 525). See also torres (2002b).

As we can see in Figure 2, regular housing areas comply with both property rights and other land use, environment, and infrastructure regulations. Shantytowns, on the contrary, are generally illegal from the perspective of property rights and other city regulations. Finally, illegal settlements encompass those cases in which property rights are respected, but other city norms are not.

As a consequence, only a part of the city – which has also been called “the legal city” (Situation A in Figure 1) – can be to some extent comparable to a city of a developed country (Grostein, 1987). And as mentioned, since private investments by developers usually occur in this legal city, being their bulk concentrated in the central areas of São Paulo, with most shantytowns and illegal settlements being located in poor suburbs and in peri-urban areas (Map 5 and Table 4).¹⁸

¹⁸ Generally speaking, organized private companies do not invest in illegal settlements or shantytowns. Data on private family investment in their own building is unfortunately not available.

Map 5: Distribution of Shantytowns and Illegal Settlements in the City of São Paulo, 2000

Source: Secretariat for Housing of the City of São Paulo, 2002.

We can observe that shantytowns are much more frequent in the peri-urban areas (19.3% of the local population) than in the central, negative growth areas (4.3%). The same pattern occurs with illegal settlements, which represent almost 24% of the population of peri-urban areas and only 10% of the population of central areas. In the poor slow growth suburbs, the percentage of population living in shantytowns and illegal settlements is 15.5% and 17.4%, respectively.

Illegal occupation accounts for 43% of the population living in peri-urban areas of the city of São Paulo, and seems to be part of the same process that induces the strong rate of population growth and deforestation. Although we base our arguments on ecological data, there is a strong rationale to support such arguments.

In the case of São Paulo, there are different institutional barriers for the provision of proper infrastructure and social services in irregular and/or invaded areas. Their high level of irregularity “justifies” the non-provision of social services, or else limits their potential availability. Even when the State decides to invest in irregular settlements, it is more difficult to find proper site location for social infrastructure in irregular or illegal land. Moreover, the State must follow complex legal procedures in order to appropriate private land, and it takes longer to find proper land for public infrastructure close to illegal developments and shantytowns. Sometimes the State decides not to invest in these areas due to the risk of losing public investments made in such places – which may be later reclaimed by their private owners. Public administrators who do not follow the complex set of standard

procedures may also be subject to lawsuits in regard to land-use regulations (Maricato, 1996; Torres, 2002). Different authors have argued that informal land use is a major issue for developing countries. Some defend the regularization of land property and the simplification of norms and regulations as important preconditions for further social and economic development in this kind of urban area (World Bank, 1999).¹⁹ However, the

Table 5: Population living in shantytowns and illegal settlements. City of São Paulo, 2000.

	Groups of Areas			Total
	Negative growth areas	Slow growth areas > 0 & < 3%	Fast growth areas > 3% a year	
Population living in shantytowns	208,478	527,462	430,283	1,166,223
Population living in illegal settlements	470,112	591,009	529,862	1,590,983
Total	678,590	1,118,471	960,145	2,757,206
% Population living in shantytowns (*)	4,34	15,50	19,27	11,18
% Population living in illegal settlements (*)	9,80	17,37	23,72	15,25
Total (%)	14,14	32,87	42,99	26,43

Source: IBGE, 2000 and Secretariat for Housing of the City of São Paulo, 2002.

Note: (*) Percentage of population living in shantytowns or illegal settlements in relation to the total population of the group area.

links between land use and social policies need to be addressed more extensively because public services must be present even when land regularization is not in force. In the case of Brazil, some of these services are even considered to be constitutional rights.

Conclusion

The general argument presented here was developed as follows. We have first shown that the demographic growth of the city is very uneven. While the center of the city is losing population, its most distant suburbs are growing fast. In addition to this observation, we have noted that those areas are the poorest and with the least infrastructure in the region. They also present high levels of deforestation and informality in terms of land use. The high concentration of social, environmental and legal problems in the far suburbs makes them a very ill-suited area for population growth, which ironically occurs the fastest there.

Second, it is important not to blame the poor migrants that move to these suburbs. They are the first to be affected by the degradation of the environment, not only due to their exposure to environmental hazards and vectors of contagious diseases, but also because their places of residence are less protected in terms of infrastructure and/or construction patterns that avoid such hazards.

The logic that produces the urban sprawl in metropolitan areas such as São Paulo is quite complex, and related to the roles of different branches of the government (i.e., regulation, taxation, infrastructure, housing policy) and private companies. Most likely, this sprawl would be happening even with a zero population growth scenario.²⁰

¹⁹ "Only well functioning land markets can provide an adequate supply of housing, and maintaining these markets is another task that deserves attention from the public sector. Providing universal registration and establishing clear property rights to all urban land will require strengthening existing institutions. Ill-defined land rights render land useless and discourage the redevelopment of entire portions of a city. But simply providing security of tenure creates incentives to improve housing and infrastructure dramatically. To avoid adding to the backlog of problem housing and neighborhoods, new development must meet basic – but not excessive – compliance standards" (World Bank, 1999: 146).

²⁰ In fact, this is already the case of the city of São Paulo, which is growing quite slowly (0.8% a year between 1991 and 2000).

Therefore, the major issue here is how to change such unfortunate trends. The idea that traditional land-use regulation could cope with such problems is quite naïve, since it has been so far unable to properly regulate illegal settlements in São Paulo. Urban environmental legislation, for instance, is many times victim of such logic. The inability of the “law of water sources protection” to avoid land occupation in the south of the city is just one tragic example of the failure of a series of attempts to enforce land regulation.

In our view, policies that promote density in well structured areas should be fully supported (Martine 2001), since they could provide a more sustainable use of space by avoiding a never-ending occupation process of peri-urban areas. As mentioned, such policies could include special taxation to stimulate vertical building and punish vacant lots, new zoning regulations that allow tall buildings in high-income neighborhoods, and housing projects located closer to central areas.

Annex 1: Procedures for generating land cover estimates

In order to produce land cover indicators, we have used the following satellite images for the Metropolitan Area of São Paulo:

1. Landsat 5 TM (Thematic Mapper), orbit point 219/076 – October 23, 1991.
2. Landsat 7 ETM+ (Enhanced Thematic Mapper Plus), orbit point 219/076 - September 21, 2000.²¹

We used the software ENVI 4.0 to process such images. Initially, we registered the 1991 image, procedure later applied to 2000. These images were geometrically corrected and registered with reference to the vector cartography of rivers and streams for the region (scale 1:10,000).

We employed different digital image processing procedures to enhance the images to better detect and measure vegetation, i.e., contrast enhancing, color composites, filters for special frequencies and mathematic operations for image classification. The color images that presented best results for visual interpretation were the ones produced with the TM4, TM5 and TM3 bands and channels red (R), green (G) and blue (B). We produced the color composites in 1991 and 2000, keeping the same contrast for both of them.

Since the main objective was to identify basic green coverage, we chose not to use NDVI (Normalized Vegetation Index). The legends were based on TM4, TM5 and TM3 bands for 1991, which guided the mapping classes adopted here. We have produced the following classes: urban areas, water, exposed soil, grassland (pasture, etc.) and forest. We have made no attempt to discriminate primary forest and secondary forest of planted vegetation, since it was not the objective of this paper.

Once such classes were produced, we started the classification based on different samples. Our basic source of information was aerial photographs (scale 1: 8,000) of significant targets. Based on the largest sample possible (at least 5,000 pixels) in the two color composites (1991 and 2000), we started the process of supervised classification.

We used the classification algorithm known as Maxver (maximum likelihood), following Richards (1986). After such initial classification, we used different filters such as “clump” and “sieve”. These procedures were adopted for the images of both 1991 and 2000.

²¹ These dates refer approximately to the 1991 and 2000 census reference dates.

In order to test classification accuracy, we used a confusion matrix generating a Kappa coefficient of 0.9466 in 1991 and 0.9442 in 2000. This coefficient varies between 0 and 1, the best classifications being those closer to 1. The Kappa coefficients we have obtained are satisfactory, and we accepted the classification (Richards, 1996). The classified images were transferred to the ArcGIS 8.1, where the images were converted to grid format and then analyzed for each census survey area for 2000.

Annex 2: Spatial Regression Model

Dependent Variable:

- PDVARBUST9 Deforestation between 1991 and 2000 (%)

Explanatory variables:

W_PDVARBUST9 Deforestation in neighborhood areas (Queen contiguity)
 TAXDESEM Unemployment rate (2000)
 PSUBNORM Population living in shantytowns in 2000 (%)
 TAXA91_0 Population growth rate 1991-2000
 PVARBUST91 Forest coverage in 1991 (%)

Summary of output: Spatial Lag Model - Maximum Likelihood Estimation

Dependent Variable:	PDVARBUST9	Number of Observations:	757
Mean dependent var:	-0.861942	Number of Variables:	6
S.D. dependent var :	2.70072	Degrees of Freedom:	751
Lag coeff. (Rho):	0.436037		
R-squared:	0.359094	Log likelihood:	-1671.42
Sq. Correlation:	-	Akaike info criterion:	3354.85
Sigma-square:	4.67469	Schwarz criterion:	3382.63
S.E of regression:	2.1621		

Variable	Coefficient	Std. Error	z-value	Probability
W_PDVARBUST9	0.4360368	0.04451628	9.794996	0.0000000
CONSTANT	0.2175727	0.2761531	0.7878698	0.4307727
TAXDESEM	0.01987509	0.01528693	-1.300136	0.1935545
PSUBNORM	-1.296872	0.5664194	2.289596	0.0220447
TAXA91_0	0.1352656	0.020164	-6.708276	0.0000000
PVARBUST91	0.02847819	0.00669473	-4.253822	0.0000210

Regression diagnostics - diagnostics for heteroskedasticity

Random coefficients			
TEST	DF	VALUE	PROB
Breusch-Pagan test	4	481.9144	0.0000000

Diagnostics for spatial dependence

Spatial Lag Dependence for Weight Matrix: pesos_mod1.GAL			
TEST	DF	VALUE	PROB
Likelihood Ratio Test	1	96.99473	0.0000000

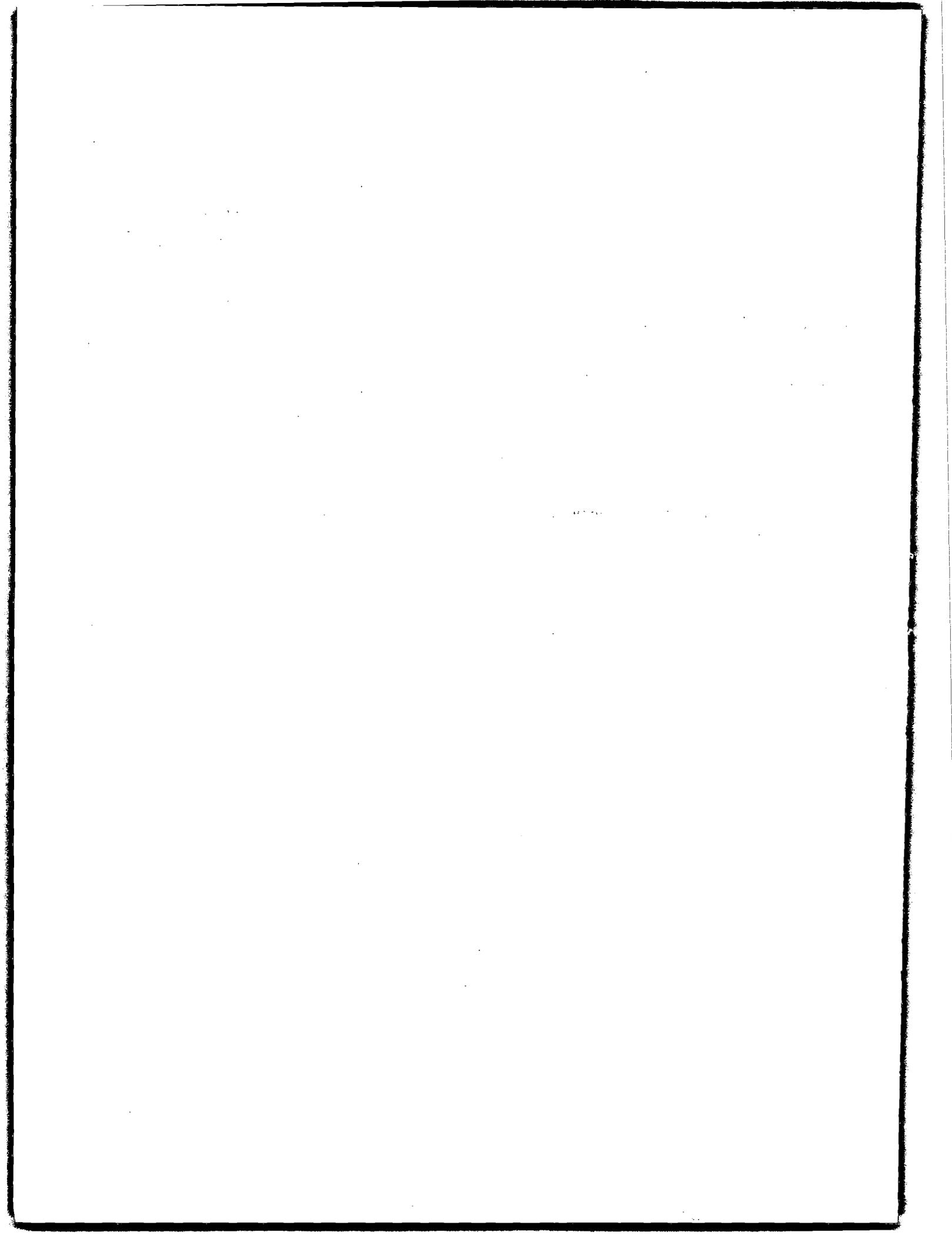
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PRIVATE RESIDENTIAL INVESTMENT GROWTH: IMPLICATIONS ON MUNICIPAL REVENUES AND SOCIO-ECONOMIC INDICATORS THE CASE OF THE MUNICIPALITY OF PILAR¹

*Cynthia Goytia**

Abstract

During the nineties, the Municipality of Pilar was one of the main recipients of private investment throughout the Metropolitan Region of Buenos Aires. A relevant feature of its economic development was the strong presence of manufacturing industries subsidiaries of international companies as well as the vast volume of real estate investment in the district, particularly, in relation to gated communities. However, the dynamic behavior of the private investment flow contrasted with what has happened with the public investment.

One of the aims of the empirical analysis is to document the way in which the process of economic development has impacted on the socio-economic indicators of the Municipality, such as housing, education, health, poverty and crime. A second aim is to analyze the municipal revenues and local taxation to assess whether the municipal revenues have followed the strong investment pattern and to evaluate if the investment boom has been reflected by the municipal income or not, and thus has generated more capacity for capital investment in infrastructure and social expenditure, allowing for the dispersion of the benefits of the economic boom to the rest of the population. The evidence showed that this had not happened. The local resources did not improve substantially in relation to the important investment flow that the municipality received and the valuation of the assets such as property. This fact explains in part why the strong growth was not accompanied by public investment which would have been necessary to reach a more balanced development throughout the territory.

Introduction

The economic development of the Municipality of Pilar during the nineties shows several particular features, which makes it different from the other municipalities of the Metropolitan Region of Buenos Aires (MRBA). The boom of residential investment, the strong presence of manufacturing industries subsidiaries of international companies, and the presence of top universities and commercial establishments have caused the district to be one of the main recipients of private investment in the last decade. A main aspect to be considered in this study is the boom of real estate investment in the district, particularly, in relation to gated communities (GC). In association with this dynamic economic activity, there is an important growth of the population, which has increased by over 60% in a period of 10 years. The issue is discussed in detail as well as the impact of private investment on the public finance of the municipality, analyzing both sides – income and expenditure.

¹ This paper is based on the Final Report of the Research Study conducted on behalf of the Agreement: Municipality of Pilar– Foundation for Pilar - Torcuato Di Tella University (September 2003) with the participation of Pablo Sanguinetti, Esteban Zorraquin, Andrea Tumosa and Marcelo Castillo.

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In this sense, the dynamism of private investment flow contrasts with what has happened with public investment.

It is essential to evaluate whether the investment boom has generated municipal income or not and thus has resulted in more capacity for capital investment in infrastructure and social expenditure, allowing for the dispersion of the benefits of the economic boom to the rest of the population. The empirical evidence shows that this had not happened. In the 1990's local resources did not improve substantially in relation to the important investment flow that the municipality received and the appreciation of assets such as property. This fact explains in part why the strong growth was not accompanied by public investment, which would have been necessary for a more balanced development.

This study describes the way in which this process of development has affected the socioeconomic indicators of the Municipality such as poverty, housing and health. Substantial disparities in the quality of life of people living in the municipality are observed. There is still a strong need to improve the welfare of families living in the district and to take care of important inequalities that have been detected in the provision of some basic services and infrastructure such as running water and sewerage systems.

What have been the main factors able to explain this rapid growth? How has this development strategy reverberated in the distribution of the economic activity, the municipal finances and in the socioeconomic indicators throughout the district? This paper is intended to answer these queries. In the first part of this report, we will discuss the empirical analysis where the sectors and economic activities promoting the development of Pilar are analyzed, which for their importance and peculiarity stand out from the rest of the localities of the Metropolitan Region of Buenos Aires (MRBA). In this sense we will show the evolution of the private activity related to the boom of real estate investment in the district, particularly, in relation to gated communities and the industrial investment received by the municipality. The second aim is to analyze the municipal public sector, to describe the impact of the private investment trends on public finance of the municipality, analyzing both sides – income and expenditure. Thirdly, the way in which this process of development has affected the socioeconomic indicators of the Municipality such as poverty, housing, education, health and crime is described.

The fourth aim is to analyze the effects of this pattern of urban development throughout the territory and its implications on the urban form and the externalities it involved. Finally, several conclusions and policy recommendations are outlined as the final purpose of this paper is for it to serve as an input in the creation of development strategies for the municipality. In this sense, the elaboration of this study has been an important step in the development strategies for the Municipality of Pilar for the reason that the discussion and analysis of this information allows the Municipal Government and the main local stakeholders to reach consensus on views and objectives of the development strategy, elements that have been essential for successful implementation.

The structure of the report is organized as follows. Section 2 briefly describes the location and characteristics of the municipality with a short historical background. Section 3 shows the main indicators of economic activity and real estate investment, whereas the municipal public sector is analyzed in section 4. The evolution of socioeconomic indicators is analyzed in section 5 as well as Section 6 is bringing an analysis of the main changes in the economic geography to the interior of the municipality. Finally, sections 7 and 8 show a series of possible outlines for working out of a development strategy.

Territorial and historical information of the municipality of Pilar

The Municipality of Pilar is situated in the northeast of the province of Buenos Aires. It is part of the third ring of the Metropolitan Region of Buenos Aires (MRBA), which currently marks the end of the suburbs of the metropolis and the beginning of the rural area. (See Figure 1).

The national tendency towards suburbanization, which accelerated during the last decade, generates a rise in rental demand in gated communities. Pilar was able to benefit from this new tendency in the real estate market due to the fact that some development of weekend houses was already located in this area and also due to the high availability of land at low costs that could be quickly re-assigned from rural use to residential use. The boom of this type of investment in gated communities for permanent residence was only consolidated as of the improvement and enlargement of the northern motorway, which allowed a considerable reduction of transport costs to work centers.

It has been observed that during the 90's the important investments of the industrial and real estate sectors motivated the migration to the municipality of medium and high income families, and they gave a major boost to services activities such as supermarkets, shopping centers, cinemas, hotels, schools, and high level universities. These projects have a scale that exceeds the municipality and serve part of the metropolitan area, thanks to their strategic location and proximity to access roads.

The central role played by these developments gave the district an important asset, the "Trademark Pilar," which is associated with high buying power groups, prestige and an excellent standard of living, even though the population that is referred to represents only 10 % of the municipality.

The industrial activity in the district is another strength that should be emphasized. This is the sector that most contributes to the production of gross value and is also the major source of employment -though these jobs are not necessarily held by residents of the district. The excellent accessibility and location of the district enhance the success of its industrial park, which plays a central role in attracting international companies that supply domestic and foreign markets.

Evolution of private investment

The aim of this section is to document which sectors and activities have promoted the economic development of Pilar and relate them to the dynamics of municipal revenues. A main aspect to be considered in this section is the boom of real estate investment in the district, particularly, in relation to gated communities. The issue is discussed in detail as well as the impact of the private investment trends on the public finance of the municipality through analyzing income and expenditure.

The economic structure of Pilar: the real estate market

Among the sectors that benefited most from the flow of private investment in Pilar, the real estate sector occupies the first place with 970 million pesos, followed by industry. The industrial sector was also very important as the 300 million invested in this activity comprised almost 8% of the total received by the Metropolitan Area of Buenos Aires, MABA (Table 2).

The commercial activity appears in third place with 80 millions, as shown in Table 1. The volume of investment directed to the real estate sector makes Pilar stand out from the other municipalities as the

investments in real estate captured were 63% of the total for this activity in the Metropolitan Area of Buenos Aires (MABA) during this period.

Table 1: Private Investments by Sectors , 1991-1999

Pilar	Industrial	302,000,000
	Real Estate	970,000,000
	Business	80,000,000

Table 2: Private Investments in the Real Estate Sector in the MABA 1991-1999²

Municipality	Accumulated Amount in \$	Participation
Berazategui	60,000,000	3,91%
Gral. Rodríguez	3,000,000	0,20%
Pilar	970,000,000	63,27%
Tigre	500,000,000	32,62%
Total	1,533,000,000	100,00%

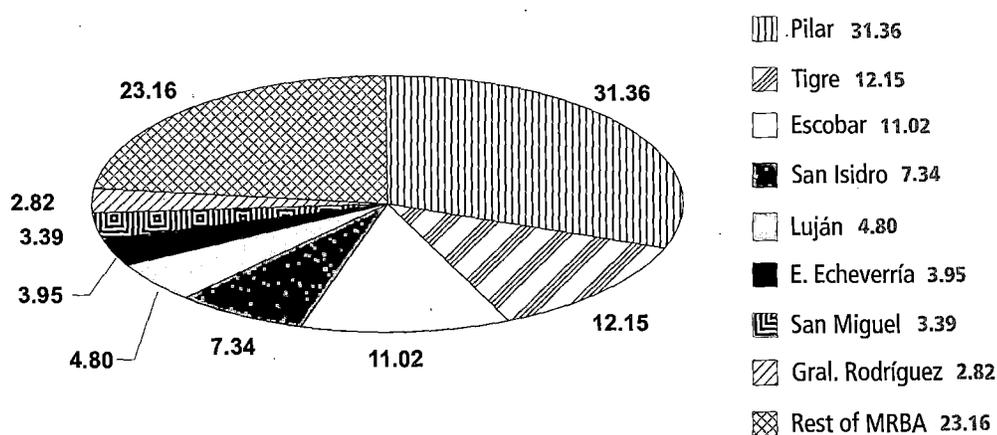
The real estate market and the development of Gated Communities (GC)

The strong flow of private investment in the real estate sector in Pilar was mainly a consequence of the boom experienced by gated communities. As shown in Table 3 and Diagram 1, Pilar concentrates a very significant proportion of the investment in this type of urbanizations within the Metropolitan Region.

² SOURCE: GABRIEL LOSANO (2001), based on Inverbaire, Investment Assessment in the Prov. of Bs.As., Honorable Chamber of Senators of the Prov. of Bs. As. (1995) and journalistic information.

Table 3: Number of Gated Communities by Municipality of the Metropolitan Region of Buenos Aires (MRBA) 2000³

Municipality	Number of Gated Communities	% of the Total	Distance to Bs. As (Kms.)
Pilar	111	31.36	51
Tigre	43	12.15	28.5
Escobar	39	11.02	48.9
San Isidro	26	7.34	18.7
Luján	17	4.80	61
E. Echeverría	14	3.95	38.4
San Miguel	12	3.39	31
Gral. Rodríguez	10	2.82	53
Moreno	9	2.54	43
Cañuelas	9	2.54	59
San Fernando	8	2.26	22.8
Berazategui	8	2.26	33
Ex de la Cruz	8	2.26	75.6
Ezeiza	8	2.26	23.5
Mal. Argentinas	7	1.98	35
Campana	5	1.41	76
La Plata	5	1.41	54
Ituzaingó	4	1.13	16.6
Pte Perón	3	0.85	31.9
Zárate	3	0.85	81
JC Paz	2	0.56	26.6
Marcos Paz	1	0.28	36.1
San Vicente	1	0.28	46
Merlo	1	0.28	26.2
Total	354	100.00	

Diagram 1: Gated Communities in the MRBA 2000⁴

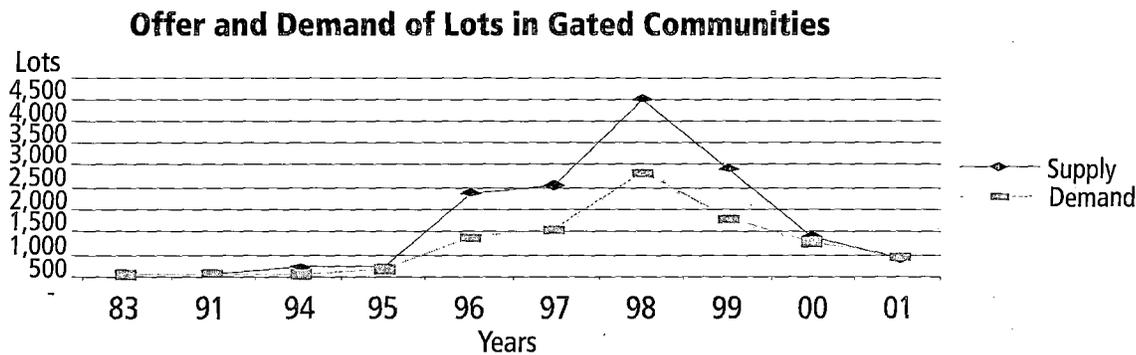
³ SOURCE: Countries Supplement of La Nación and Clarín Newspapers, Argentine Federation of Country Clubs, and Countries and Gated Neighborhoods Guide of Publiccountry S.R.L.

⁴ SOURCE: Prepared by the author, based on: Countries Supplement of La Nación and Clarín Newspapers, Argentine Federation of Country Clubs, and Countries and Gated Neighborhoods Guide of Publiccountry S.R.L.

The gated-neighborhood market started in 1977 when provincial Act 8912 was promulgated; this Act authorized the creation of gated communities as well as the first developments in the North Area of Metropolitan Buenos Aires. At first, it was intended for a wealthy segment of the population who demanded outdoor life in a secure environment due to the growing crime rates in the country.

Even though an incipient growth in the supply of gated neighborhoods could be observed, until the year 1995 the total did not exceed 528 units in the district of Pilar, with a market that as of the year 1983 had only carried out 325 operations (see Diagram N° 2).

Diagram 2: Evolution of the Market of Gated Communities in the District of Pilar 1983-2001⁵

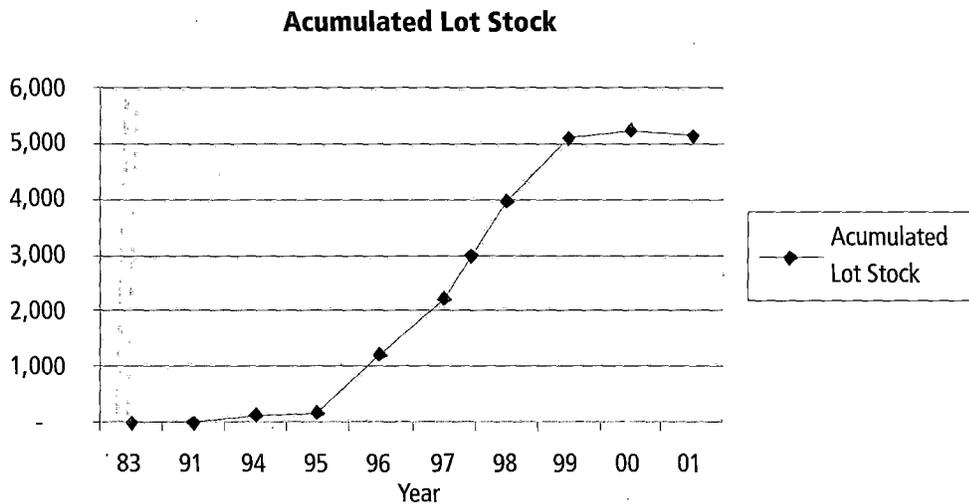


Since 1996, with the conclusion of the *Autopistas del Sol*, more distant zones such as Pilar have become attractive as places to live permanently due to the reduction of journey times to the Federal Capital. At that time the supply increased rapidly to reach 1894 units compared to 223 in the year 1995. This development was also encouraged by the strong expansion of mortgage loans, which promoted the house building industry, in general. Another important determinant was the consolidation of the trend towards suburbanization and the “green” fashion –that is to say, the change of home preferences to live in wooded areas in contact with nature. However, the district also had plenty of land available at reasonable prices and the Municipality originally had a quite open policy to authorize the change of land use and allow the development of these projects throughout the territory of the Municipality.

Supported by these factors, during the forthcoming years the strong investment flow in relation to gated communities continued until the year 1999, when the economic crisis started to affect the macro-economic stability of the country and the market volume fell in 2001 to a level similar to that of 1995. At the same time, in the years of expansion, the supply was higher than the demand. So, with a more reduced market incapable of absorbing this excessive supply, there was an accumulation of unsold lots, which at the end of 2001 amounted to 5,136 units (see diagram 3).

⁵ SOURCE: PIX AT Study Department

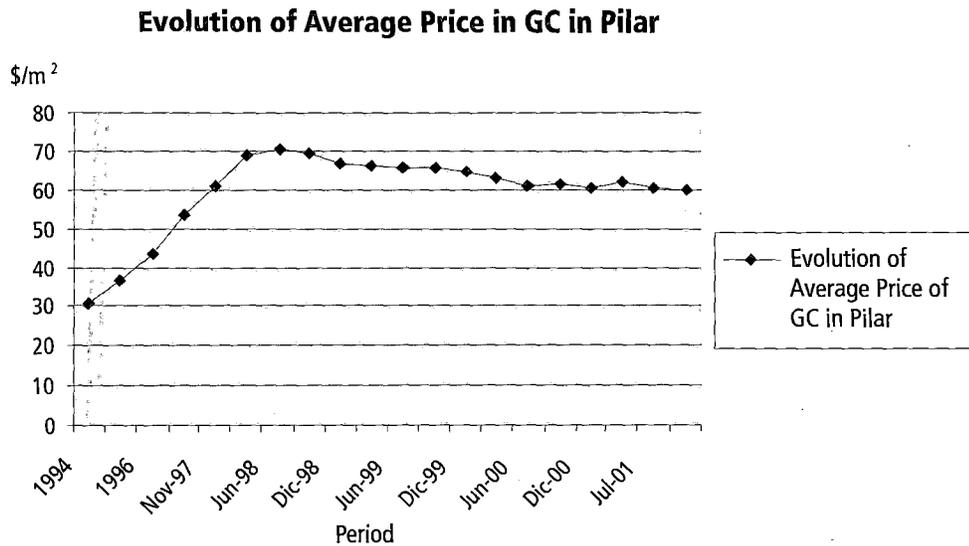
Diagram 3: Evolution of Gated Communities Lots in the District of Pilar 1983-2001



The growth in the accumulated stock of lots was stronger in the years of higher expansion of supply ('96, '97 and '98), and became stable as of the year '99. In view of this trend, there was an excessive supply in the gated neighborhood market and three years of a similar or superior demand to the one of the years '96, '97 and '98 (making a total of 4649 units) would be needed to absorb the 5,136 units of the accumulated stock.

The above mentioned circle of expansion and contraction of demand of lots in gated communities was clearly reflected in the price per m², which in 1994 was US\$30 and in June 1998 reached a high of US\$70. Since the year 1999 this price starts to become stable and to fall to a value of US\$59.76 per m² in September 2001 (see Diagram 4).

Diagram 4: Evolution of Prices in Gated Communities in the District of Pilar 1994-2001⁶



⁶Diagram 4: Evolution of Prices in Gated Communities in the District of Pilar 1994-2001

In September 2001 the gated community market in Pilar involved 79 gated neighborhood projects already launched in the district, with 12,229 lots, including 7,093 owners and 3,282 lots with constructions. Thus, there was a 42% vacancy over the total offered and a still low construction rate (27%) over the lots sold. As shown in table 4, the vacancy rate of Pilar is relatively high. It exceeds by 3.73% the average rate of the market, by 8.47% the general average of the North Area, and by 13.90% the rate of the District of Tigre.

This can be explained by the extension of the district, which has allowed the incorporation of new developments, representing 30% of the market, with 79 projects (the District of Tigre has 51 projects and the 19.62% of the market). However, the district shows a favorable construction rate in relation to the market, probably because the development of gated neighborhoods took place in Pilar earlier than in the rest of the MABA.

Table 4: Gated Community Market. September 2001

Zone	Projects	Lots	Owners	Built Houses	Vacancy	Construt. Rate
Total	260	43.993	27.159	10.072	38%	23%
North	195	29.641	19.703	7.350	34%	25%
Pilar	79	12.229	7.093	3.282	42%	27%
% of Pilar / Market	30%	28%	26%	33%		
% of Pilar / Northern Zone	41%	41%	36%	45%		
Tigre	51	10.398	7.472	1.419	28%	14%
% of Tigre / Market	20%	24%	28%	14%		
% of Tigre / Northern Zone	26%	35%	38%	19%	84%	
Northdelta	7	1.623	1.184	45	27%	3%

Source: Own elaboration based on local real estate firms and Municipal information.

Private and Public investment in Pilar

This dynamic behavior of the private investment flow contrasts with what happened with public investment. As shown in Table 5⁷, Pilar does not have an outstanding performance in relation to this indicator. Public investment amounted to approximately 30 million pesos during 1991-1999, an amount that is inferior to many municipalities of the MABA, even those which are relatively poorer than Pilar, such as Moreno (39 millions). Some of the reasons for the lack of public investment in a context of strong private investment are examined next.

The municipal public sector

The purpose of this section is to show the evolution of tax collection in the municipality throughout the decade of the 1990s and the main areas of expenditure.

The question is whether the investment boom was reflected by municipal income, and thus generated more investment in physical infrastructure and social expenditure, and allowed for the dispersion of the benefits of

⁷ An important drawback to identify and locate investment in the MABA during a period of nine years was the lack of sources, registers and/or related works. As to private investments, different sources were consulted: qualified informants, NGOs, specialized journalistic information, large companies and certain officials who had been in charge of dealing with certain investments. We are aware of the fact that many investments could not be identified due to their nature, their amount or their location. But we believe that we succeeded in providing an important, accurate description of the investment process in the MABA during the last decade. As to public investments, in some cases there were differences in the amounts depending on the sources. Therefore, we relied upon the information provided by the Ministry of Public Services and Works (MPSW) of the province of Buenos Aires as it was the most complete as to the amount, type and location of the public investments.

the economic boom to the rest of the population. If this did not happen, what were the main reasons why collection did not follow the trend of the investment boom? Although income increased, did taxes capture entirely the revaluation of the property?

As to the productive sectors and the industries, how was collection of taxes made? Are there municipalities where a similar pattern of development was better managed? Does this mean that there was a problem in the way in which taxes are applied to properties in gated communities compared to other municipalities? The evidence described in this section shows that in the 1990's local resources did not improve substantially in relation to the important investment flow that the municipality received and the valuation of the assets such as property. To be able to answer this question, we will study which things the municipality spends on and how it collects (that is to say who pays the taxes).

Municipal Revenues: A mix of own resources and co-participation

The tendency towards a higher degree of autonomy and fiscal appetite for the resources of higher levels of government is a basic principle for any local government wishing to defend its management, its mission, and its objective, which is to govern the city. However, the municipalities of Buenos Aires have very little taxation capacity (Table N° 6) since the province of Buenos Aires rather than these local governments has authority over the bulk of taxes; the districts do not collect taxes on real estate unlike other provinces. Municipal governments normally draw their regular revenues from a combination of "own" revenues and intergovernmental transfers. "Own" revenues include local taxes, local surcharges on state taxes, user charges, and administrative fees. Intergovernmental transfers may include shares of state taxes (distributed by origin or formula) and/or grants (multipurpose or targeted to specific expenditures).

Table 5: Investments in the Metropolitan Area of Buenos Aires (MABA) 1991-1995⁸

Municipality	PRIVATE INVESTMENTS		PUBLIC INVESTMENTS	
	Accumulated Amount in \$	Per capita	Accumulated Amount in \$	Per capita
Tigre	2,258,000,000	7,513	48,313,498	161
Pilar	1,297,000,000	5,554	30,308,627	130
La Plata	479,300,000	839	202,969,024	355
Morón	405,000,000	1,307	31,218,299	101
Berazategui	339,000,000	1,177	43,447,329	151
Avellaneda	302,000,000	916	69,431,668	211
Vte. López	298,500,000	1,090	7,615,993	28
San Isidro	277,000,000	945	26,506,207	90
Quilmes	270,000,000	521	57,053,212	110
La Matanza	250,000,000	199	128,058,351	102
Gral. Rodríguez	233,000,000	3,434	18,332,899	270
San Fernando	212,500,000	1,412	37,034,571	246
San Vicente	175,000,000	3,952	26,819,634	606
L. de Zamora	120,000,000	203	72,784,234	123
Moreno	120,000,000	315	39,769,103	105
E. Echeverría	110,000,000	450	138,538,454	566
Alte. Brown	70,000,000	136	50,926,858	99
Ensenada	61,300,000	1,198	76,014,298	1485
Gral. San Martín	30,000,000	74	19,529,626	48
Merlo	30,000,000	64	71,637,067	152
Gral. Sarmiento	26,500,000		8,706,024	
F. Várela	18,000,000	52	97,055,869	278
Lanús	2,000,000	4	61,998,573	137
Berisso	w/d		8,943,210	112
Ezeiza	w/d		18,095,416	152
Hurlingham	w/d		4,802,853	
Ituzaingo	w/d		10,430,831	
J. C. Paz	w/d		16,402,600	
Mal. Argentinas	w/d		21,294,711	
Marcos Paz	w/d		120,252,395	
Pte. Perón	w/d		7,163,620	
San Miguel	w/d		14,079,277	
Tres de Febrero	w/d		38,938,947	
Total	7,384,100,000		1,624,473,278	

⁸ SOURCE: GABRIEL LOSANO (2001). The data about private investment were prepared on the basis of Interbaires, Investment Assessment in the Prov. of Bs. As., Honorable Chamber of Senators of the Prov. of Bs. As. (1995) and journalistic information. The data about public investment were prepared on the basis of the information provided by the Planning Division, Sub-Secretary of Planning, Public Services and Management Control, Province of Bs.As (División de Planificación de la Subsecretaría de Planeamiento, Servicios públicos y Control de Gestión de la , Provincia de Bs. As)

The level of tax centralization together with a high level of expenditure decentralization has given origin to a high level of vertical fiscal imbalance. This large vertical fiscal imbalance has been addressed with a complex system of intergovernmental transfers. The most important is the tax-sharing regime (co-participation) which is the process by which the collection of the main taxes is then re-allocated to the local governments.

In the case of Pilar, the percentage that it receives as transfers has decreased since 1998 to the present, from 46% to 38%. It should be noted that regularly due taxes (like ABL, Public Lighting, Street Sweeping and Cleaning], Security and Hygiene, Road System, Security Board) make up the most important part of the municipality's own resources and, at the same time, represent similar or lower amounts to those of transfers.

Even though an improvement in the collection of regularly due taxes is observed, it is interesting to observe the way in which collection of other taxes falls and it is particularly surprising how low taxes on which economic activities depend are. In addition, it is also interesting to note the progression of income due to concessions to private firms (as water and sanitation)⁹

It is important to examine the reason for this low elasticity of the local public income with wealth growth. The problem was that local tax collection was not linked to urban land value in the case of real estate or to the invoicing of the companies. Clearly, this is an important subject which must be faced before thinking about social or public investment programs. It is necessary to generate resources for them. The reasons behind the need to formulate a fiscal reform should be attained not only to make up for strong social inequities but also because public investment made by means of these resources may have a favorable impact on infrastructure, security, connection access, etc., which eventually result in a revaluation of real estate and a benefit to taxpayers. In this sense, important tax reforms allow not only the recovery of cost of the services which are to be provided but also the reactivation of local public investment. It would be very important to generate an operating surplus,¹⁰ which should be planned in the annual budget to generate reserves for capital development investment in the following year.

Legal framework of the Municipal Public Sector.

Today municipalities have many powers that they did not have before. In recent years there has been a process of transfer of responsibilities that has been accompanied with resources. The decentralization of many educational and health services since 1992 was initially financed by a transfer equivalent to the estimated cost of the services transferred. As a consequence of various reforms, new types of transfers besides co-participation per se were introduced. Pilar received funding for educational financing, and a small amount for housing programs, but in the recent years, for example, the hospital started to depend on the municipal budget. When analyzing the expenditure charts, we see that the health services absorb an important part of the expenditure, together with the public services area (Table N°7).

It is important to state that the municipal budget may redistribute income from the richest sectors towards the poorest ones. In this sense it becomes a relevant instrument to share the benefits of economic growth with the bulk of the population. This is done through tax collection and through expenditure programs, mainly intended for the lower-income population.

⁹ One interesting point to be considered is the fact that public lighting, in some districts, is collected through Edenor residential electricity bill since it has higher collection rates.

¹⁰ Represented by the excess of current revenue over current expenditure.

Table 6: Income 1998 – 1° Semester 2003 : Municipality of Pilar¹¹

Income	1998	1999	2000	2001	2002	To June 2003
Regularly Due Taxes (1)	12,298,081	12,031,270	10,937,349	15,294,690	18,559,160	11,059,294
Taxes depending on Economic Activities (2)	2,015,934	1,796,824	1,620,221	1,085,465	618,312	695,913
Former Payment Plans (3)	2,418,878	2,667,710	4,156,631	1,602,341	492,592	41,618
Other Minor Taxes (4)	2,970,876	3,006,046	2,787,746	2,040,842	1,438,576	1,247,287
Municipal Income from Concessions	969,865	1,084,156	2,567,876	3,171,765	3,483,197	2,252,309
Total Own Resources	20,673,634	20,586,006	22,069,823	23,195,103	24,591,837	15,296,421
Total Income – Co-participated Income, special and affected	17,872,726	15,281,510	15,112,400	14,429,342	15,250,741	8,815,221
Co-participation Proportion over the Total	46.37%	42.61%	40.64%	38.35%	38.28%	36.56%
Total Municipal Income	38,546,360	35,867,516	37,182,223	37,624,445	39,842,578	24,111,642

Table 7: Budget 1999: Municipality of Pilar¹²

CENTRAL ADMINISTRATION	
Total	\$ 7,062,920.00
HEALTH SERVICES	
Total	\$ 12,529,401.00
PUBLIC SERVICES	
Total	\$ 15,414,312.00
PUBLIC WORKS	
Total	\$ 1,522,818.00
SOCIAL SERVICES	
Total	\$ 1,056,112.00
H. CONSEJO DELIBERANTE	
Total	\$ 860,175.00
OMBUDSMAN	
Total	\$38,445,738.00

¹¹ **SOURCE:** Municipality of Pilar.

It includes: ABL (Public Lighting, Street Sweeping and Cleaning?, Security and Hygiene, Road System, Security Board Tax (in all these cases: regular and debt recovery), Debt recovery Construction Taxes, Publicity and Promotion.

It includes: Construction Tax, Commerce and Industry Authorization, Public Performance Tax.

It includes: D. Amicable Agreement 1545/97. Moratorium 2000 Ord. 238/99.

It includes: Cemetery Tax, Miscellaneous Income, Other Fines, Extra Taxes, Automobile Patents, Trademarks and signs Control Tax, Veterinary Inspection Tax, Other Office Taxes.

¹² **SOURCE:** CIPPEC.

As it was explained, it would have been expected that a strong relationship should have arisen between the strong investment in residential units and the improvement of the municipal resources.

When statistical information was obtained to analyze the incidence of the phenomenon on the municipal treasury funds that may be increased by means of services and construction taxes, it was observed that the district that demonstrates this relationship is the district of Tigre (Table N° 8); which almost quadrupled its resources from 1991 to 1997. It is also interesting to analyze this district in relation to its per capita income from 1991 to 1999, where it is observed that whereas Pilar doubles it, Tigre triplicates it. This chart also shows that Pilar's income increased significantly from 1991 to 1993, and later this increase continued gradually.

Table 8: Per capita Municipal Resources 1991-1999¹³

Municipality	1991			1999		
	Resources	Population	Per capita	Resources	Estimated Population	Per capita
Tigre	24,376,144	257,922	94.51	82,211,492	303,323	271.04
Morón	74,416,140	643,553	115.63	87,719,185	352,709	248.70
Pilar	11,178,396	130,187	85.86	35,867,517	185,505	193.35
Merlo	25,163,225	390,858	64.38	78,544,094	477,369	164.54
F. Varela	28,163,115	254,997	110.44	53,065,898	326,659	162.45
Alte. Brown	24,272,367	450,698	53.86	63,628,006	555,252	114.59

Tax collection at present.

a. Municipal services taxes

At present the municipality collects taxes such as ABL for the following services:

- **Direct:** Cleaning (garbage collection, sweeping and sanitation of non-paved streets) and maintenance of public roads.
- **Indirect:** maintenance of squares, parks, promenades, etc.
- **Taxable basis:**
- Lineal front meters are calculated.
- Vacant (non-built) lots rise by 50% over the standard tax.
- **Categories:** They are classified only according to the service provided (streets sweeping, garbage collection, maintenance of public roads, indirect services).
- **Tax payment:** There is no special provision.

¹³ SOURCE: Statistical Yearly Report, Provincial Statistical Office (Dirección Provincial de Estadísticas).

- **Rate:** A fixed tax is determined for each category (according to the service provided) and it is then multiplied by the lineal front meters.
- In private neighborhoods, counties or developments, a different tax is charged (taxes for the maintenance, repair and improvement of the municipal road system and indirect services), with a purpose similar to the traditional ABL.

b. Taxes for Municipal Services to Enterprises or other Lucrative Entities

Today the municipality charges as Security and Hygiene Tax for the following services:

The inspection of whatever nature intended to preserve the security, health and hygiene of any type of industrial, commercial or service premises.

- **Taxable basis:**
 - The tax is calculated mainly in relation to the gross income (all taxes paid at the national and provincial level are deducted from this income).
 - Number of people under employment relationship
 - Fixed amount according to the activity carried out
 - **Categories:** They are divided according to amount of sales and income and also according to the activity carried out.
 - **Tax payment:** Every two months an income return (affidavit) should be submitted to proceed with the calculation and subsequent payment. Closures may be ordered in cases of non-payment.

c. Construction Fees

Decree 27 of the year 1998 is perhaps the most important one as gated communities are concerned, as it states that it is the Municipality's function to study, decide upon and approve new urban development.

The municipality charges a Construction Fees for the following services:

Study and approval of plans, inspections, authorizations and other administrative services related thereto.

- **Taxable basis:**
 - Metric values according to destination and type of building.
 - Pursuant to the provisions contained in the construction agreement.
 - **Categories:** They are divided according to type: housing, industry or business. There are special taxes for hypermarkets and private neighborhoods (50% higher).
 - **Tax payment:** Prior to starting works.

Municipal Resources

The lower increase of the resources for the district of Pilar may be explained in part by the fact that lots and houses in gated neighborhoods pay a fixed amount (\$60 and \$30 pesos every two months), independently of

their value, which in some cases has tripled in relation to their original value. All buildings in a gated neighborhood (regardless of surface area and the size of the lot) pay the same yearly. A building situated in an open area, with less building area and low building standards, may pay even more.¹⁴

Another important charge in the taxation scheme of Pilar was for construction duties, which have been directly related to this economic and residential growth process of Pilar. There is a need for municipal charges and fees prices to be based on efficiency and broad (social) equity. When considering efficiency, the principle of pricing allows public service providers to recover all their costs and to earn a fair profit, which will in turn encourage further development of the companies and efficient and reliable service supply. Another basic principle of price setting should be that each customer class pays its proportionate share of the total cost for the provision of a service, i.e. gradual elimination of cross-subsidization.

What has happened with municipal revenues related to other economic activities?

In relation to the productive sector the Municipality of Pilar granted a tax exemption for the industry that settles in the Industrial Park. This exemption had a maximum duration of 6 years and, in exchange, the enterprise had to hire 50% local workers. It was only recently that measures have been taken to verify that they meet this requirement and in many cases this verification resulted in their loss of the benefit. Initially, tax collection was based on the number of employees. But this regulation has been changed and at present it is based on the company's turnover. Strong attention should be taken in relation to this issue as it was argued by the private firms that an appropriate labor force with the required skills could not be found throughout the Municipality's economic active population.

Another important point arising from the issued-collected charts is the failure to pay taxes: the municipality collects, on average, between the 40% and the 43% of the ABL (Public Lighting, Street Sweeping and Cleaning) taxes issued, and in some localities this percentage is not higher than 20%.

When comparing tax collection with other municipalities of the Province of Buenos Aires, the most important conclusions in this area were: firstly, the taxes collected by the different municipalities are, in general, the same; secondly, the most general tendency in the reforms is that of including in the determination of the rate parameters such as the value of the property, the value of the land or the gross income; thirdly, the update of the real estate registry is essential to tax reform; and finally, it is important to include incentives for those who punctually pay their taxes. In the fiscal system of Pilar, unlike the fiscal system of other municipalities, there are very few regulations applicable to those who do not pay taxes or fines for those who do not comply with the municipal regulations. Besides, unlike the other municipalities there are no incentives for cash, in advance or on timely payment.

On the other hand, according to the Organic Law of Municipalities of the Province of Buenos Aires and taking into account current practice, there are not many possibilities of adding new taxes to the ones already collected by the municipality, which concentrates on the collection of retrievable taxes for services.¹⁵

¹⁴ A most frequent point of discussion is why gated neighborhoods should pay the municipality fees for services that are not offered. However, they do not live in isolation; they get to their neighborhoods through the city which the municipality takes care of. In other municipalities (as Malvinas Argentinas, for example) gated neighborhoods have to pay for the streets, as it is their view that it is parceled private land of exclusive use. Consequently, if they do not want to pay for the streets, they should open them to the public domain.

¹⁵ The Municipal tax collection has started to be provided by the private sector. They have incorporated information technology for this task, and the results have showed an improved revenue collection for the last year.

However, it is important to note that a basis should be established for the calculation of the above mentioned retrievable taxes for services that takes into account cost recovery, profit returns, gross income or the valuation of the property.

The most important conclusions in this area were: firstly, the taxes collected by the different municipalities of the Province of Buenos Aires are, in general, the same; secondly, the most general tendency in the reforms is that of including parameters such as the value of the property in the determination of the rate, the value of the land or the gross income; thirdly, the update of the real estate registry is essential to tax reform; and finally, it is important to include incentives for those who punctually pay their taxes.

Socio-economic indicators

In this section we evaluate how the economic development pattern above described has influenced the socioeconomic indicators of the district. In doing so, we focus on the task of describing how the economic transformation of the district affected the welfare levels of the inhabitants. The discussion of these socioeconomic indicators will be as follows: population and Unsatisfied Basic Needs, housing and provision of running water and sewage systems, health and crime.

Demographic Growth

There has been a sharp rise in the population of Pilar. Between the censuses of 1980 and 1991 the municipality had already registered an increase of over 46%, but the rise was even higher between 1991 and 2001 when it topped 61.4%. In the year 2001 there was an estimated population of 233 thousand inhabitants. We should emphasize the magnitude of such a rise, considering that in the Metropolitan Region of Buenos Aires (MRBA), excluding the City of Buenos Aires, the population grew 15.91% during the same period.

It is interesting to describe some of the reasons that may explain this growth which is related to the changes in the boundary of the municipality, to a high rate of vegetative growth as well as to important migration flows. Although there are no studies on the latter, we can infer that the internal migration process was somehow caused by the investment flows that affected the Municipality during the nineties, which have been described in the previous section. In this investment process, gated communities occupied a very important place and its influence on the migration flow is evident. According to estimates of the Municipality, more than 20,000 people have their permanent residence in said communities. However, this only represents less than 10% of the population of the district, so this type of urbanizations explains a very small part of the population growth of the Municipality.¹⁶

It can then be concluded the importance of the migration of families that settled in other areas of the District (in the "Ciudad Abierta") attracted in part by expansion of the employment demand generated by the investment flow in the construction sector as well as in the industrial sector. The availability of land at low price in open areas was an incentive for the settlement of the population. The low income households settled

¹⁶ According to this large growth in the period between both censuses, it can be calculated that gated communities contributed to the municipality with 20,800 inhabitants. To make this calculation we take into account the number of existing parcels, which according to the information provided by the Municipality of Pilar, were 26,000 units, of which we estimate that only 20% of them have houses built for permanent residence and occupied, which implies 5,200 houses that function as permanent residence.

in areas having scarce provision of service infrastructure; most lack running water and sewerage systems as well as paved streets.¹⁷

Housing construction in gated communities developed throughout the period under study constitutes an important incentive for the settlement of those workers employed in activities related to the developing construction industry. Additionally, a new market for the provision of services has emerged. These services include gardeners, swimming pool keepers, repairs, domestic labor and other activities related to the demands of the families residing in the gated communities. This supply of unskilled services and domestic jobs has, in turn, increased the population.

This should be confirmed by the rise of the number of below-standard low-income housing units built in the period 1991-2001 between the two national censuses. In this regard, the number of type B¹⁸ houses rose from 10,557 to 15,664. *Ranchos* and *casillas*¹⁹ increased throughout the decade from 3,248 to 5,754.

This means that the large increase in the population of the lowest strata of the society as a result not only of the vegetative growth of the population but also of the internal migrations that characterizes the last decade is reflected in the increase in the number of houses of inferior conditions.

Unsatisfied Basic Needs of the population (UBN)

A first approach to the degree to which minimal welfare standards are enjoyed by the population of the locality may be made taking into account the indicators of unsatisfied basic needs (UBN), as provided by the National Census. As known, this parameter is constructed combining parameters that describe housing, services and education features.²⁰ Each of these aspects is individually analyzed later, but it is useful to start evaluating the behavior of all of them in combination on the basis of the UBN measure. Tables N° 6 and 7 show the households and the population living with UBN, according to the data of the 1991 and 2001 National Censuses. These poverty measures were very high in Pilar in 1991 (25% of households, and 30% of the population) when compared to the total in the province for the same period (14.6% and 17%,

¹⁷ Though there are no indicators reflecting the number of the population located in the Municipality in the decade comprising the years 1991-2001 as a result of these internal migrations, we tried to estimate this number on the basis of some known data. We know that the total increase in the population for the period under study was of about 88,000 inhabitants, of which 18,000 were the ones absorbed to the Municipality as a result of the change of the borderline when incorporating the territory of Del Viso. We have also estimated in 21,000 inhabitants the population residing in gated communities according to the figures, above mentioned, provided by the Municipality of Pilar. We can infer that due to the vegetative growth of the population (estimated in 21% in 1996), about 31,000 new inhabitants are incorporated to the Municipality, and therefore we should be in a position to conclude that about 18,000 inhabitants settled in the open area of the Municipality throughout the period analyzed.

¹⁸ Type B houses are those houses that meet at least one of the following conditions: they have earthen or loose brick floor or made of any other material (excluding ceramic tiles, floor tiles, mosaic floor, marble, wood or carpet) or do not have provision of running water through plumbing inside the house or toilet with discharge of water.

¹⁹ Different types of buildings where very poor people live.

²⁰ The Unsatisfied Basic Needs were defined according to the methodology used in "Poverty in Argentina" (INDEC Series Studies N° 1, Buenos Aires, 1984).

Households having Unsatisfied Basic Needs (UBN) are the ones showing at least one of the following privation indicators:

- Over-crowding: homes with more than three people per room.
- Housing: households living in houses of an undesirable type (a room in an inquilinato (T.N.: buildings having many rooms that are rented to different families for living), precarious housing or others, including houses, flats and ranchos).
- Sanitary conditions: households having no toilets, of whatever type.
- School attendance: households with children at school age (6 to 12 years) who do not go to school.
- Living capacity: households having four or more people per employed member and also, whose head has not completed successfully the third grade of primary school.

respectively), in the suburbs of Buenos Aires (16.5% and 18.9%) and in the rest of the Province (11.7% and 13.9%).

Table 6: Households with Unsatisfied Basic Needs (UBN). Years 1991-2001²¹

Jurisdiction	1991			2001		
	Total	With UBN (2)	% (3)	Total	With UBN (2)	% (3)
Prov. Bs. As	3,409,089	497,726	14.6	3,921,455	508,671	13.0
24 Districts in the Province of Buenos Aires	2,088,005	344,520	16.5	2,384,948	346,613	14.5
Rest of the Province of Buenos Aires	1,321,084	154,566	11.7	1,536,507	162,058	10.5
Pilar	31,259	7,814	25.0	58,313	12,154	20.8
Moreno	69,726	16,525	23.7	95,538	21,060	22.0
Escobar	30,893	6,796	22.0	45,347	8,818	19.4
Campana	18,498	2,996	16.2	22,773	3,170	13.9
Luján	21,303	2,045	9.6	26,178	2,541	9.7

(1) Households living on the streets were included in the census.

(2) The Unsatisfied Basic Needs were defined according to the methodology used in "Poverty in Argentina" (INDEC Series Studies N° 1, Buenos Aires, 1984).

(3) Percentage of the home population having Unsatisfied Basic Needs over the total population of each department.

Table 7: Population with Unsatisfied Basic Needs (UBN). Years 1991-2001

Jurisdiction	1991			2001		
	Total	With UBN (2)	% (4)	Total	With UBN (2)	% (4)
Prov. Bs. As	12,482,016	2,121,942	17.0	13,708,902	2,161,064	15.8
24 Districts in the Province of Buenos Aires	7,924,424	1,497,716	18.9	8,639,451	1,518,319	17.6
Rest of the Province of Buenos Aires	4,557,592	633,505	13.9	5,069,451	642,745	12.7
Pilar	129,680	39,552	30.5	231,139	57,312	24.8
Moreno	286,922	75,747	26.4	379,370	98,518	26.0
Escobar	127,775	33,988	26.6	177,579	41,154	23.2
Campana	70,957	13,907	19.6	82,731	14,110	17.1
Luján	77,789	9,490	12.2	90,816	10,643	11.7

(1) Households living on the streets were included in the census.

(2) The Unsatisfied Basic Needs were defined according to the methodology used in "Poverty in Argentina" (INDEC Series Studies N° 1, Buenos Aires, 1984).

(3) Percentage of the households having Unsatisfied Basic Needs over the total population of each department.

In 2001, the percentage of the population having Unsatisfied Basic Needs (UBN) decreased from 30.5% in 1991 to 24.8% of the population in 2001, which indicates a percent reduction higher than the one observed in other Municipalities (Tigre 22.8% to 20.3%, Escobar 26.6% to 23.2%; Campana 19.6% to 17.1%).²²

²¹ And¹⁶ SOURCE: National Census of Population, Households and Housing 2001 (*Censo Nacional de Poblacion, Hogares y Viviendas*).

²² There was also a reduction in the UBN indicators for the province of Buenos Aires, where the figures fell down from 17% to 15%, while for the 24 districts of the suburbs of Buenos Aires the reduction was from 19% to 17%.

In spite of the fall in the percentage of poor households living with UBN, the indicators for the Municipality of Pilar are still high when compared to the provincial indicators. Moreover, if we analyze the absolute figures, they show an increase in poverty during the nineties (from 7,815 households with UBN in the year 1991 to 12,154 households with UBN in 2001). This represents 17,760 inhabitants with UBN (39,552 in 1991 and 57,312 in the year 2001) (Table N° 7).

Housing

As regards the characteristics of the housing units, we adopt the categories used by the INDEC in the National Census of Population, Households and Housing, distinguishing two types of housing: A and B. Type B housing comprises all those houses meeting at least one the following conditions: earthen or loose brick floor or made of any other material (excluding ceramic tiles, floor tiles, mosaic floor, marble, wood or carpet) or that do not have provision of running water through plumbing inside the house or toilet with discharge of water.

In the Census of the year 1991, the proportion of type B houses in the Municipality of Pilar (33.8%) was double its equivalent in the Province of Buenos Aires, the suburbs of Buenos Aires and the rest of the Province (about 14%).²³ (Table N° 8). This offers clear information about the housing characteristics of the population at the beginning of the last decade. The analysis of these indicators for the year 2001 shows that in Pilar there has been an increase in the number of households living in type A houses, today being 58% of households, although this figure is below the values found in the province of Buenos Aires (68%), the suburbs of Buenos Aires (65%) and other neighboring municipalities.²⁴

Table 8: Types of Housing. Years 1991-2001

Jurisdiction	1991				2001			
	House A %	House B %	Rancho and Casilla %	Flat %	House A %	House B %	Rancho and Casilla %	Flat %
Prov. of Bs. As	64.1	14.5	7.0	13.8	68.0	14.0	4.8	11.4
Suburbs of Buenos Aires	60.5	14.7	8.9	15.3	64.0	16.3	5.6	12.0
Rest of the province	69.7	14.2	3.9	11.5	74.2	11.2	3.6	10.5
Pilar	53.9	33.8	10.4	1.3	58	30	12	1
Moreno	50.2	31.2	13.0	5.3	56.0	31.2	9.2	3.2
Tigre	61.4	17.8	14.5	5.5	70.0	16.5	7.0	4.6
Campana	68.5	16.7	7.0	7.0	71.6	15.0	5.9	6.5
Escobar	55.4	28.7	10.8	4.5	64.0	23.0	8.8	3.6

²³ Likewise, the number of type B houses in Pilar was higher than its equivalent in the municipalities of Campana (16.7%), Escobar (28.7%), Tigre (14%), being more similar to the number of type B houses in Moreno (31.2%) and Florencio Varela (33.4%).

²⁴ Such as Campana (71.6%), Escobar (64%) and Luján (78%).

SOURCE: Population, Households and Housing National Census 2001 (Censo Nacional de Población, Hogares y Viviendas, 2001).

Running water is supplied by a public concession of the service granted to the company Sudamericana de Aguas, which is in charge of obtaining and distributing water, including the administration of sewage systems. The concession has a service radius which relies on the pre-existing network system developed by the ex Water Services Direction (Dirección de Obras Sanitarias) of the Municipality of Pilar.

This figure was similar to other neighboring municipalities, such as Moreno (13%) and Escobar (10.9%), and quite below Luján and Tigre (29%), Campana (76%), and Exaltación de la Cruz (44.9%). In the Province of Buenos Aires, in 1991, the percentage of households with running water was 54.5%, in the suburbs of Buenos Aires 5.7%, and 61.1% in the rest of the Province.

At the same time, type B housing comprises 30% of the houses, while they reach 14% in the Prov. of Buenos Aires and 16.3% in the suburbs of Buenos Aires. (Table N° 8). As to the homes residing in *ranchos* and *casillas*, they represent 11.2% of the housing, while in the Province of Buenos Aires they reach 4.8% of homes, 5.6% in the suburbs of Buenos Aires, and 8.8% in Escobar, just to make a comparison with a neighboring municipality.

The growth and development of gated communities throughout the decade explain in part the increase in type A housing that in absolute values has risen from 16,835 to 35,543 homes. Gated communities incorporate type A housing. The large population growth of the lowest strata of the society as shown by the data related to vegetative increase and other internal migrations has also characterized the last decade.. Hence, the number of type B housing (sub-standard units) has risen from 10,557 to 15,664. *Ranchos* and *casillas* increased from 3,248 to 5,754 homes, that is to say by 56%.

Infrastructure provision and basic services

A very important aspect to be considered is the provision of sanitary infrastructure for the supply of running water and sewerage systems. As we will see this type of service shows an important deficit in the Municipality, partly because of the rapid population growth that brought the densification and urbanization of rural or non-urbanized areas.

According to the data of the Population National Census of the year 1991, 13.3% of the households in Pilar had running water supplied from the public network. (Table N° 9). The data for the year 2001 indicate that the proportion of households connected to the water network in Pilar has increased, representing today 19.3% of the total.

Table 9: Water and Sewerage Supply (%). Years 1991 – 2001²⁵

Jurisdiction	1991				2001			
	With running water supply (1)				With running water supply (1)			
	Total	Inside the house	In the lot	With connection to sewage system	Total	Inside the house	In the lot	With connection to sewage system (2)
Total of the province	54.5	50.7	3.8	31.4	97.8	84.2	13.6	37.5
Suburbs of								
Buenos Aires	50.7	46.4	4.3	27.0	97.55	82.25	15.3	2.45
Rest of the province	61.1	58.2	3.0	39.1	75.55	72	3.55	51.88
Campana	76.0	66.6	9.4	38.6	84.13	76	8.13	40.37
Escobar	10.9	10.5	0.5	9.4	20.11	18	2.11	28.72
Exaltación de la Cruz	44.9	41.6	3.4	18.5				
Luján	29.4	29.1	0.3	24.0				
Pilar	13.3	12.2	1.1	7.4	19.3	18.0	1.3	11.6
Moreno	13.0	12.7	0.3	11.5	37.93	30.43	7.5	14.65
Tigre	29.0	23.3	5.7	7.0	58	50	8	8.60

²⁵ SOURCE: Population, Homes and Housing National Census 2001.

As to drainage services to the sewerage network, in the year 1991 7.4% of the households living in the municipality of Pilar had this service, a figure that is slightly inferior to the figure of other neighborhood municipalities. This percentage of homes connected to the sewerage system was already very low if compared to 31.4% of the Province of Buenos Aires, 27% of the suburbs of Buenos Aires, and 39.1% of the rest of the Province. (Table N° 9). By the year 2001 the sewerage network had extended to cover 11.6% of the households living in the Municipality.

From the National Census of the year 2001 we have quoted the data related to the characteristics of the provision and the origin of water for drinking and cooking in the housing units. In the case of Pilar, the population having water supply inside their house is low (66% of the population and 69% of homes), while the percentage of the population obtaining water in their lots or outside continues to be very high. The insufficient access to running water has serious consequences for the quality of life and the health of the poorest households, which are the most negatively affected by the lack of said infrastructure.

These problems are even worse in the case of sanitary infrastructure inside the houses. 11% of households have a toilet with water discharge and connection to the sewerage system. This figure rises to 38.6% in the Province of Buenos Aires, and to 33% in the suburbs of Buenos Aires. In Pilar, 37.5% of the households have a toilet with discharge of water and connection to a cesspit and a septic chamber, compared with 27.4% of those in the Province of Buenos Aires and 30% of the population of the suburbs of Buenos Aires.

The households having a toilet without discharge of water or having no toilet at all represent 32% of the population, while in the Province of Buenos Aires, the suburbs of Buenos Aires, the figures are much lower (18% and 20%, respectively). These indicators are directly related to the high rate of infant mortality observed in the municipality, particularly post neonatal mortality, as we will analyze later when discussing some of these health indicators.

From the discussion of these sanitary and water services indicators we can conclude that one of the reasons underlying the high number of families with UBN is the fact that there is a high proportion of them (32%) that do not have a toilet or have a toilet which lacks water discharge.

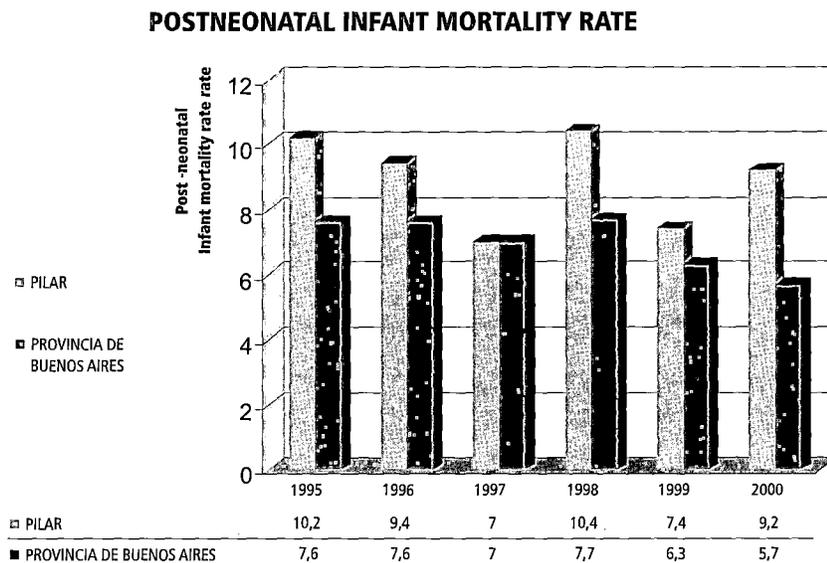
Health issues associated to service under provision

Child mortality indicators show that Pilar has a high rate of infant mortality compared with other municipalities of the Province of Buenos Aires. There is a strong connection between the infant mortality rate and the socioeconomic situation of the population. It is clear that the most vulnerable and sensitive sectors to infant mortality are the ones having fewer resources, due to their income, employment condition, low level of education, living conditions, access to health care, etc.

But these sectors differ according to the infants' age. In the cases of neonatal mortality (before the first year) the prevailing conditioning factors are associated not only with congenital determining factors but also the care of the mother's health, pregnancy control, birth assistance, and also control of the newborn's health during the first days. In the cases of postnatal mortality, environmental and socioeconomic conditions have more influence on the infant's health. In this regard, the deficiency of sanitary infrastructure in relation to the provision of running water and lack of connection to the sewerage system is directly associated with the high rates of postnatal infant mortality observed in Pilar. (Chart 1) Children are particularly vulnerable to illnesses

related to water because of their lower immunity, higher susceptibility and higher exposure due to insufficient knowledge of how to avoid risks (WHO, 2002a). There are two important mechanisms for the transmission of illnesses caused by inadequate water supply systems: illnesses caused by the consumption of contaminated or low quality water and illnesses related to the insufficiency of water for sanitary hygiene at homes. In many poor countries small children suffer from fatal illnesses which may be easily prevented by attacking the transmission mechanisms while securing access to good quality water and sufficient supply of water for sanitary discharge to the sewage system.

Chart 1: Post-neonatal infant mortality rate. 1995-2000



Source: Statistics Provincial Office of Buenos Aires with data supplied by the Health Planning Provincial Agency, health Ministry of the Province of Buenos Aires. (*Dirección Provincial de Planificación de la Salud. Ministerio de Salud. Provincia de Buenos Aires*).

The infant mortality rate in Pilar has been very high throughout the decade compared with the rate observed in the Province of Buenos Aires. For example, in the year 1993 Pilar had a rate of 30.6 every thousand inhabitants, while in the Province the rate was 20.8 every thousand. The rate has decreased throughout the decade and in the year 2000 it was of 19.7 every thousand inhabitants, while for the Prov. of Buenos Aires it was of 14.9 every thousand inhabitants.

However, as said above, environmental and socioeconomic conditions have had more influence on the post neonatal infant mortality rate. In the year 1995 this rate was 10.2 per thousand inhabitants in Pilar, and of 7.6 per thousand inhabitants in the Province. In the year 2000 this rate decreased slightly to 9.2 in Pilar and 5.7 in the Province of Buenos Aires. To what extent could these higher infant mortality rates registered in Pilar be associated with the deficiency in the running water and sewerage services as explained above?

In relation to this point it is interesting to quote a work of investigation that shows the impact of the expansion of the sanitary network carried out since the privatization of water supply services on the reduction of infant mortality rate in areas with low-income homes. The analysis made by Galiani, Gertler and Schargrodsky (2002)²⁶

²⁶ Galiani, Gertler and Schargrodsky (2002) Water for Life: The Impact of the Privatization of Water Services on Child Mortality.

explains that medium- and high-income sectors that were not connected to the infrastructure network or received low-quality service enjoy better access to substitutes, such as wells with engine pump, aseptic chambers, or bottled water, goods to which low-income sectors have no access. Therefore, the expansion of the network and services has benefited primarily the low-income sectors, which are the most vulnerable to infant mortality.

In their analysis these authors study how a better access to the water and sanitary networks together with the potential changes in the quality of the service have impacted on the improvement of infants' health. They found that infant mortality has decreased significantly in areas where recent privatization of the service implied an actual expansion of the network. The authors observed a fall in infant mortality caused by illnesses related to water, a decrease which is more relevant in areas where the population has few resources and where the percentage of the population with unsatisfied basic needs (UBN) is higher.

Crime

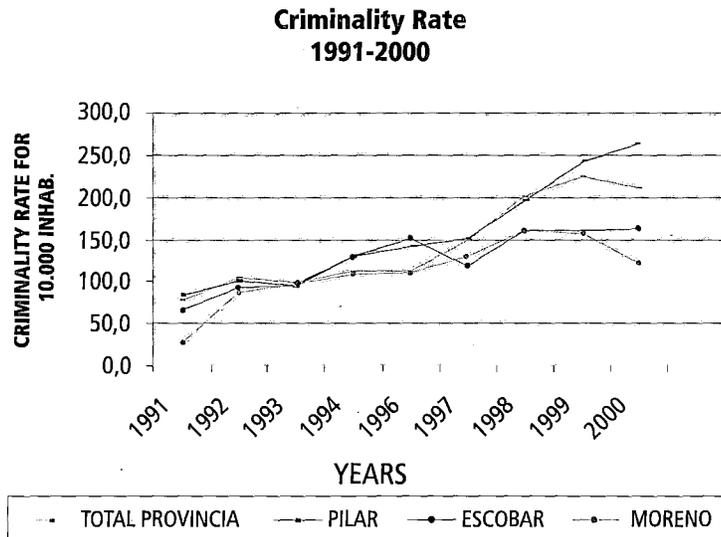
The evaluation of crime indicators should be taken cautiously due to several problems conditioning these estimates. For example, the statistics refer strictly to crimes that have been reported, figures which certainly differ from the crimes actually committed and from the trend to report them depending on the jurisdiction as well as to the distance to the court, among other factors.

The existing data reveal a pronounced and sustained rise in crime in the Municipality of Pilar for the period under study, which comprises from the year 1991 to the year 2000. During this period, the crime rate per 10,000 inhabitants increased from 25.4 to 261.8, which represents a proportional increase of 1,004%. Although the rate observed in 1991 was significantly inferior to the rate of the Province of Buenos Aires (76.8%), the suburbs of Buenos Aires (79.2%) and the rest of the Province (72.6%), in the year 1993 Pilar reached a crime rate (96.4%) similar to the rate of the province (98.8%) and inferior to the suburbs of Buenos Aires (101.2%) (Diagram N° 5). Since the year 1994, the crime rate in Pilar has exceeded the rates registered in the Province and the suburbs of Buenos Aires. Thus, in the year 2000 the crime rate in Pilar was 23% higher than the rate of the Province of Buenos Aires with values of 261.8 for Pilar and 211.1 for the Province of Buenos Aires.²⁷

²⁷ The analysis of the indicators reflecting the structure of criminal offences in the year 2000 shows that most of these offences are against property, in the nature of robbery, attempt to rob, or theft. In fact, following a similar trend for all the Province of Buenos Aires, about 60% of criminal offences corresponds to crimes against the property whereas about 18% of them consists in crimes against the person, that is to say murder and damages.

Offences against honesty and honor, including rapes and others, though lower than the number observed in other types of offences, in Pilar doubles the values of the Province of Buenos Aires (1.6% in Pilar and 0.8% in the province), figures that are also higher than the offences reported in neighboring districts.

Diagram 5: Crime Rate 1991-2000



Source: Justice Nacional Ministry (*Ministerio de Justicia de la Nación*) National Office of Criminal Policy (*Dirección Nacional de Política Criminal, 2001*) and Statistics Provincial Office of Buenos Aires. (*Dirección de Estadísticas de la Provincia de Buenos Aires*)

More recent information dating back from the year 2003 shows that Pilar has a better reputation and its situation has been evaluated and depicted as less dangerous compared to other jurisdictions such as Tigre.²⁸

As to the evaluation of crime impact on the different social groups, the investigation made by Di Tella R., Galiani S. and Schargrotsky E. (2002) at the national and provincial level reveals that during the first half of the decade higher-income inhabitants suffered a higher house break-in crime rate than that suffered by lower-income sectors. This difference has now become insignificant. The hiring of private security systems and services for the protection of houses of the medium- and high-income sectors has shifted crime towards the areas where the poorest sectors of the population live. The evidence presented in the investigation indicates that the poor sectors are the ones which have suffered more the rise in house break-ins. However, when analyzing the case of crimes committed in the streets such evidence shows that all social sectors are equally vulnerable to this type of incident.

Simultaneously to the rise in criminal offences there is a rise in public as well as private security expenditure. This is reflected in the increase in the provincial Police budget throughout the decade, and also in the increase in the hiring of private security companies, etc. This is particularly important in the Municipality of Pilar due to the high concentration of gated communities. According to police sources and the trend observed itself, private security expenditure is five times higher than public security expenditure.

²⁸ The police in the municipality is under the direction of the Security Ministry of the Province of Buenos Aires (Ministerio de Seguridad de la Provincia de Buenos Aires), thus local authorities are only entitled to cooperate by means of their action in a Consejo de Seguridad (Security Commission) created for that purpose.

This commission gathers representatives of the local executive and the chiefs of the four police sections in the district to facilitate the provision of information and channel the main claims. Beyond this coordination policy, the municipality does not act directly on the security of the territory, and this limits its power to make substantial reforms in the local security. However, improving security in the district does not necessarily imply creating its own police. The municipality and the local community may generate and dispose of their own resources and create stronger coordination instances with the provincial police so that the latter may offer a service more appropriate to the needs of the district.

This was one of the objectives when the Community Security institute of Pilar (Instituto de Seguridad Comunitaria de Pilar) was created.

Considering that private security expenditure may have an impact only on up to 15% of the district population, this clearly shows a high level of inequality in the distribution of this public service in the district. However, beyond the distribution problem, these differences in public vs. private expenditure levels could conceal an extremely high inefficiency considering that security is subjected to many external factors; thus, a coordinated scheme in the provision of the service may generate important benefits (the same provision quality at lower costs).

The impact of the development process on the economic geography of the district

The aim of this section is to describe how the development pattern related to the sectors and socioeconomic indicators analyzed in the sections above have been reflected throughout the territory of the district. Now we evaluate, in particular, the consequences of these developments on the use of the land for residential purposes and their effects on land valuation and use in open urban areas, especially adjacent areas.

Gated communities and their impact on the territory

The gated community investment boom has caused this type of development to concentrate a high proportion of the residential space of the District. According to the digital treatment of the cartography with data provided by the Municipality of Pilar, it was possible to determine that the municipality has a surface area of 34,132.33 hectares, 4,734.44 hectares (13.87%) of which are occupied by gated communities. The information shown in Table N° 10 reveals that, within the urban areas, the residential space occupied by the “open” city represents 2,749.18 hectares, whereas the “available” or vacant space is 238.16 hectares. In other words, today the residential space in Pilar is predominantly occupied by gated communities (61%).

Table 10: Land Use in Urban Areas ²⁹

Use	Quantity of Functional Units*	Surface Area (Has.)
High Occupancy	647	501.73
Médium Occupancy	751	626.66
Low Occupancy	1458	1620.79
Vacancy	218	238.16
Gated Communities	32	4.734.44
Leisure Equipment	13	70.38
Other Equipment	23	128.57
Warehouse/Industrial Premises	81	87.44
Unused	17	192.28
Intensive Farming	25	487.53
Declining Intensive Farming	8	29.9
Slums	8	10.09

²⁹ Squares and/or pieces of land. **SOURCE:** prepared by the author, based on aerial photographs, and Municipality of Pilar, 2003.

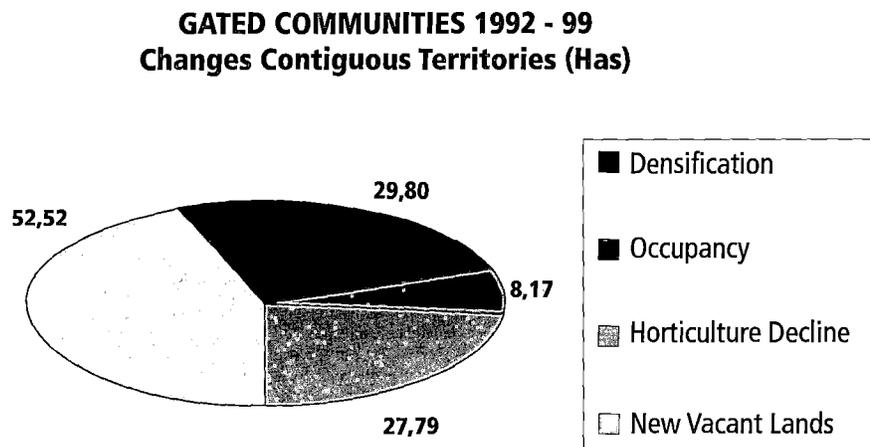
The impact of gated communities on the use and value of land in the open city

The development of gated communities within the urban area should seek a balance with the rest of the open city so that there would be no strong discontinuities in the uses and densities. To what extent have these regulations been complied with in the case of gated communities developed in Pilar? The information available shows that these projects have not always been adequately integrated into the rest of the territory. From a more comprehensive context, we see that the settlement of these developments has created barriers that hinder an easy connection between contiguous localities. As an example, the connection of some localities is only possible by motorway.

On the other hand, in more industrialized areas these projects cause circulation problems, thus hampering the circulation of goods (input-products), as well as lack of land (or a rise in their price) for future expansions of industrial activity. This may have a negative influence in the development of industrial small and medium-sized enterprises (SMEs), which are the ones with the lowest capacity to afford high values of the land.

At a micro level, gated communities (GC) have not always contributed to the development of the land in areas close to or near these upscale residential developments. The major changes that occurred in territories adjacent to these undertakings are, according to their importance, incorporation of vacant land, densification of urban squares in the open area, horticulture decline and occupation of vacant squares (Diagram N° 6).

Diagram 6 ³⁰



In part, the fact that the lands contiguous to the GC do not increase their values or are occupied with high densities is explained by the null or low infrastructure provision level observed in such territories, although as we have seen this requirement is provided for by law. This lack of dispersion of some GC spillovers is reflected in the value of the land inside and outside the undertakings in contiguous territories. The differences can be very significant, for example: Martindale: US\$ 250 and in Astolfi, a short distance away US\$ 3. As to investments related to commercial, leisure and other type of equipments (Km. 50), something similar is happening with the GC; there is no important development in relation to infrastructure and asphaltting to efficiently supply the rest of the territory of the district (starting from the nearest lands) with these equipments.

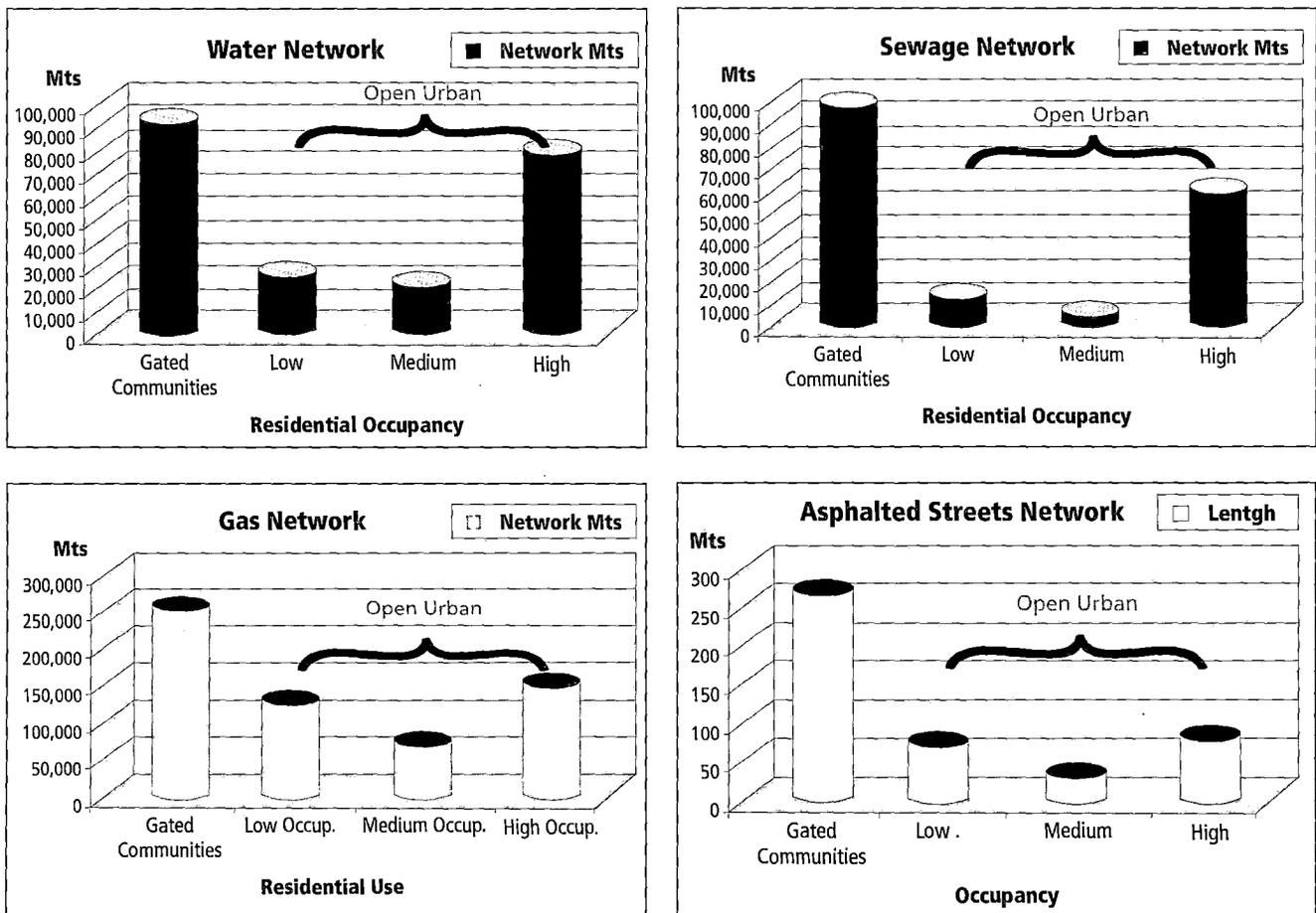
³⁰ SOURCE: Prepared by the author, based on Drawing: Territorial Changes 92-99.

Public Services and Infrastructure

There is a considerable difference in the provision of service infrastructure between open urban spaces and closed urban spaces (Diagram N° 7 and Drawing *Water and Sewage Systems – Gas Network*). Thus, the water network has 92,500 meters (43%) and 78,300 meters (36%) in the GC and the “open city” of higher density, respectively. On the other hand, the sewerage system shows a much more noticeable difference: 90,300 meters (54%) and 54,300 meters (32%) in the open and closed urban spaces with higher density. The gas network maintains these differences: 258,200 meters (42%) and 150,200 meters (24%). In contrast, only 10% of the population of the district of Pilar lives in the gated neighborhoods.

The asphalted streets are deficient in almost all the localities. The condition of the road infrastructure may be a determining factor for the access to certain basic social services such as health and education.

Diagram 7: Public Services and Infrastructure³¹



Conclusion

After a detailed analysis of different aspects of Pilar’s development - sectoral, socioeconomic and territorial aspects - we outline a diagnosis which integrates all these elements.

³¹ Represented by the excess of current revenue over current expenditure

The development pattern of the district has involved imbalances in wealth distribution at the family and individual levels as well as territorial imbalances.

Observations of economic indicators produce significant data with regard to poverty, health and crime levels. In this sense, the high population growth experienced by the district does not reflect the parallel booming growth of the economy, but it is an indirect indicator of the poverty that affects an important portion of the population. In that sense, the 2001 Census data show that 24.8% of the population has unsatisfied basic needs. This is a high value compared to the Province de Buenos Aires (15%) or the corresponding values of the 24 districts of the suburbs of Buenos Aires (17%).

There is evidence linking these high poverty indicators to the insufficient supply of running water and sewerage services in Pilar. In this aspect, the 2001 Census data indicate that, at present, approximately 19.3% of the population has running water and 11.6% has sewerage service connections against 38.6% of the Province of Buenos Aires and 33% of the suburbs of Buenos Aires (32.5% of the population in Pilar does not have a toilet or drainage system).

The inadequate running water and sewerage supply may have a direct impact on people's health. In fact, this aspect is one of the reasons that explain the relatively high level of infant mortality registered in the district (in the year 2000 it was 19.7%, whereas in the Province of Buenos Aires this rate was 14.9% in the same year).

Besides these poverty indicators, and probably partly associated with them, the district has suffered a significant rise in crime in recent last years. Although we realize that it is very difficult to have homogenous and reliable data about crimes, those of Pilar should stimulate interest in determining the real impact of the phenomenon. According to data provided by the Ministry of Justice and Security, Pilar has gone from the lowest crime rate of the Province in 1991 to indicators higher than the average rate of the neighboring municipalities and than the rate of the other districts of the suburbs of Buenos Aires. This point is very relevant because it is linked to one of the strengths of the district: the quality of suburban life that is therefore deeply threatened.

The development pattern of Pilar in the 90's had also another unwanted consequence; it generated territorial imbalances in the distribution of economic activities and wealth. In particular, the traditional locations of the district, such as the Pilar downtown, have suffered a deterioration of commercial activities and also of urban development aspects, related to the new centers that arise around the access roads to the motorway (e.g.: Km. 50). This deterioration is clearly reflected in the rentals in these traditional areas, which dropped by 50%, in pesos, in the period 1998-2001. Likewise, road infrastructure problems and the connection to the interior of the district did not allow for the valuation caused by important infrastructure work and services (e.g.: motorway) to spill over to the urban land of the open city. In part, this bad connection of some neighborhoods in the district (e.g.: Derqui) is due to the location of gated communities in conflictive areas and at the same time due to the fact that neither they nor the local government foresaw the execution of infrastructure works (roads, service networks, etc) capable of integrating these developments with the rest of the urban open area. This lack of spillage of some of these urbanizations is reflected in the value of land. In this sense, the value of land inside a GC reaches amounts up to 60 times higher than the value of contiguous lands.

What is the reason for this low elasticity of the local public income with wealth growth? The problem is that local tax collection is unlinked to urban land value in the case of real estate or to the invoicing of the companies. Clearly, this is an important subject which must be faced before thinking about social or public investment

programs. It is necessary to generate income and resources for them. The reasons behind the need to reform are that it should be made not only to make up for strong social inequities but also because public investment made by means of these resources may have a favorable impact on subjects such as: security, connection access, etc. that eventually result in a revaluation of real state and a benefit to tax payers. In this sense, other experiences such as that of the Municipality of Tigre, where important tax reforms allowed the reactivation of the local public works, should be taken into account.

Another type of public investment that generates a strong impact on poor people is the road infrastructure. In this sense, although there was an important advance in the 90's at a trunk level, (*Autopista del Sol*, Pilar-Escobar road), the stagnation observed during the last years foreshadows a growing deficit that also affects public buses. To give hierarchy to the road layout is the main requirement to articulate the different scales of urban life. The social productive flow is organized by the avenues and streets network. There are studies indicating that inhabitants must walk more than 10 blocks, on average, to reach a supply or transport center.

In this sense, a good passable and lighted street network together with an efficient public and accessible public transport network for all lower-income inhabitants would improve the connection to education, health and work services. Thus, the lack of urban transport at low prices (shuttle and vans services have a high cost for every common citizen) may create an important barrier.

Guidelines for a Development Strategy of the Municipality

The purpose of this section is to suggest some guidelines for a strategy or plan for the development of the Municipality. We do not intend to design a plan of action, programs or works. The detailing of such plans is a next step. Nonetheless, the guidelines that we will present here are an important input for that next step.

From the analysis we have developed throughout this paper, we suggest that the development strategy for Pilar should be based on three principles:

1. Designing a territorial project to wisely use the land taking into account the provision and maintenance of infrastructure, reservation of land for multiple uses and the environment resources.
2. Improving Municipal Revenues
3. Providing a social strategy or project to ensure that the profits of the development will spread its benefits over all the inhabitants of the district, mainly over the lower-income population. This program must seek to reduce the existing social inequalities and imbalances by providing access to basic infrastructure and services for the population.

Territorial and Land Use Project

The strategy to be adopted is intended to generate a control by the municipality over the use of the land not only to keep attracting investors but also to preserve a balanced development in the area - that is to say, to avoid negative externalities that could affect productivity and investments.

As explained in section 6, disorganized territorial development creates urban barriers and external negative factors which finally cause a decrease in the value of land and impoverish its use. In this sense, a big gap is

detected in Pilar in relation to territorial planning. Even though there is a zoning code since 1985, it has not been updated to take into account the growth that the area has had for the last 10 years.

Such territorial planning should foresee which green spaces should be preserved are, either by means of agriculture and livestock -including the entire required infrastructure related to polo, which has an important presence in the district- sports and leisure areas or just public spaces (squares, parks, etc). Floods in these areas and all the areas covered by rivers -particularly, the Luján River-, and which are part of the municipality's environmental assets, should be evaluated and a solution sought. Likewise, it would be advisable to protect and preserve areas to set up future projects to accompany the growth of the district, no matter whether they will be destined for industries, medium and small companies, businesses, housing or other kind of services to the community (waste disposal, schools, hospitals, and others).

This territorial order and planning is expected to have positive repercussion:

- On the one hand, lands for agricultural and livestock and industrial use would not risk their value; this means that they will still be profitable for these uses because their value would be in accordance with land profitability and also because they would not be subject to real estate speculation.³²
- Existing urban areas would consolidate and consequently there will be an improvement in the provision of all services (health, education, means of transport, etc).³³
- Reserved land areas would be available for future growth of industries, medium and small companies, and distribution facilities (Pilar is very important as a freight transfer center), etc.
- The provision of infrastructure - running water, sewerage systems, lighting-, would be concentrated to reach the urban sectors. As we have seen before, these basic services are highly inadequate, particularly the infrastructure related to running water, which has a direct effect on health. Of course, the shorter the extension of the networks, the lower the costs involved in construction and maintenance.
- The current existing vacant land would gain importance, fostering urban occupancy in the "open" area as well as in gated communities. Here, it would be advisable to do a study of the optimum urban population density to encourage in each area.
- A roads and avenue system would improve accessibility to certain areas.
- Green spaces for recreation, either private, such as golf and polo courses, or public ones - today there are hardly any-, should be restructured and valued.
- Ecosystems should be created to contain and regulate the flood plain of the Luján River system, fostering short trips in this area.

³² This can be proved if the flow of real state investment is analyzed in the 90's in the value of the rural land in bordering locations.

³³ "... it was demonstrated that it is almost impossible to provide public means of transport in a dispersed housing and work context... the potential for investment in high density railway roads is low for cities of undefined structures with an extensive informal low density development." Sir Peter Hall, London University, in a workshop on Management of the Territory, FADU, UBA, 1999.

Improving Municipal Revenues:

To increase the population's access to this kind of infrastructure must be a priority objective. The local budget is a relevant instrument to spread that benefits of the economic growth over the population. This is done through tax collection, which is usually paid by medium- and high-income families, and through expenditure programs mainly intended for the lower-income population. The evidence described in Section 4 shows that in the 1990's local resources did not improve substantially in relation to the important investment flow that the municipality received and the valuation of the assets such as property. This fact explains in part why the strong growth was not accompanied by public investment which would have been necessary for a more balanced development.

Local tax collection needs to be linked to urban land values in the case of real estate or to the invoicing of the companies. Fiscal reform should not only to make up for strong social inequities but also have a favorable impact on infrastructure, security, connection access, etc., which eventually result in appreciation of real estate and a benefit to taxpayers. In this sense, important tax reforms allow not only the recovery of the cost of the services which are to be provided but also the reactivation local public investment.

It would be very important to generate an operating surplus,³⁴ which should be planned in the annual budget to generate a reserve for capital development investment in the following year.

Social Project

Social programs are necessary to improve the welfare of families living in the district and take care of important inequalities that have been detected in the provision of some basic services and infrastructure such as running water and sewage systems. As we have seen, the lack of these services has a drastic implication for households and consumers. There are great differences in the quality of life of people living in the municipality, basically between the inhabitants of the "open" city and those living in gated communities. The high infant mortality rate during the first year of life observed for the open city is directly related to inadequate running water and sewerage distribution. In this sense, running water and sewerage are services with a high social content.

Another type of public investment that generates strong positive externalities for poor people is the road infrastructure. In this sense, although there was an important advance in the 90's at a trunk level, (*Autopista del Sol*, Pilar-Escobar road), the stagnation observed during the last years promises a growing deficit that also affects public buses. A good road layout is the main requirement to articulate urban life. There are studies indicating that inhabitants must walk more than 10 blocks, on average, to reach a supply or transport center.

In this sense, a good passable and lighted street network together with an efficient public and accessible transport network for all lower-income inhabitants would improve the connection to education, health and work services. Thus, the lack of urban transport at low prices (shuttle and vans services have a high cost for every common citizen) creates important barriers.

In the district of Pilar, the clear preeminence of the main axis, the motorway, which crosses the district over interstitial areas (with little access and bad services), is widely reflected in one of the most devalued and forgotten areas of the district: Derqui-Toro. This area has been deteriorating while losing the good connectivity that had made it emerge: the railway. Inadequate provision of health and education services exacerbates this social exclusion. Poverty reduction is influenced not only by the availability of running water, transport and sewerage system

³⁴ Represented by the excess of current revenue over current expenditure

services but also by the creation of job opportunities for resident families. We have observed that Pilar has job opportunities in industries, businesses and services while new industries²⁸ and enterprises²⁹ continue to locate in the territory. However, job opportunities should be available to and captured by the local population to generate income for the poorest socio-economic sectors. . In this regard, it would also be important to implement vocational projects already proposed, such as the creation of a technical school that uses the Industrial Park as a work training place. It would also be interesting to organize within the existing private universities programs to connect local people with job opportunities in the companies settled in the Municipality. The establishment of a public university in the municipality would also be a leading initiative to allow the lower-income population to have access to higher education. This kind of initiative may be important due to the high share of young people that live in the district.

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URBAN REDEVELOPMENT IN DEVELOPING COUNTRIES

*Anamaria de Aragão Costa Martins**

Abstract

This paper discusses practical issues of converting urban redevelopment into a feasible growth policy that answers to different demands of new housing. The main hypothesis explored attempts to the fact that in peripheral expansion in the city's fringe and in suburban sprawl, the program and householder's needs define the spatial requirements, while, in redevelopment, transformation procedures lead the program to establish the household profile.

Although redevelopment is argued to be a sustainable mechanism to reuse the existing city, is it able to supply all housing demands? The European experience in the last 25 years shows that redeveloped neighborhoods create a distinguished urban space for upper-income groups. In developing countries where housing demands come mainly from low-income households, affordable housing in redevelopment projects is a small portion of the new housing units, requiring governmental subsidizes.

By contrasting European experiences with the programmatic conditions offered by the Brazilian redevelopment competition of Sao Paulo's "*Bairro Novo*" master plan, the paper concludes that redevelopment should not be argued as a magic alternative that would stop urban growth. Redevelopment brings positive effects to the neighborhood, usually an old marginal area. However, due to the costs of transformation, for affordable housing to become an integral part of redevelopment, entrepreneurs must also be involved, and not only public agencies, but the costs will continue high. In that sense, other policies will still need to be designed to solve the problem of affordable housing in the inevitable peripheral areas.

In the last 25 years, several approaches have been developed to reinforce the concept of the compact city in opposition to the unlimited growth (continuous or sprawled) that many cities have faced ever since the second half of the 20th Century. The possibility of using public transportation instead of private vehicles, high population density and revitalizing urban life has called attention to the redevelopment of former peripheral areas now adjacent to older urban centres, with the conviction that "re-colonizing" these areas would help restrain expansion.

This article analyses redevelopment as a phenomenon that has been taking place in the last 25 years by means of the cleaning and re-shaping of pre-existing industrial sites, railway areas and ports. The introduction of new activities can create an atmosphere of urbanity in places usually considered as marginal when compared to the "central" city. Housing but also new cultural facilities, services, offices and new infrastructures have been established in areas previously occupied by industrial activities, integrating these urban fragments with the central areas.

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Redevelopment, during the last 25 years, has involved many dimensions. Regarding the neighbourhood context, benefits derived from the improvement of the area - as redevelopment upgrades the environment changing the 19th century industrial atmosphere - are relevant dimensions of analysis. Besides, redevelopment adds a new population profile to those urban fragments (since there are usually few residents living in the sites under transformation), creating an impact on the surrounding areas. The benefits for the housing market are subjected to analysis, because, in contrast to urban renewal or rehabilitation, they increase the housing stock.

As for the metropolitan perspective, redevelopment can be seen as an alternative to urban sprawl, that is to say, to the suburban growth in low-density housing developments, since both urban processes focus on similar householder's income profile. In the same way, it can be questioned if redevelopment would act equally if the demand was related, instead, to affordable housing, usually answered through urban expansion processes, that is to say, new housing developments placed in the city fringe. This last dimension constitutes the focus of this article.

By analysing how transformation procedures lead the program to establish a distinctive household profile, this study intends to evaluate the restrictions on this policy in order to be considered an alternative option to the demand of a housing market that usually expands on the urban fringe, especially in developing countries.

In redevelopment, the costs concerning the preparation of land for re-urbanization tend to be higher than the costs of urbanization of peripheral areas. Besides, the improvement of the redeveloped sites leads expected increases in their location values. So, just after redevelopment is finished, the land prices of recent redeveloped areas tend to face an important raise, when compared to the land prices of non-redeveloped surrounding areas.

As time passes, redevelopment affects the whole neighbourhood, generating a rise in price because the surrounding areas benefit from a succession of planned or unplanned improvements. Affordable housing typically remains as "islands" of price control, not as natural outcomes of the market, in this new local context.

In developing countries, social inequality tends to produce spatial ghettos of poverty, and housing demand come mainly from low-income households. As regards the social aim of generating affordable housing for poor segments of society, redevelopment tends to be an inefficient policy, because it usually produces spaces only affordable for households who can pay a substantial part of the monthly rent or mortgage payment. This social selection excludes the poor, the main focus of housing policies in developing countries.

Unfortunately, there are hardly any policies of that nature already consolidated in developing countries. Buenos Aires's Puerto Madero transformed the port site mainly into a leisure area, where housing impacts were minimal. In Brazil, experiences in Rio de Janeiro and São Paulo are still under planning. This makes difficult any data collection that would allow the observation of redevelopment effects on the surrounding neighbourhood. Such data require incorporation of the redeveloped urban fragments into the neighbourhood over an extended time. For this reason this research decided to analyse cases already consolidated, selected from the European context in which this sort of policy has been developed in large scale during the past decades. In the European context, data concerning housing price analysis were collected for both Barcelona Poblenou's redevelopment and Paris Quartier de la Gare's case. São Paulo's Bairro Novo Competition was also studied to contrast the aforementioned realities, although housing prices were not a comparable variable, as the project is still under planning. Since the characteristics of industrial neighbourhoods are similar in cities

that passed through industrialization process during the second half of the 19th century, however, it is possible to establish many comparable elements and behaviours, even between divergent economic contexts.

What can cities in developing countries interested in redevelopment learn from previous experiences, such as that of Paris and Barcelona? Does redevelopment represent an effective alternative to the expansion of affordable housing on the urban fringe?

To answer these central questions the article is divided in three parts.

The first part explains the specificity of redevelopment in the last 25 years. Industrial decentralization, the revaluation of the existing urban fabrics and sustainability have led to a consensus in favour of transforming inner cities in order to profit from the centrality of those zones.

The second part explains how the initial cost of urban redevelopment is appraised. Then, the urban context in which redevelopment takes place is described so that the difference in price observed between adjacent areas can be understood as a consequence of the distinctive urban landscape created by means of redevelopment.

The final part presents conclusions about the effects of redevelopment on the neighbourhood and on the metropolitan area. The limitations of redevelopment in replacing other approaches to satisfying housing demand are explained. How affordable housing is provided in some experiences is portrayed to help understand why those areas are conceived as exceptions to the housing market of the neighbourhood. Prices between redeveloped and non-redeveloped areas are compared. The positive effects of redevelopment in supporting urban policy are described.

In conclusion, this article does not reject redevelopment, since the many positive effects that the urban transformation has offered to former industrial peripheries in the last 25 years are undeniable. However, this paper questions the direct relationship often presented by supporters of redevelopment as a policy to generate affordable housing compared with peripheral expansion in the city's fringe.

Transforming inner areas

The industrial decentralization process in urban centres

The growth of metropolitan regions in the second half of the 19th Century coincided with the industrialization process. In that period, the working force gained importance as a resource, transferring the production to sites near the existing urban nucleus. New industrial sites and new infrastructure were built in the outskirts, serving as new poles for urbanization. The embryo of these early peripheries typically lay along roads that linked the urban nucleus to other towns. Railways also offered appropriate locations for industrial sites as production could be easily transported and distributed. Cities with ports became the terminal point of this industrial distribution and of the conjunction of the main commercial routes, leading to the development of new urban areas.

The second growth boom is associated with the post-war period and characterized by low densities mainly composed by single family houses, in effect, a distortion of the garden-city model of the 19th century. The successive peripheral belts moved away from the urban centre, not only in terms of physical distance but also because of the morphological referents used: the new housing areas were organized as discontinuous built-up spaces, in self-contained units, emerging near infrastructural nodes or sprawled in the territory, connected to the centre by highways.

In this territorial scenario, it became more profitable for industries to move to city edges where land competition with other uses was minimal, initiating a decentralization process. According to DiPasquale & Wheaton (1996), two elements contributed to this option.

On one hand, the fact that manufacturers store goods in large, single horizontal structures means that changes in production and storage methods increased the amount of land used per unit of output by industrial firms. Searching for less expensive land, industries began looking for spaces undesirable for other uses, such as areas adjacent to highways and airport. For industries, those spaces meant cheap land and points with high accessibility.

On the other hand, DiPasquale & Wheaton also point out that transportation technology changed to a more dispersed model: from the railway system that guided the location of 19th Century industries to the development of highways and the increased use of truck transportation allowing industries to be placed in different points of the territory. Thus, industrial location logic changed from the sites near to railway terminals to favor locations near the highway system.

Since the 1960s many central areas (especially the early peripheries formed in the second half of the 19th century) faced a process of industrial abandonment, caused by a progressive deindustrialization process. Large amounts of land became vacant because the biggest firms moved to the edges of the cities. Buildings and structures inside industrial precincts became obsolete, although small manufactures without funds to relocate remained. At the same time, many new port areas were constructed in big cities¹, making former ones obsolete.

In this new metropolitan reality that emphasizes territorial discontinuity, the relative centrality and the distinctive urban continuity observed in the first historical peripheries have marked their role as possible spaces for urban redevelopment in the last 25 years. These early peripheral sites have been disputed by market interests as possible spaces for different uses other than industrial.

In this context, many theoretical approaches to those "vacant" spaces were developed, such as the concepts of "*terrain vague*", "*friche industrielle*", "*aree dismesse*" or "derelict lands". The concept of redevelopment of central areas underlies many of these approaches because those vacant areas might represent spaces of opportunity for new uses, such as housing, leisure and shopping. According to this argument, the transformation of industrial urban fabrics in the early peripheries could bring more urbanity to the neighborhoods than that of previous marginal activities.

The revaluation of the existing

With post-modern movement, the city is analysed as a sum of superimposed layers representing the past moments of urban growth. Urban fabrics are seen as necessarily fragmented, in a collage of multiple uses, many of them ephemeral. In terms of urbanism, new principles reject the large scale rational planning of the post-war, defending diversity in the cities (Harvey 1990).

The existing urban spaces are no longer object of rejection. Instead, many urban and architectural approaches defend principles of the traditional city, such as mixed uses (instead of zoning laws), high densities that allow

¹ Rio de Janeiro's port changed from the former docklands to the neighbourhood of Cajú; Amsterdam former eastern docklands became obsolete, since the new Western Docklands started functioning in a container system; London Docklands also lost importance to other southern ports or international ports (Rotterdam), turning obsolete many of its 8 square miles.

a great variety of householders and housing types (instead of low densities and segregation), changing the parameters adopted by Modern Movement urban designers. These new approaches hold that the city should be intervened by urban fragments, in such a way as to respect its history and surrounding areas, leading to the development of new planning, project and management instruments.

Coinciding with the tendency towards the redevelopment of industrial fabrics these new instruments have been applied and improved. These planning and managing mechanisms avoid the reproduction of massive urban renewal actions of the first half of the 20th Century. The *ZACs-Zones d' Aménagement Concerté* in Paris, the *PERI-Proyectos de Reforma interior*, in Barcelona or the *Sleutenprojects* in Amsterdam are the instruments used to develop this process of urban transformation.

Since the 1970s, the cultural industry formed within this overall movement has motivated big corporations to invest in art, history and cultural heritage (Zukin 1995). Urban regeneration and urban rehabilitation are resultant policies of supporting movements towards the urban transformation by fragments, which could profit from the opportunities (vacant plots, obsolete structures and available areas) given by the deindustrialization process of big cities.

In American cities, replacing the post-war renewal policy, based on large public works (high-rise structures and high-speed expressways), the 1970s saw the introduction of the revitalization concept, reusing industrial areas such as ports and factories. Hall (1996) points to Boston's Quincy Market and Baltimore port revitalization as paradigms of this movement, based on the inclusion of leisure and commercial activities in those spaces, as well as in the rehabilitation of old buildings, recovering the "past traces of industrial America".

With post-war suburban sprawl that moved middle class housing away from the city centre, the urban core was occupied mainly by business or marginal householders. The cultural movement (also associated with a new social profile: the 1980s yuppies) led to the rehabilitation of the downtown area. That meant reusing old spaces in traditional 19th century industrial neighbourhoods, by converting old warehouses into lofts (Zukin 1995).

In Europe, as well as in many Latin-American contexts², the city centre was not completely abandoned as a residential district, but had declined and fallen into disrepair. Revitalization focused primarily on the historical centres, reforming old buildings with modern standards of ventilation, lighting, lifts and sanitary facilities, and improving urban spaces, such as squares, and urban furniture. Many policies also fostered new uses and the introduction of attracting activities: new museums, cultural centres, libraries, art galleries, up-scale restaurants and boutiques.

² Old centres revitalization affected many Latin-American cities since the 1980s. In the Brazilian context, the case of Olinda's revitalization constitutes an important reference to the preservation process, especially because of the importance given to popular participation. Governmental funding and a policy orientated to benefit the existing householders lead the program to preserve also the immaterial heritage of the historic area. In Rio de Janeiro, two urban policies served as paradigms for urban improvement: Corredor Cultural in 1984, affecting the City Centre, and Rio Cidade, affecting many peripheral and central neighbourhoods, during the 1990s. In the old centre the idea was to bring life back to the area occupied mainly by offices and a marginal population, due to the abandonment of the area as new neighbourhoods in the south zone were developed. In the peripheral neighbourhoods, the idea was to reconstitute their self-confidence by means of an improved urban space and in some cases, rediscover their identities as historic areas. More recently many urban areas became the focus of redevelopment in Rio de Janeiro: Praça XV and the old port area. In that context, Enseada da Gamboa redevelopment was one of the interesting projects that intended to transform the old maritime-railway terminal into a new housing area. Due to political changes, the implementation of this project was delayed. In 2002, a strategic plan for the old port was developed affecting a larger area of redevelopment. In São Paulo, the redevelopment of Água Branca is an operation that intends to transform many railway areas and vacant plots in favour of new residential facilities, offices and institutional areas. But few actions were executed. Referring specific to Brazilian redevelopment actions, most projects still remain as intentions to be developed.

The next stage was to improve peripheral neighbourhoods, in order to create a multi-centred metropolitan structure. Peripheral neighbourhoods had their urban spaces (new squares, parks) improved and facilities with metropolitan importance were introduced, such as commercial centres, transportation nodes or new public equipment (Busquets 1989).

In both American and European contexts, urban redevelopment is the next stage of this process of transformation through urban fragments.

Nuno Portas(1998) points out that redevelopment projects are part of a third generation of policies. If the first generation (post-war) rejected the existing, the second and the third ones are characterized by taking advantage of the opportunities offered by the inner cities. Nevertheless, the second generation responds to specific demands (those derived from the degradation of historical centres and the need for improve open areas), while the third generation is mostly sustained by large scale events (Olympic games, Expos, Cultural capitals) or international funding (funding from European Community or BIRD projects). In terms of dimension, the third generation affects large amounts of land and are a response to new financial and marketing conditions, political and environmental constrains, and involvement of private partners.

The urban-redevelopment actions examined in this article correspond to the aforementioned third generation.

Sustainability and redevelopment

Originally the sustainability concept was associated with the use of natural resources (measured by physico-biotic parameters), economic development (measured in monetary terms) and social equity (measured by social parameters)³. The questions around urban sustainability were finally discussed at the 1996 Habitat II Istanbul Conference. Urban sustainability was formerly related to lowering and/or recycling waste outputs, reducing air and water pollution, lowering resource inputs. A shift in the discussion comes from the relation between sustainable development and urban form.

As ecological issues originally structured the concept, many ecological metaphors were used to guide how cities should be developed. The analogies between nature and urban spaces led to the argument that compact urban models are more sustainable than the disperse ones. Following this analogy, dispersed ecosystems have less community diversity, few functional niches, and waste nutrients, etc, while compact ecosystems present high structural and species/community diversity, high levels of nutrient recycling, reduced gross (photosynthetic) activity and higher energetic efficiency (Newman & Kenworthy 1999). So, compact urban models are also more efficient than sprawled territories.

In addition, cities should reach the size of optimal efficiency - which is often held to be less than a megalopolis but more than a small village. Newman and Kenworthy's conclusion that the cost of transportation, energy-used per capita, waste treatment and recycling systems generally decline as city size increases is an example of the argument not only for the compact model but also for reinforcing existing urban areas.

In many countries that meant a different planning policy direction: from support of suburbs to the strengthening of the inner areas of the metropolis.

³ The Sustainability concept was formerly presented at the Stockholm Conference (1972) and then developed by the 1986 Brundtland Report. The latest 1992 Rio de Janeiro Earth Summit focused mainly ecological issues.

One singular example is the Netherlands' Fourth and Fifth National Report that changed the national planning rules from the post-war decentralized model towards a "concentrated" policy: the VINEX projects provide new housing near urban centres or by transforming central areas.

According to this argument, urban redevelopment has been seen as the policy *par excellence* to reuse the existing city. In this context, the reuse of large amounts of area especially in the first industrial peripheries would respond to the demands for housing, helping avoid urban expansion on the fringe.

Redeveloped areas as a distinctive space

Comparing costs: peripheral urban expansion vs. urban redevelopment

The cost of urban peripheral urban expansion generally includes the passage from rural to urban land, sometimes involving the expropriation of agricultural land. One of the main issues in peripheral urban expansion is to bring infrastructure to this ex-rural area: sewerage, water and lighting networks, as well as road access and public transportation. As physical planning designates areas suited for urban expansion, the real estate market also tends to attribute a higher land value to the rural areas where growth will be possible.

In urban redevelopment, on the other hand, the process affects already urbanized areas, which, in principle, lowers infrastructure costs. But when the urban transformation affects a large amount of land other constraints appear. The urban redevelopment of the last 25 years focusing mainly 19th century industrial areas has involved requirements with costs that approach or surpass those of peripheral urban expansion. The passage from industrial sites to spaces with opposed activities, such as residential, offices or leisure, requires many morphological changes.

Industrial areas are usually organized in a system of large plots with irregular shapes and low densities. The urban grid usually reaches the entrance of the large plot in a way that there is no internal grid, because the inner streets just give access to the large buildings. Few sanitary facilities exist and few infrastructures networks are observed inside these former peripheries. The 20th Century sewerage urban network, implemented after the establishment of the industrial sites, tends to be distributed around rather than throughout these areas. Thus, urban transformation of industrial sites also requires much of the same infrastructure needed in projects of urban expansion (Martins, 2004).

Furthermore, the pre-existing 19th century industries typically have contaminated the soil. Hence, the land clearance includes not only the elimination of industrial buildings and facilities, but also the decontamination of the land. This adds a supplementary cost to the operation, which is not found in peripheral urban expansion. So, soil needs to be either corrected/improved or cleaned through difficult procedures.

The real estate market expectation for peripheral urban expansion is often for relatively less profitable activities. In comparison, urban redevelopment creates high-value central areas, with central activities. The parcels to be redeveloped have to be acquired by the entrepreneur (either public or private). As a result, land prices for expropriation tend to be much higher. As land price increases, the urban redevelopment program is defined according to this higher expected profit, reinforcing high-value.

The main hypothesis explored in this study is that householders' needs and income profile largely define spatial requirements and land costs in urban sprawl and in peripheral urban expansion. In contrast, the transformation procedures of the redevelopment program establish the profile of the householder.

Peripheral urban expansion can respond to upper-income household demands. Those projects are mainly developed as exclusive private areas with restricted access and security requirements, called "condominium" in Latin America. For the public administration, these are low cost operations, since public investments concern only peripheral infrastructural works. The investments inside the area are made by entrepreneurs.

Peripheral urban expansion, however, also responds to low-income household demands when plot division (pd) and housing construction (hd) are adopted previous to infrastructure works (iw). The sequence (pd!hd!iw), although undesirable, is frequently adopted when the concern is to respond to popular demands for new housing in a short period of time. When housing construction precedes plot division or infrastructural works - the sequence (hd!pd!iw) - slums normally emerge in urban centres. Typically, the public sector pays for virtually all the capital costs of (iw) and some of those of (pd) in both these scenarios. Although the initial public cost of (iw) and (pd) may be low, the total public cost over the long period of consolidation of these settlements is often very high.

In urban redevelopment, infrastructural works never appear to be the final urbanization step. Since the plots have to be reacquired, the soil needs decontamination, and buildings or railway infrastructure must be demolished, the costs with redevelopment begin before any profit is achieved. Redevelopment follows the sequence (iw!pd!hd), which means that the full cost tends to be transferred to the agents that will finally buy the apartment, shop or office: the householder or the owner - rather than absorbed by the public sector.

Therefore, the program as well as the householder/owner profile is usually defined according to this cost incidence.

Redevelopment operations in Barcelona, Paris and São Paulo

This section describes the most notable features of three redevelopment operations - in Barcelona, Paris, and São Paulo. The next section investigates the historical evolution of these cities and the common elements that redevelopment involves.

Barcelona's Poblenou

Since the 1992s Olympic Games publicised Barcelona's strategies of urban improvement, this case became a model, especially regarding the Olympic areas. The Olympic Village, in the industrial neighbourhood of *Poblenou*, was the result of the redevelopment of 157 industrial areas and the railway line that historically segregated the *Poblenou* neighbourhood from the rest of Central Barcelona. The Olympic Village affected 46.7 ha and created 1,814 new houses.

In the same neighbourhood, two other large urban operations are under development since 1985 adding to the Olympic Village the redevelopment of more than 100 ha. One of these operations, known as Maritime Waterfront redevelopment, affected the area cleaned by means of the elimination of the coast railway line and the closure of many industrial precincts. It aimed to create 421,000m² of new housing in two main projects: the five blocks of *Marbella* and *Diagonal Mar* area. *Diagonal Mar* was built in a system of towers in order to create a large park inside the 52 hectares of the redeveloped area, and also allowing enough land for a new shopping centre. *Marbella* is a group of 5 urban blocks facing Barcelona's waterfront redeveloped following

many rules of the *Cerdà's* grid⁴: buildings aligned with urban block perimeters, inner courtyards inside the block, maximum number of floors compatible with the existing areas.

The third operation involved the extension of the *Diagonal Avenue* (the Diagonal infrastructural element that cuts the orthogonal *Cerdà* grid of the *Ensanche*). The opening of this section of the Avenue in *Poblenou* affected one of the former 19th century urban fabrics of Barcelona's outskirt villages. This 63.7 ha redevelopment is transforming the area previously occupied by numerous small industrial plants (almost 500) and many residences (732 old houses). It is creating 5,700 housing units, a new urban square, hotels and shops. This operation has not been finished yet.

Paris's Quartier de la Gare

To preserve central areas of Paris, the main urban transformations in the city during the 20th century affected its peripheral belt. Renewal was conceived for most of the early peripheral zones from the 19th century, ancient "*faubourgs*" (villages) placed outside the Parisian walls. However, the renewal concept started changing in the late 1970s, as the urban instrument of ZACs (*Zone d'Aménagement Concerté*) began to be applied. It first focused on the redevelopment of small urban fragments and then larger areas such those of *La Villette* quarter or *Bercy*, and, most recently, the *Seine Rive Gauche* redevelopment analysed in this article.

The first studies for *Seine Rive Gauche* began with the candidature of Paris for the 1992 Olympic Games, finally won by Barcelona. After many years of discussion, the redevelopment affects almost 130 hectares and includes notable features such as the National Library, a new University Pole, a business pole (Avenue of France and *Austerlitz* quarter), but also smaller cultural activities and a housing program of 500,000m². Urban land for the operation was obtained through the creation of a new urban level 8m above the existing railway (to *Austerlitz* Station), the elimination of the freight terminal of *Tolbiac* and the inactivation of the *Grands Moulins* and other industrial precincts. The operation is still in process.

São Paulo's Bairro Novo

Bairro Novo is the name given to the 120 ha area in the city of São Paulo proposed in a national competition of urban projects in June 2004. The territory is located between the neighbourhoods of *Água Branca* and *Barra Funda*, near to a future inter-modal station. The competition organized by the Brazilian Institute of Architects and São Paulo City Council aimed to define a Masterplan for a model 21th century neighbourhood.

The program had to be detailed by the competitors, but a certain number of houses, commercial and institutional facilities as well as public open areas are defined by the organization. Around 5,500 new houses and 115,000 m² of services are expected. The Masterplan should deal with some constraints such as the railway line at street level configuring the southern limit of the area, the *Tietê* River and the frequent inundation of the area to this river during rainy season. In addition, some particular buildings should remain in the area.

⁴The Expansion plan of Barcelona (the *Ensanche*), was based on Idelfons *Cerdà* Master plan from 1859. The grid proposed by *Cerdà* is composed by a system of urban blocks placed between axes distant 113,3 m with streets of 20 m. The blocks are octagons, since the corners are chamfers. Larger streets of 50m width cross the grid as structural elements; one of them is the *Diagonal Avenue*, a diagonal axe that represents an element of inflexion in the orthogonal grid. The *Cerdà* Plan unified the historic centre of Barcelona with small villages in the surroundings, configuring the embryo of the "Grand-Barcelona", the modern metropolis.

The environment of redevelopment: the early peripheries

The early urban peripheries were developed in the second stage of the industrialization process of the second half of the 19th Century, when many cities faced their first spurt. Cities that had gone through an industrialization process during the 19th century tend to present some common characteristics since the growth process followed similar patterns.

The early peripheries grew as a continuation of the urban centre, because they took advantage of the existing roads as growth lines. Industrial sites and railways played an important role during the construction of these territories. They functioned initially as points of attraction for new metropolitan activities. Subsequently, however, they started to function as a barrier to linking the urban fragments that constitute this early periphery. These obstacles typically remained in place for most of the 20th century, although the city continued to expand.

This explains why cities in different contexts, that nowadays demonstrate divergent economic development, can present similar territories which could be submitted to analogous urban operations. Not only New York, Milan, Paris, Amsterdam, and Barcelona, but also Buenos Aires, Rio de Janeiro, São Paulo and Bogotá can be object of similar urban operations involving the redevelopment of their early peripheries. Of course, the more unequal the context, the worse the living conditions in these areas and the greater the abandonment of spaces.

The changes in the first half of the 20th Century early peripheries were usually associated with improvement of living conditions through health and building codes, and zoning. These common-sense reforms to improve the bad living conditions of early peripheries came from the rejection of the high-density urban model and the mixing of inappropriate activities, such as housing and industry from the industrial 19th city. The small house size, the super-populated buildings, and the poverty of the inhabitants of these neighbourhoods led to the development of public policies towards urban renovation.

As cities have been growing since then, those territories no longer function as an external periphery. However, they still maintain the morphology and the characteristics of a peripheral space, because the main urban obstacles remained, as well as, their peripheral uses.

This similar historical context of Barcelona, Paris, and Sao Paulo (*Poblenou*, *Quartier de la Gare* and *Bairro Novo*) helps explain the common characteristics of the redevelopment efforts in these different contexts:

Barcelona's Poblenou⁵

Poblenou urban characteristics were historically associated with marginal uses existing in this peripheral neighbourhood: the first modern cemetery of Barcelona, the railway, industries, slums, hospitals, women's prison, etc.

The railway is the cause why Poblenou was traditionally seen as a distant neighbourhood. Although in terms of physical distance this area is close to the Old Walled Town, the main obstacles (dangerous level passages crossing the railway, the existence of industries with high level of air pollution, absence of paved areas connecting it to Barcelona) created a psychological distance.

Before redevelopment started (1985), Poblenou's morphology involved 8 different areas: the Northern area, with family houses and small buildings; *Taulat*, comprising family houses of no more than 3 floors around

⁵ Information obtained by the author. See MARTINS, 2004.

the metallurgical industry of *Can Girona*; the section of the port route, mainly industrial and with buildings of no more than 5 floors; the *Pequím* slum, in the beach, formed by Chinese families from the Philippines that emigrated to Spain; *França-Xica*, which was composed by workman houses around a big industrial area; *Somorrostró* area (1879-1966) near the ancient Hospital for the infected, and the group of houses behind the Cemetery (1898-1999).

Since 1970 multifamily housing developments based on the post-war tower model were built in Poblenou's outskirts. Two of them must be highlighted: *Sudoest del Besòs*, a lower-middle class area and the conflicting *La Mina*, occupied by gypsies and poor immigrants from southern Spain. Both areas are under-going an extended process of rehabilitation while a social inclusion program is under development.

Paris's Quartier de la Gare⁶

Quartier de la Gare in Paris, in the 13th *Arrondissement*, was formed along the route to Fontainebleau, the route to Wales and the route to Lyon beyond the inner walls of the medieval city. Many elements of "out wall" areas were located in this area: *La Salpêtrière* Hospital, the slaughterhouse, many plants such as the Gas Usine, the Refinery *Say*, the *Grands Moulins*, the freight railway terminal of *Tolbiac* and finally the passenger railway terminal of *Austerlitz*. *Quartier de la Gare* is also known as the Chinese neighbourhood, because since 1965 the neighbourhood has received a large ex-colony migration flow. In fact not only Asian, but also African immigrants have occupied the new housing areas constructed in the tower model as part of many renewal operations (from the 1967 *Plan Directeur d'Urbanisme*). The area of *Olympiades*, a set of towers over a commercial shopping centre, or the areas of *Nationale*, *Baudricourt* or *Gandon Masséna* are examples of this phenomenon. Those towers ensembles represent another current theme in urban transformation: the rehabilitation of this group of buildings and the densification of those areas.

Quartier de la Gare is characterized by small workshops and factories, in high density, with working-class houses or small buildings. In the *Gobelins*, the area touching the 5th *Arrondissement*, buildings follow the *haussmanian* model with regular urban façade and well defined urban blocks. Near to *Italie* Avenue and *Boulevard Masséna* the landscape is mainly formed by a set of high tower. *Avenue de Choisy* and *Avenue d'Ivry* are commercial streets full of Asian shops and restaurants, creating a special atmosphere for the area, very different from the sector around *Jeanne d'Arc* square where the old *faubourg* ambience with some old buildings reflect the origin of the neighbourhood.

São Paulo's Bairro Novo⁷

In São Paulo's "Bairro Novo Masterplan" area, the urban scenario includes some of the elements found in 1980s Barcelona's Poblenou: the railway, the waterfront, here represented by the *Tietê* River, the slum adjacent to the perimeter of intervention; a popular housing development (The *Singapura* housing ensemble); industrial sites. The area of intervention presents several other obstacles involving the corridors of mobility: *Marginal*

⁶ See MARTINS, 2004.

⁷ References:

- IAB-SP, Prefeitura de São Paulo. 2004. Concurso Bairro-Novo: termo de referência (material do Concurso entregue aos participantes). São Paulo, mimeo.
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Tietê is a system of express roads along *Tietê* River, where major east-west traffic flows take place. The large commercial outlets along *Marginal Tietê* create the metropolitan character any neighbourhood may assume in a megalopolis like São Paulo. *Marquês de São Vicente* Avenue is a bus corridor that cuts the neighbourhood in two parts, north and south. The area is occupied by outlets, and small workshops. *Nicolas Boer* Avenue is connected to a viaduct that establishes the flows between northern and southern neighbourhoods of São Paulo, crossing transversally the *Tietê* River.

In developing countries, the characteristics of the early peripheries - marginal activities, segregation and peripheral condition - aggravate inequality. Areas for high standard class appear side by side with existing marginal housing. In *Bairro Novo* site, they are accompanied by private and fenced sport clubs (a training club and a middle class leisure club), where access is controlled and limited to members. Also, a group of luxury office towers constructed near the boundary of the area contrasts with the ordinary furniture shops along one of the existing avenues.

In this urban scenario, additional expectations over land transformation are added to the usual pressures. The surrounding activities influence the market in how to look for the most profitable use of the area. The existence of luxury offices nearby could also influence the redevelopment program towards an area with offices. The large plots occupied both by sport and social clubs which could not be removed from the program configure islands of exclusiveness inside the area of intervention. The vicinity of a slum and a low class area leads the north-western portion of the perimeter of intervention to a low class profile zone.

Points in common

Old housing areas placed close to industrial sites, transportation infrastructure (frequently obsolete) that presents obstacles to development, large plots besides small parcels in high densities, absence of an urban grid, lack of sanitation infrastructure, and groups of towers for housing or offices are common characteristics of such different contexts as Barcelona, Paris or São Paulo. Together, they present a marginal image when compared to other central areas.

Redevelopment tends to introduce different urban standards in the early peripheries. The operations usually correct many problems because they affect the basic structure of the territory through proposing a new grid, new accesses and connections, new open spaces, or activities with metropolitan importance, innovative buildings etc. Since redevelopment proceeds by urban fragments, the improvement of redeveloped areas contrasts with the situation of the rest of the neighbourhood.

Limits of Redevelopment

Affordable housing as a small portion of redevelopment

As a strategy to attract the householder, experimental spatial models are applied to redevelopment projects, gathering housing and other notable uses such as cultural facilities, transportation nodes, shopping centres, urban parks, etc.

The distinctive characteristics of redevelopment lead only a small portion of new housing units to be designated as affordable. In European examples or in unequal contexts, affordable housing is suggested as an alternative for units that the real estate market would not value.

In the Paris *Rive Gauche* redevelopment, the operation designates almost 50% of total new units as social housing (among the total of 4,000 new houses, 2,000 will be considered as affordable in a rental system).

Certain targeted groups, such as students will benefit from the program with 1,000 new houses assigned (600 social houses and 400 market-rate units). The social housing program defines different segments of affordability, representing different housing prices. The "studio" typology of about 45 or 50m² is offered as social housing.

In Barcelona's *Poblenou* the situation is very different in numbers, because since 1992, about 14,000 free market houses have been created and only a small share has been designed as affordable housing. In *Poblenou*, affordable housing is provided among the smaller apartments: those at ground floor of about 50m², which as compensation have a 20m² terrace, facing the inner court. Although income defined the potential applicant for affordable housing, those who could benefit from the program had to win a lottery. Aware of the expulsion that the original population of the neighbourhood suffered, and to avoid repeating this outcome in a new program under planning (the *Program 22@*) residents organized to demand that 50% of social housing units be assigned to inhabitants of the neighbourhood.

In unequal contexts, the units to be considered as affordable housing in redevelopment follow the same logics found in European examples: size constraints, less valued urban location or permissiveness with public space. However, the householder profile for social housing is extremely different. In more equal contexts, affordable housing is designed for householders whose incomes allow paying at least part of the rents, while in developing countries social housing often targets the poorest segments of society. Homelessness or misery have been historically leading Governments to find "lower-cost" solutions like parcelling out public land in the city's outskirts, distributing free plots in areas with bad accessibility and lacking infrastructure.

To assure affordable housing in the redevelopment, the pre-program presented in the competition for São Paulo's *Bairro Novo* Masterplan assigned 600 housing units as social housing. In a context of more than 5,500 potential housing units, that meant no more than 10% would be affordable to low-income groups, which could be considered as a lack of social content. However, in fact, it means that proposing affordable housing seems to be unfeasible in such an operation.

To be viable, as indirectly pointed out in the Competition rules, affordable housing should be organized in buildings with no more than 5 floors. This solution means affordable buildings, probably developed with governmental funding, as an island of price control. Those buildings will probably be constructed with stairs instead of lifts and will probably be constructed with low quality materials. As a result, one of those social buildings could be easily become a ghetto in the distinctive atmosphere of redevelopment.

But the solution also brings another contradiction, related to the small size of apartments. Inside the social building, apartments must have the maximum area of 45m². This size constrains the family profile. How can a family of almost 4 people (since 3,76 people is medium family size in Brazil according to the Census tract of 2000) live in 45m² apartments? Probably, only single people, couples or single parent families will apply for those apartments. Indirectly, the selection for affordable housing is not considering income but social profile, reproducing the European approach to affordable housing, but in contexts where this segment is not the centre of the housing problem.

The population in a marginal situation (neither those living in the slum near the area nor the low-class householders living in the close *Singapura* building ensemble) would not benefit from the program. The demands for affordable housing of the poorest segments will continue to be answered by means of peripheral urban expansion, creating new peripheral housing areas in the edge of the city.

In that sense, the housing program established in the Brazilian competition fails to target low-income households, which are at the centre of the housing problem in unequal contexts.

Price appreciation in redeveloped areas leading to gentrification⁸

Redevelopment represents a marked improvement in many of these former industrial neighbourhoods that – without these investments – would be marginal and segregated.

Just after redevelopment, prices in redeveloped areas tend to be higher than in the adjacent ones, as a consequence of the intense contrast between the early periphery environment and the redeveloped area. The contrast emerges because most redevelopment projects tend to supply innovative urban elements (in terms of new activities or building typologies) and new urban spaces (open areas, new avenues, etc). Areas recently redeveloped in Paris *Rive Gauche* redevelopment such as the quarter around the National Library (*Tolbiac Est* and *Tolbiac Ouest*) show a great difference in price when compared to adjacent areas; for instance, the area around *Chevaleret* metro. The same difference happens between recent redeveloped areas and places that experienced an older process of transformation, such as the 1970s renewed areas of *Olympiades*, *ZAC Baudricourt*, *ZAC Gandon Masséna* and *ZAC Nationaléin* the same neighbourhood. In these older housing ensembles prices are similar to those of the 19th century urban fabrics, like the houses around *Place Jeanne d'Arc*.

Table 1: Area Type m² Price

Area	Type	m ²	Price
1990s Redeveloped Tolbiac quarter	Flat -4rooms(new construction)	88 m ²	710,000 €
Existing Tolbiac Quarter	Flat-4rooms(new construction)	83 m ²	440,000 €
Nationale Quarter			
(area redeveloped in the 1980s)	Flat-4rooms(new construction)	85 m ²	430,000 €
Chevaleret Metro area	Flat-4rooms(new construction)	85 m ²	420,000 €

Sources: <http://paris.lesiteimmobilier.com>, <http://www.trouver-un-logement-neuf.com>, <http://www.abonim.fr>, <http://www.bouygues-immobilier.com> (data collected in November 2004).

The data collected also shows that among the redeveloped areas, a difference in price is observed, according to the sort of facilities brought by the redevelopment. Barcelona's *Diagonal Mar* is an especially over-valued area among the redevelopment projects, because of the exclusiveness of this development: the organization of buildings in private condominiums with swimming-pool, paddle tennis court, social area for parties, playground area, private gardens; the presence of the park; and the 17-22 floor tower organization allowing sights from the Barcelona waterfront and from other parts of the city, offering a singular housing product in the context of Barcelona. On the other hand, both in *Marbella* and in the Diagonal Avenue redevelopment, the urban

⁸ The research aimed to confirm the phenomenon of price appreciation by comparing house prices between redeveloped and pre-existing properties. Poblenou's Barcelona and Paris's Quartier de la Gare were the territories chosen for data comparison because, there, redevelopment projects were either finished or under course of action. Price behaviour in European cases could play the role of a thermometer for other environments. Methodologically, the research privileges qualitative information, by comparing prices of apartments of similar size, housing features, similar levels of general accessibility and public facilities; the differences remain mostly in the urban scenario in which the apartment is placed as a consequence of redevelopment.

block parameters, as well as the use distribution (commercial ground floor + higher housing floors), are very similar to the urban form found in other Barcelona neighbourhoods, especially the *Ensanche* (see reference 9 and table 2).

Table 2: Area Type m² Price

Area	Type	m ²	Price
Poblenou existing property	Loft	110 m ²	354,597 €
Diagonal Avenue redevelopment	Flat	117 m ²	462,780 €
Marbella Waterfront redevelopment	Penthouse	115 m ²	580,577 €
Diagonal Mar redevelopment	Duplex	120 m ²	727,225 €

Sources: <http://www.habitaclia.com>, <http://www.diagonalmar.com>, www.buscainmobiliarias.com (data collected in November 2004)

Although the positive change that the redevelopment has provided to many urban areas over the last 25 years is undeniable, householders living in the existing housing areas in those affected neighbourhoods also suffer negative consequences.

In the second stage of the process, improvements tend to appear in the areas surrounding the redevelopment and prices tend to rise in the whole neighbourhood.

The effect is larger in many environments because open spaces improvement, façades and building rehabilitation tend to be extended to the surrounding areas: for example, other smaller industrial sites occupying only half block are acquired by an entrepreneur and rebuilt according to adjacent redevelopment patterns. In Barcelona's *Poblenou* the morpho-typological patterns used in the Olympic Village or *Marbella* redevelopment can be now recognized in many other rebuilt areas. That is when gentrification tends to occur.

The literature about urban redevelopment or urban rehabilitation in the last 25 years tends to present gentrification as one of the results of the price-appreciation process that the whole neighbourhood suffers after the redevelopment of an urban fragment. This large social, economic and ethnological change is caused both by the replacement of the population and the expulsion of former neighbourhood inhabitants, as a consequence of the distinctive character of the redeveloped area, which contrasts with the previous peripheral condition of the neighbourhood where redevelopment takes place.

Filtering compensating gentrification

As time passes, however, the redeveloped areas begin to age and devalue.

The data showed that when redeveloped areas begin to age (with the natural devaluation of the house characteristics through the years), the gap between prices of old and new areas tend to fall. The example of the Barcelona's Olympic Village is paradigmatic (table 3). Many buildings already need a rehabilitation of their façades. Besides, Olympic Village is no longer a novelty in the *Poblenou* context. The initial contrast with the surrounding areas just after the area was redeveloped led a television program to picture the impact of the Olympic Village on the neighbourhood with the following scene: by opening the front door of one of the new buildings the new waterfront scenario could be seen, while the back door showed the old landscape of

industries, chimneys and abandoned buildings. But this threshold no longer exists: the “backdoor” of the redevelopment has been turned into new building ensembles. The industrial enclaves that still remain are the backyards of other more recent redevelopment operations, such as the one along the Diagonal Avenue.

Table 3: Area Type m² Price

Area	Type	m ²	Price
Poblenou existing property	Flat	50 m ²	173,000 €
Olympic Village	Studio	45 m ²	171,300 €

Sources: <http://www.habitaclia.com>, <http://www.diagonalmar.com>, www.buscainmobiliarias.com (data collected in November 2004)

As new redevelopment projects take place in other zones of the neighbourhood, a new change in population may happen: as prices tend to approach between older and newer areas, wealthy social segments may choose to move to other new redeveloped areas; people in the non-redeveloped spaces can move to the oldest redeveloped areas and, finally, new population flows from other neighbourhoods can move to the non-redeveloped areas. Thus, over time, redevelopment provokes a filtering process, what can compensate the gentrification.

Housing demands that redevelopment may respond

The filtering observed in these areas suggests that redevelopment is more likely an alternative to suburban sprawl (low-density housing development mostly demanded by middle or upper-income groups), rather than to peripheral expansion in the city's fringe (developments mostly designed to low-income groups).

Of course the product offered through redevelopment is very different from the house+garden offered in the dispersed housing areas that characterize sprawl. But the distinctive product offered by redevelopment may attract similar householder profiles. The examples presented usually employ multi-stored buildings rather than family houses. However, the characteristics of these multi-story buildings allows for the green and light also existing in the house+garden typology. Balconies with waterfront views, penthouses with private open spaces, or private terraces connected to collective inner courts, with garden and swimming-pool provide the living elements of upper-income groups: spaces where children could play safely, families could be entertained during the weekend, friends could meet.

Other examples not detailed in this work, such as Amsterdam's *Oostelijk Havengebied area* (the eastern dockland redevelopment) offer in the peninsulas of *Borneo* and *Sporenburg* the house+garden typology, through row-house morphology, recalling the traditional Amsterdam urban fabric. The proximity to central Amsterdam and the accessibility to redeveloped neighbourhoods are elements to be taken into consideration by householders when choosing to live in disperse housing areas or in more central redeveloped areas.

Another question refers to filtering process. It assures that in the future the existing stock of houses in a neighbourhood with redeveloped areas may become affordable to householders coming from other, more peripheral areas. Therefore, filtering should be taken into consideration by public planners. Public policies must be designed to stimulate this cycle, because filtering depends on the emergence of new distinctive areas that might attract upper-income householders in order that they would be able to free housing units for new householders.

Redevelopment as an alternative to peripheral expansion in the city's fringe mainly involves the affordable housing theme. As affordable housing in redevelopment is only possible if the government subsidizes most of the market price, however, social housing tends to be artificial islands in this context. Another alternative for including affordable housing in redevelopment is to designate housing units with such unattractive characteristics that they would be of no interest to the market.

To turn affordable housing into an integral part of redevelopment, entrepreneurs must also be involved, and not only public agencies. A compensation policy can be adopted: if a certain number of affordable housing units are provided in each building, then the authorized plot built-up area or the maximum granted number of floors could be revised in order to compensate for the inevitable "loss". Such private-public partnerships are a way to avoid affordable housing becoming islands of price control inside redevelopments. This approach also avoids the ghetto formula, when a single building is identifiable as social housing contrasting with the adjoining ones.

But this method does not solve the cost problem of redevelopment in unequal contexts – e.g. those of developing countries - where even with systems of compensation for the entrepreneur, the final price of the housing unit is unaffordable to low-income groups.

Instead of providing affordable housing, this approach usually makes available somewhat less expensive housing units for a social segment close to the one that occupies the market-rate units.

Final remarks

This study has contributed to the analysis of the difficulties of promoting urban redevelopment as an alternative to urban expansion, particularly as regards affordable housing for poor segments of society, especially in developing countries.

The costs of transforming industrial plots increase land value and oblige redevelopment projects to target upper-income households. As a result, redevelopment is not often a substitutive alternative for all housing demands.

In this regard, two elements have to be considered when designing redevelopment programs. On the one hand, gentrification is almost inevitable and affordable housing for poor people is quite difficult in this context. Gentrification could be in the long term compensated by movement of householders from other neighbourhoods to old redeveloped areas (filtering). Affordable housing will probably serve the needs of particular social segments (the new family profile such as single parents, couples, young or elder people).

Nonetheless, redevelopment has to be considered as an efficient urban policy due to the positive effects it brings to the neighbourhood by introducing housing in former industrial sites.

Redevelopment should not be argued as a magic alternative that would stop urban sprawl or the emerging of new peripheral areas. This most certainly is an interesting alternative to reuse most areas of the inner city and to meet the demand for upper-income housing. In that sense, other policies have to be designed to solve the problem of affordable housing, by means sustainable models, in the inevitable peripheral areas.

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VACANT AREAS IN GUADALAJARA, MEXICO A PROFILE OF PROPERTIES AND OWNERS

*Adriana Fausto Brito**

Abstract

The present work aims to provide elements needed for discussion of vacant land, its relation to urban areas and to social inequalities in cities. Although the empirical parts of the analysis take the case of Guadalajara and its metropolitan area (the second largest conurbation in Mexico) as a reference, the methodology proposed could be useful in the design of policies for other Mexican cities as well. This methodology includes the following elements: the identification of different types of vacant property; establishing the profile and the ideology of owners; the legal framework regulating land tenure; and a brief review of policy instruments created by legislation (for example, public-private associations, preemption rights and the transfer of development rights).

Conclusions highlight the need to define public policies for incorporating vacant properties into urban dynamics. Factors to be taken into consideration are: characteristics of the properties, economic cycles and the demand for spaces, urban regulations, the environment and ways of occupying space. More attention should be paid to the socio-cultural and political aspects of properties, for these determine different forms of valorization of urban space. Knowledge of these values is necessary for identifying and questioning notions of general interest and public utility.

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Introduction

The question of vacant land and underused spaces in cities is constantly acquiring greater importance in contexts where there is a concern for sustainable development: doubts are raised about the models of unlimited growth followed by the great metropolitan areas; questions are asked about the processes of suburbanization that leave the European idea of a "compact city" behind and start to take over rural territory; criticisms are also made of low densities, the excessive consumption of land and of energy resources, the indiscriminate use of the automobile, and the degradation and abandonment of urban centers.

The metropolitan areas of Latin America have been systematically associated with low population densities, and uncontrollable physical expansion and squandering of urban land. And yet it was not until the late 1990s that the subject of vacant land came up as a central theme and an object of systematic study, starting with a comparative analysis in five cities in the southern countries of Latin America – sponsored by the Lincoln

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Institute of Land Policy. The studies coordinated by Clichevsky (2002), emphasize the capitalist valorization of land as a factor of socio-spatial segregation, and explore, as factors determining the existence of vacant land, the structure of ownership, housing submarkets and circuits of commercialization, the agents taking part, the role of the State and urban policies. These are pioneering works, and rather than offering answers to the problem, they introduce us to its complexities, leaving innumerable questions to be dealt with later.

In Mexico studies of the subject of vacant property are few in number. Until the approach of the year 2000, just a few texts on the processes of urbanization for housing, land markets, and fiscal policies alluded to unbuilt parcels. Regarding urban planning there is in fact a paradox: vacant land would appear to be an important element for the proper development of cities, and this is shown by the countless times they have been mentioned, for over ten years, and included in the diagnoses and strategies of urban development plans. And yet there are found to have been only a few actions (generally ephemeral) that were actually taken to deal with them.

Methodological and practical factors conditioning the study of vacant property

In this work, vacant property is taken to mean built on or usable ground – possibly plots, or else buildings, large estates or zones – located inside urbanized areas, that is either currently unoccupied or is used below its full urban potentiality. This covers a wide range of unoccupied or partially-used sites within the consolidated areas of a city, spaces which may include:

- a) interstitial land and vacant lots. The first of these may include parcels left over from big urban developments as well as reserves of developable land; the second refers to lots of different sizes in places where the land was parceled out for housing or industry or for commercial use, thus, plots that have been urbanized but not built on.
- b) abandoned or half-used constructions (for example, degraded houses and buildings in historical centers); joint developments built for a specific activity no longer carried on in the area (such as some factories, shopping malls, military installations, or special infrastructure facilities).

The metropolitan area of Guadalajara (MAG) extends over four adjacent municipalities: Guadalajara (capital of the State of Jalisco), Zapopan, Tlaquepaque and Tonalá¹. In the year 2000, slightly less than three and a half million people lived in these municipalities, over a surface area of 46,276 hectares (i.e. 462.7 square kilometers or approximately 288.9 square miles, equivalent to, say, 15 miles by 19). The metropolitan municipalities have gross densities oscillating between 51 and 117 inhabitants per hectare, in other words an average of 75 inhabitants per hectare, or 7,500 per square kilometer. Just in Guadalajara the average density is of 117 inhabitants per hectare; whereas in the west of the city and in the central zone there are respectively 48 and 91 inhabitants per hectare, and the density on the eastern side fluctuates between 142 and 160 (COPLAUR, 1999).

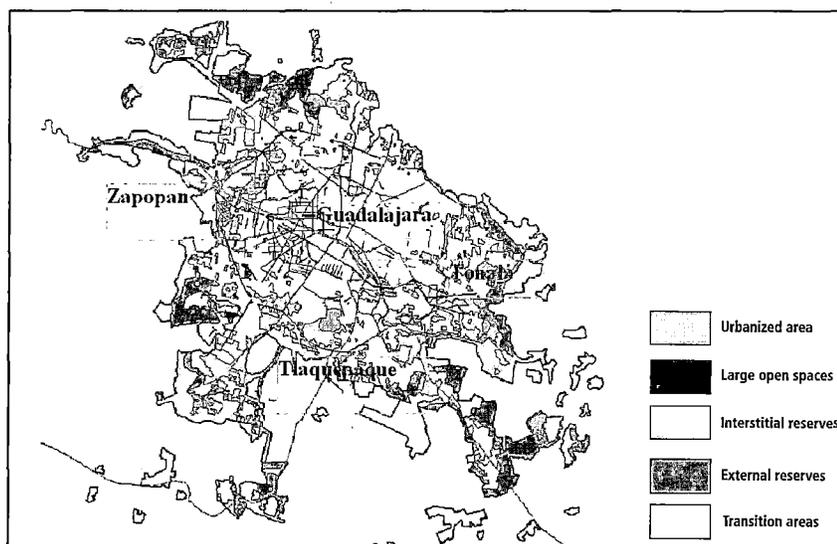
¹ For planning purposes, the conurbation of Guadalajara covers eight municipalities, the four that make up the metropolitan area and the municipalities of Tlajomulco de Zúñiga, El Salto, Juanacatlán and Ixtlahuacán de los Membrillos. These eight municipalities cover a total area of 2,828 sq. km. However, only some 17% of this area is actually urbanized, and of this, most is in the four metropolitan municipalities.

Table 1: Population density in the metropolitan municipalities of Guadalajara

Municipality	Inhabitants in 2000	Urbanized area, in hectares (A)	Total urban area, in hectares (B)	Net density	Gross density with
				with respect to (A) Inhab/ha	respect to (B) Inhab/ ha
Guadalajara	1,646,319	13,598	14,119	121	117
Zapopan	1,001,021	14,138	17,686	71	57
Tlaquepaque	479,178	5,647	9,275	84	51
Tonalá	337,149	3,285	5,196	103	65
TOTAL MZG	3,458,667	36,668	46,276	94	75

Source: own calculations based on data in PPOZCG 2000. Area (A) refers to land that is effectively urbanized (housing, industry, etc.); total urban area (B) is the sum of the urbanized areas plus open spaces and intra-urban land reserves.

According to the Urban Development Master Plan for the Guadalajara Metropolitan Area for the year 2000, 8,179 hectares of the area covered by the metropolis consists of “large parcels of underused vacant land.” This represents some 18% of the total urban area². So Guadalajara has 521 hectares of plots already supplied with infrastructure and services; the vacant land in Tonalá adds up to 1,611 hectares, while Zapopan has 2,966 hectares and Tlaquepaque has 3,081 hectares. For a metropolis growing at an annual rate of just over 1,000 hectares (according to the projections of the Plan referred to), these interstitial reserves would be able to satisfy the demand for land for the next eight years.

Figure 1: Reserves of land and the large empty parcels (interstitial reserves) in the metropolitan area of Guadalajara

Source: Proyecto de Plan de la Zona Conurbada (PPOZCG, 2000).

² According to the urban plans of other cities in Mexico, their situation is similar: 19% of the urban area of Aguascalientes in 1998 was said to be plots with no use; in Colima-Villa de Álvarez such land accounted for 14% of its urban area; and in the year 2000, in Mexicali, the area of vacant lots amounted to at least 16%.

Although statistically significant, many vacant properties are hard to quantify and even harder to manage, because most of them are micro-spaces dispersed through the cities: dilapidated houses left to deteriorate in the city center and tall buildings with the top floors empty; plots and even whole blocks unoccupied in recent urban developments; properties in the city center that are used as parking lots and rural land that has become embedded in the urban fabric. The size of the empty lots is no less variable: within the metropolitan area empty properties of less than 100 square meters can be found scattered through popular settlements, and there are also areas of rural land measuring several hectares.

The Urban Development Master Plan 2000 repeatedly refers to the “large parcels of underused vacant land”, without explaining what is meant by this notion: what kind of spaces they are and what characteristics they are supposed to have; what conditions they present that would make them underused; what size they are and what are the parameters within which they are significantly “large”. The truth is that neither this plan, nor the municipal plans nor the plans regulating land use, provide basic information allowing one to know the morphology, the judicial-administrative situation or the specific features of these plots, let alone try to make a comparative analysis of the municipalities and comprehensive proposals for the metropolis. There are no public data bases set up specifically to register the vacant lots or unoccupied built spaces found in the municipalities of the MAG. Such information is found dispersed in different offices at every level of government (municipal, state and federal): for example, the cadastre, in the public property registry, the planning and public works offices, the National Agrarian Register, commissions for the regularization of land tenure (some for private property and some for *ejido* land), and offices in the historic center.

The challenge is not a simple one to meet. One would need to have a common methodology shared by the four metropolitan municipalities for the collection and processing of data related to vacant property, which implies, to start with, defining and managing the same concepts, or at least being able to identify their equivalents. All of which supposes that the information be equally detailed and ample in all cases, but this is not so, mainly due to the unequal economic and technical capacity of each municipality, their different sizes and rates of urbanization, and because of the policy of decentralization down to the municipalities that allows different priorities for urban programs and policies. Furthermore, the information handled by the various dependencies of a single local government may vary enormously; it may be out of proportion or frankly contradictory; in the best of cases it may be incomplete and what is worse, it is hard for the academic community and for the public in general to gain access to it.

Some of the basic factors conditioning any advance in the knowledge and understanding of vacant property are listed below:

1. *A conceptual revision of the institutional and normative language related to these spaces.* There is no agreement about the use of terms to denote the various different kinds of vacant property that there are, or the words used to describe them: vacant and abandoned property, vacant real estate, underused spaces, urban reserve, free areas, brownfields, and derelict land. Every institution adheres to the concepts stipulated in the law governing their activities – if indeed they are fixed with any precision –, or, in the worst of cases, they infer them from their own functions and responsibilities; which can lead to misunderstandings, a lack of coordination, and problems of jurisdiction, among others. It is therefore important to review the various laws

and regulations guiding urban planning, the execution of public works, property rights (both in the urban and in the agrarian³ context), the registration of these rights, and cadastre and real estate tax assessment.

2. *The definition of a shared or comparable methodology for collecting and analyzing information.* Each institution gathers data that it will find useful for fulfilling its functions, and it uses the resources within its reach but very often without a methodology that would guarantee the information is properly representative, homogeneous, systematized, and updated - in short, reliable. Even when there are important differences in the capacity of each public dependency and the training of its staff, working with comparable concepts and methodologies will allow information banks to be used to maximum effect.

3. *Establishing parameters to determine the intensity of urban property utilization.* Notions such as the under-use of urban spaces has a negative connotation or one of reproach with respect to the current degree of use, making a moral judgment that their capacity or potential is not being properly exploited (they are not working to maximum or ideal effect). Opinions of this kind immediately raise two difficulties. First, the problem of how to define or determine the potential of a property, as the parameters or the points of reference used, is hardly ever clearly stated. Second, any such potential for exploitation may depend on the interest of the agents concerned - whether it be of those who use the spaces or of those who determine the ways in which they are used. It is therefore absolutely necessary to define clearly the criteria and indicators used for reference: for example, installed urban infrastructure, the density of construction and population, and the potential for economic profit ("highest and best use"). Also it should be clearly explained how the indicators allow aspects related to social equity and the quality of life in the city to be evaluated.

4. *The need to include qualitative variables that allow typologies of vacant property to be drawn up.* The identification of these spaces in urban planning documents is primarily directed to recording quantitative aspects. Qualitative variables should also be included - the surrounding area they are in, land tenure, their judicial situation, the time they have been left vacant, etc. - making it possible to discern the real potential of these spaces and to see how workable their exploitation really is. To do this would lead to differentiated policies intended to help restructure the city. Rather than just occupy an unused space, the issue is how to integrate the under-used land into a complex urban dynamic; most immediately, with the surrounding area. In this sense, these empty spaces also acquire a dynamic connotation. As they enter into a temporal dimension they no longer need to be regarded as a fixed item in calculations of urban growth.

5. *Improving access to information on real estate properties and making it more transparent.* As a general rule, those in charge of public offices prove reluctant to provide data, or information, and are unwilling to grant interviews on the subject of real estate property, even public property. Access to the records is restricted for economic reasons - the information has to be paid for, as it is held to be one of the services provided by the public administration that it has a right to charge for - and because of the discretionary confidentiality exercised by officials, which they justify in terms of the security of the owners (i.e. so as not to expose them to risks associated with criminal behavior - for example, kidnappings, frauds, land invasions, or dispossession). It is absolutely necessary to establish the right to information related to the property market (planning and urban

³ For example, although no urbanism law in the State of Jalisco recognizes this definition, the term baldío is commonly used to refer to areas of ground not built on in cities. At the same time, the Agrarian Law does define terrenos baldíos as those lands that have not ceased to belong to the Nation by means of a legally issued title, and have not been delimited or measured.

development, specifying in principle, what type of information is to be considered confidential, and justifying the criteria on which it may be classed as such).

Vacant property, as a concept and as an urban phenomenon, should be visualized in a dynamic sense, which means that it evolves in the course of time. The “appearance” and “disappearance” of plots and interstitial lands are not spontaneous occurrences, as they form part of the life cycle of urban areas (expansion, consolidation, decline, renovation). Likewise, other morphological-functional differences (the consumption of space per inhabitant, density of construction, available urban services and infrastructure ...), are determining factors in attaining greater objectivity in the criteria used to qualify the under-use or the equitable exploitation of the city for all social groups. Vacant property cannot therefore be understood in isolation but only as part of an urban fragment that is itself intimately linked to the other pieces that go to make up the jigsaw puzzle of the metropolis. So it is important to try to see if there is a “normal” period for these portions of the city to mature, coming to the point at which they fulfill the objectives for which they were constructed or when it becomes possible to achieve a maximum exploitation of the spaces they are made of, which may be interpreted not only in an economic or physical sense, but also in terms of the legal, financial, social and even the political order.

Profiling the vacant areas: a typology of vacant property for Guadalajara

In spite of the limitations mentioned above, we have decided to offer a typology of vacant property in the metropolitan area of Guadalajara. Rather than presenting a faithful reflection of the phenomenon, the intention here is to submit for discussion the parameters used and the categories proposed. The main types of vacant areas whether real or potential may be distinguished by such aspects as:

- a) physical details and location:* the dimensions of the plot, the characteristics of any construction and special features of the property; the infrastructure and services available in the area where it is located; the natural and ecological features of the surrounding area, its historical and cultural importance.
- b) the normative and legal condition:* permitted use, the laws governing the exploitation of the properties, taxes and contributions that have to be paid for it, and the institutions involved in the application of standards.
- c) the owner and his or her ideology:* which implies not only a legal aspect of land tenure, but also discerns the motives of the proprietors or those in possession of the vacant land, and the logic guiding them to exploit their properties at particular times and in particular ways that other stakeholders might question.
- d) the average length of vacancy:* identifying this parameter on the basis of processes of urbanization, commercialization and consolidation of the spaces produced in the city will provide a basis for debate on the problems and opportunities represented by the vacant property. For this it would be necessary to detect the *flow* – that is, the new plots, parcels and urban buildings introduced into the market – as well as the *stock* – the existing real estate reserve.

It is to be noted that not all the criteria have the same weight or importance in determining the type of vacant property. For example, sometimes the (lack of) functionality of a plot, linked to its physical characteristics and location – as in the case of buildings not being used in the historical center – may count for more; on

other occasions it might be the type of land, and the legal problems that a plot is involved in, that make it remain vacant. The six types of vacant property identified in the MAG are:

1. Totally or partially abandoned property in neighborhoods (*barrios*) in the historic center, which could be buildings or vacant lots. This type is more characteristic of the municipality of Guadalajara than any of the other municipalities of the Guadalajara metropolitan area; in the central area of the municipality of Guadalajara there were 459 unbuilt parcels in 2001, of varying sizes up to 600 square meters, amounting in total to 28 hectares, a quantity which could be virtually tripled if an additional 698 deteriorated properties were taken into account. In reality these are potential empty lots – occupying as they do an area of 42 hectares⁴.
2. Unimproved lots in housing developments for upper, middle and lower income groups. These represent a land reserve that is atomized and dispersed over the metropolis; sizes may range from 90 to 5,000 square meters, depending on the income of the people seen as potential buyers. In the municipality of Guadalajara, outside the historical center, there could be at least 4,600 lots (amounting to no less than 250 hectares)⁵ in the year 2001, which is equivalent to 2% of the urbanized area of Guadalajara. The other municipalities do not have reliable estimates or figures, but the quantity is no doubt much greater, as they cover the outer and middle rings of the metropolis which are currently being consolidated or are still in full expansion.
3. Vacant commercial property, principally lots and warehouses (roofed structures, called *naves*) in industrial parks and zones, as well as sites for shops and offices. According to a survey by the company Colliers Lomelín, there were in 2002 in five industrial corridors of the MAG plots of this type covering 332 hectares, and 80,653 square meters of unoccupied industrial warehouses. With regard to the market for offices, an average of 21% of the spaces built for this purpose was still available, amounting to 85,044 sq. meters. Finally, in five main commercial zones, unoccupied spaces amounted to a total of 54,559 m².
4. Land left over from urban developments and subdivisions, including in this category areas of generally between 5,000 sq. meters and ten hectares, which might be simply subdivisions of larger areas or of urban operations in general. Compared to the interstitial reserves (next point), the normative requirements for the use of these open “leftover” spaces are less stringent and the procedures are faster, as the land has already been incorporated into the urbanization process. In this category and the next one, it would be possible to distinguish subcategories based on different kinds of proprietorship.
5. Interstitial reserves of rural land, meaning portions of land not yet officially urbanized larger than 10 hectares in size – and that may be of over 50 hectares – which are embedded inside the perimeter of the metropolitan area. The information from the Master Plan of the conurbation makes no distinction between this type and the previous one; together they cover over 8,000 hectares in the four municipalities, which according to the estimations of the Plan amounts to nearly 18% of the total urbanized area. There is no doubt that the largest amount of this area is accounted for by the interstitial land reserves.
6. Plots that should not be urbanized or potential vacant spaces, among which we include areas of an ecological character, or subject to environmental risk, easements to protect infrastructure and public services, etc.,

⁴ Data from the Department of empty lots, slum mansions, and ruined properties of the municipality of Guadalajara (Departamento de terrenos baldíos, vecindades y fincas ruinosas del municipio de Guadalajara).

⁵ The figures are from the same source as those given for the previous type (from the municipality of Guadalajara). One should bear in mind that figures from public dependencies do not distinguish between these empty plots and land that has not yet been urbanized (that is, between our types 5 and 6).

which are bound by laws and regulations forbidding the construction of buildings. They are of varying sizes, from hundreds of square meters to hundreds of hectares⁶. If we include them as potential vacant spaces it is because many of them have been regarded as empty spaces (though they are not) and have been occupied irregularly: the tops and sides of hills, gullies, agricultural and natural land, ground subject to flooding near streams, easements located alongside gas pipes and railway lines, etc.

⁶ According to the Master Plan, just the large intra-urban open spaces cover a total of 1,429 hectares, equivalent to nearly 4% of the MAG. Although many of these areas now have a definite use and corresponding protection, others not fitted for exploitation as areas of recreation, could be susceptible to irregular occupation.

Table 2: Typology of vacant property in the Metropolitan Area of Guadalajara

Type	Sub-type	Typical size	Figures and absolute areas	Relative areas	Morphology and principal characteristics
1. TOTALLY OR PARTIALLY ABANDONED PROPERTY IN THE OLDER BARRIOS	1.1 Buildings		49 has. = 848 constructions (municipality of Guadalajara)	7% of the area of the historic center of Guadalajara (744 has)	<ul style="list-style-type: none"> • Houses of 1-2 floors, 19th century • Buildings of 2 or more floors, mid 20th century • Regular and irregular shapes (plots, cores of blocks) • Subject to legal restrictions protecting the historical heritage
	1.2 Empty plots	250 – 600 m ²	70 has. = 28 has. (459 lots) + 42 h. (698 ruined buildings). Municipality of Guadalajara	9% of the area of the historic center of Guadalajara	<ul style="list-style-type: none"> • Time of vacancy: occasionally up to 20 years
2. UNIMPROVED LOTS IN HOUSING DEVELOPMENTS (90 – 5,000 M2)	2.1 High income	500 m2 or more	At least 250 has. = 4,628 plots in Guadalajara	1.6% of the area of the municipality of Guadalajara	<ul style="list-style-type: none"> • Rectangular plots (of 90 to 5,000 m2), according to income of inhabitants • Atomized and dispersed stock of unused land • Time of vacancy: depends on degree of consolidation (high income: 20-30 years; low income: less than 20 years)
	2.2 Middle income	250 m2			
	2.3 Low income	100 m2			
3. VACANT COMMERCIAL PROPERTY	3.1 Properties in zones or corridors of the activity	Variable	149 has. industrial use 31,559 m2 commercial 85,044 m2 offices	Offices: 21% of all space for offices in the market	<ul style="list-style-type: none"> • Various constructions: warehouses, industrial plants, office buildings. • Some located in enclaves, such as industrial parks or shopping malls
	3.2 Plots and premises in enclaves	Plots in industrial parks (I.P.) from 1,000 to 100,000 m ²	514 has. in I.P.	42% of the total area of I.P.	<ul style="list-style-type: none"> • Others in zones or corridors, with direct access to the street

(continued)

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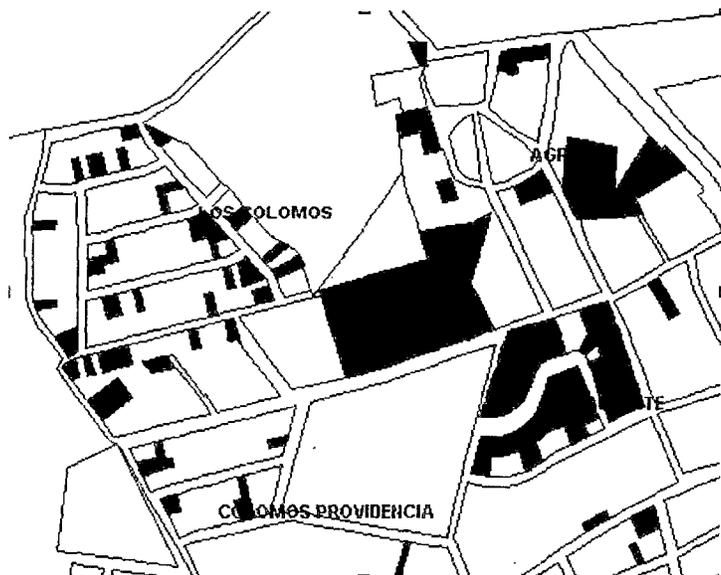
Type	Sub-type	Typical size	Figures and absolute areas	Relative areas	Morphology and principal characteristics
4. AREAS OF LAND LEFT OVER FROM URBAN DEVELOPMENT	4.1 Private property				<ul style="list-style-type: none"> • Variable shapes • "Urbanized" land • Possibility of immediate use • Time of vacancy: variable
	4.2 Public property	0.5 – 50 has.			
	4.3 Social property		8,179 has.	18 % MAG	
5. INTERSTITIAL RESERVES (URBANIZABLE LAND)	5.1 Private property				<ul style="list-style-type: none"> • Rustic areas or land not incorporated into the urbanized area • Time of vacancy: variable, 10 – 30 years
	5.2 Public property	Over 50 has.			
	5.3 Social property				
6. AREAS NOT URBANIZABLE (POTENTIAL OR DE FACTO VACANT LAND)	6.1 In areas of transition	Variable			<ul style="list-style-type: none"> • Easements: depending on the objectives and reach of prohibition to build • Riverbeds and easements of hillsides and tops, landfill sites, unstable lands, subject to flooding, etc. • Restricted areas in airports, railway installations, prisons ...
	6.2 Of ecological conservation or prevention of risks				
	6.3 Affected by passage of infra-structure or special installations				

One should bear in mind that, strictly speaking, the different types are not mutually exclusive, as the same features or properties may be common to more than one category. For example, areas reserved for the growth of an industrial park might in the first instance be classified as vacant spaces for productive activities (type 3), and yet might also be considered as land left over from urban development (type 4), available for other uses⁷. The need to limit the size of this work does not allow us to explain every type in detail, so we shall only make a few general points.

Regarding *vacant and abandoned property in historic neighborhoods*, the authorities are guilty of a lack of interest in the reinsertion of these spaces into current urban dynamics, which derives from the historic centers and old neighborhoods having been forced to adapt their situation to legal schemes that were originally intended for the urban periphery. This makes the regulations for intervening in the historic areas of the metropolis too onerous, with, in principle, at least two normative and institutional domains in contention: the urban (planning, building and urban services), which is the responsibility of the municipalities⁸; and that which is related to the historical-cultural heritage of the city, and comes under federal and state departments.

As a result, any intervention in the older parts of the city implies more rigorous development standards than in areas on the expanding periphery. It even takes twice as long for urban renovation plans to be authorized. Also, anyone seeking to modify an existing construction or build a new one has to obtain a license which requires not only the usual papers but in addition special documents or studies to be produced. Depending on its features and the architectonic value of the property, the property is given a classification that determines how much or how little it may be modified (maintenance, restoration, rehabilitation, partial or total replacement).

Figure 2: Some lots and vacant areas identified by the Commission of Urban Planning of the municipality of Guadalajara, in the year 2000. These lots are located in estates built in the seventies for high income groups.



⁷ For example, in the year 2000, large areas of land in several industrial parks in the metropolis were offered for development, principally to the electronic industry. However the supply of land greatly exceeded the demand in this sector, so some of the parks, once built, found they had to offer some of their land reserves to housing developers.

⁸ Whose responsibilities, in turn, may fall to different dependencies. For example, in the municipality of Guadalajara, these would be the Urban Planning Commission, the Direction of Public Works and the Patronage of the Historic Center.

In the category *residential lots*, the vacant land consists of a stock of atomized and dispersed plots. For the most part, they have morphological characteristics that correspond to the minimum parameters required by urban laws. Property rights are also spread amongst numerous holders, who in some cases cannot be properly identified. As these lots form part of the areas considered urban, their physical use or occupation could be immediate; they only have to fulfill the municipal standards for building and land use. Other situations arise where there is some kind of irregularity or problem with land tenure. At any rate, what distinguishes this type from others is the particular income brackets that residential plots are offered to, along with the accompanying socio-cultural elements that determine how the consolidation and occupation of these spaces proceed.

In urban developments intended principally for higher income brackets (like gated communities), there is a low rate of land occupation, and the process of building out and populating the area is slow⁹, and it may on occasion take 30 years or more. It is apparent that these developments are not only intended to satisfy an elementary need for shelter; rather than seeing it only as a habitable space, many owners or potential buyers see short to medium term benefits of another kind reflected in properties of this type (second residence, hedge against inflation, investment, security, status, speculation). Whereas in development of a popular type the number of vacant lots tends to diminish constantly, because free areas in these *settlements* are quickly saturated: in just a few years, twenty at the most¹⁰.

As is not the case in other kinds of housing development, where the plots are fitted with infrastructure and services are laid on prior to occupation, in popular settlements the plots have to be occupied before even basic urban services will be provided. This means that people have to install themselves in adverse conditions, organize and then request (or just wait) the support of the authorities for the construction of the urban environment. The different conceptions of housing (and of land, its principal component), either as a merchandise or as a dwelling process, also give the existence of unused land a different meaning in relation to one form or another of producing the urban environment. Hence comparisons of the unused plots in popular developments will be unfavorable with those made of other kinds of housing production, unless the degree of physical (not populational) consolidation reached is in some way equivalent - in effect, that they have evolved to the stage where they have the infrastructure and the urban services that the developments intended for middle and upper income brackets were provided with from the start.

With regard to *vacant commercial property*, the real estate market for and, hence, the occupation of these areas is intimately linked to changes in the economy - and in employment - and to transformations in the city (Granelle, 1998: 386-391). Productive activities are pretty well diversified in their kind and in their space requirements. Mainly in the sector of real estate services, the characteristics of the construction and the location of the property become the determining factors, which brings in as fundamental for the analysis of land vacancy, the question of *obsolescence*.

The category *land left over from past development*, refers to areas of unused land that are the result of operations that alter the fabric of the city (the urbanization of rural land, the subdivision of land, urban renewal projects

⁹ See the study by Ickx (2000) of the gated estates in Guadalajara. Similar references for other countries may be found in Bragos et al. (2002: 456); Clichevsky (2002: 66-67).

¹⁰ For further information, see the exhaustive study by Bazant (2000), conducted in areas of popular urbanization in the south of Mexico City. This author notes that in the first decade popular settlements expand at a low density (of some 20 houses per hectare); then comes the accelerated consolidation that increases the density to as many as 50 houses per hectare. It can be deduced from Bazant's data that in occupied areas of between 26 and 40 hectares, these processes take no more than twenty years.

that require demolitions or the rearrangement of plots ...), but are not immediately incorporated into the market, either because they are not part of the face changing operation, or because they are being kept for other stages of development. Unlike the *interstitial reserves of raw land* (developable land), these are *urban lands* – although they are not urbanized, that is, haven't been internally equipped for a specific use – because they are considered to be land that has been officially incorporated into the city, i.e. recognized as urban by the municipal administration.

Figure 3: Area measuring several hectares, left over after urban developments in Guadalajara. The photo is from the municipal housing atlas (*Atlas municipal de vivienda*), Ayuntamiento de Guadalajara (2000).



The qualification of these areas as “urbanized land”, though it might be more a formal than a material distinction¹¹, conditions the possible form of use and exploitation differentially. For example, the urban land must pay higher rates of municipal tax (*predial*) than those areas designated as rural in the cadastre; on the other hand, the procedures and requirements for construction might be simpler and take less time¹², with subsequent reductions in the costs of permits, rights and contributions. Further, the preemption right of the authorities to acquire land and make territorial reserves, does not apply to lands that are the result of operations conducted according to an urbanization plan.

Concerning the *interstitial land reserves*, these areas relate to a land use type designated in the legislation and in zoning plans, as areas of urban reserve, that is, those which are intended to accommodate the future

¹¹ For this qualification favors the administrative situation of the lands, rather than their use or technical outfitting; thus the areas which have been urbanized irregularly are not formally considered part of the city until the zoning plans classify them as areas of urban improvements or “progressive urbanization”.

¹² Sometimes this depends on the area to be developed: i.e. for interstitial lands of less than one hectare, even if they appear to be rustic, the elaboration of an urbanization plan is not required.

growth of the city. It is therefore land which is considered developable, but the planned expansion does not necessarily coincide with the real expansion tendencies of the city. Although urban plans specify whether the reserves are considered short term, medium term or long term; in the metropolitan area of Guadalajara few plans specify how long is meant by each of these expressions. How long is left up to the criterion of the officials who authorize urban developments, who must base their decision on the existence of basic infrastructure, or the possibility of realizing them. But the classification of land as long term, short term or medium term reserves does not help with programming areas to be urbanized according to Master Plan's objectives, because a developer may at any moment use a reserve classed as long term (i.e. on the periphery of the city and still not joined up to the urban area), as long as he builds the indispensable infrastructure for linking the land to the rest of the city, even if this leads to a leapfrog development.

Finally, *areas of land that cannot be urbanized or are potentially vacant* are defined with respect to the normative and planning dispositions regulating land use and establishing the limits to property rights. Generally these are easements that arise from the assumption by the law of an interest in the area in the name of public utility.

The types of easement vary principally according to their objectives and according to whether or not it is possible to build on them. Although differences could also be established on the basis of which institution is in charge of defining them, in the end the responsibility for seeing that they are respected falls in the first instance to the municipal authority, as one of its attributions in the area of planning and regulations in its territory. In these areas of land – which are mostly public property – certain forms of irregular occupation that have to do with tenure and the creation or the introduction of uses not permitted are a frequent occurrence.

A hypothetical profile of the owners of vacant property

The judgments that are made of vacant property depend on the different postures of separate stakeholders. Whereas for some, the empty lots are a sign of speculation and of inefficient land use, others (such as the owners of particular plots) see them as a family inheritance, or as a way of saving and of investing. Full time investors, developers, and government officials might find in them opportunities for renewing the image of the city and, in the process, make a profit. Also, as land speculation is deeply rooted in the behavior of a variety of agents in the metropolitan area of Guadalajara, it is an inseparable part of local power games. Even so, the practices of the owners and those of the agents, have different impacts on the configuration of the city, on the land market, and on political decisions.

It is the large landowners or those who have strategically important land - people who generally belong to groups that are economically strong or have connections in the spheres of power – who have an important influence from the very start for negotiating with the authorities that define and validate the public interest. Small proprietors on their own (with one or just a few plots for housing) will not have much effect in decision taking, unless they can present a common front, in an organized way, such as through neighborhood associations. And even amongst these small owners distinctions could be made on the basis of how well they know the norms, or according to their economic capacity, or the relations and the negotiations they are able to establish with the authorities. It is also important to recognize that speculation may assume different forms; local agents who may be passive speculators might be joined by other financial real estate speculators who could be foreigners. Following another line of research, it would be necessary to go into greater depth to study the impacts each kind of speculation can have on the structure of the city.

In the absence of concrete information and with no recent empirical studies, but in accordance with the feature most used to qualify the real estate market, we can offer a possible classification of the owners of vacant property in the MAG into different types with corresponding patterns of behavior. The categories derive from other research projects, our own experience, interviews with professionals in the real estate business or in land regulation, and certain theoretical considerations.

The attempt to classify the types of owners here should therefore be thought of as a hypothesis or a working methodology for future research. We have used the four basic criteria of Bromier and Makowski (1971): the location of the properties¹³, a rough idea of the dimensions of the areas involved, the type of land (its current or potential use), and its designation as collective, individual or public. To this we have added the most frequent ways of obtaining the land and the predominant types of behavior by the owners in the real estate market, basically so as to be able to see the underlying logics or reasons for holding onto the land.

A principal difference is the one we have established between what we call patrimonial retention and what we call speculative retention in order to emphasize that not all agents retain possession of a property with the immediate aim of appropriating price increases to their land. As Smolka says (2003), there are other factors influencing retention (e.g. legal obstacles, excessively permissive urban and fiscal policies, deficiencies in planning and in public administration, etc.). For the case of speculative retention, we follow the distinction proposed by Jaramillo (1994), between *passive speculation* and *inducted speculation*, depending on whether or not the owners took specific measures to provoke the appreciation of their properties.

Amongst those proprietors who own land as individuals or as joint owners, we find there are two kinds of small landowner (some in urban, others in rustic areas), and a third type who are medium or large owners. As individual owners, they have a degree of autonomy in decisions about their property, which makes the situation of their lands different to that of those owned by corporate private proprietors, whose fate depends on decisions taken by directive organs or boards. In much the same way, the social or communal land of the agrarian nuclei, is subject to the dispositions of an assembly, but we consider it separately because of the particular regulations of this kind of ownership and its historical-political context¹⁴. Public ownership might appear to be like corporative ownership, as, generally speaking, any institution can dispose of its property as its administrative committee sees fit; however, as we have just said, there are also a number of legal restrictions and special conditions applying to the use of land held this way.

¹³ In the present case, this refers to their geographical position in the metropolis, on the basis of a simple scheme of concentric circles, where the nucleus corresponds to the central area of Guadalajara, and the inner rings cover basically the four metropolitan municipalities (Guadalajara, Zapopan, Tlaquepaque y Tonalá), the intermediate rings would cover parts of the conurbated municipalities (Tlajomulco, El Salto, Juanacatlán, Ixtlahuacán) and the outer ring contains the urban areas of the periphery in transition.

¹⁴ Social land includes ejido land and communal land. Ejido land is land granted by the Mexican State in 1917 to groups of peasants, who have collective rights over its use. Communal land is land returned to traditional communities of peasants or indigenous groups that had rights over it before the agrarian reform of 1917. For further information see Fausto (2005), *Land Tenure, Housing Rights and Gender – National and Urban Framework: Mexico*.

Table 3: Profile of owners of vacant land in the Metropolitan Area of Guadalajara

Type of owner	Location of property	Typical area of individual properties	Kind of land (principal, actual or potential use)	Examples of owners	Principal means of acquiring the land	Predominant forms of behavior and rationalities	
Type of property	A. Small owners of individual urban plots	Central nucleus, inner and intermediate rings of the metropolis: decaying parts, consolidated areas, and areas being consolidated	90 – 5,000 m ²	Formal or informal housing developments	--	Purchase, inheritance, irregular occupation	Patrimonial retention. Micro-investment.
	B. Small rural landowners	Outer rings: areas in expansion	Variable. 0.5 to 10 has. Occasionally over 50 has.	Rustic areas in transition. Land that may or may not be urbanizable, with the potential for diverse uses (housing, industry, services). Irregular subdivisions.	--	Purchase, inheritance, exchange, full ownership (of privatized ejido lands)	Patrimonial retention and passive speculative retention.
Private property / co-ownership	C. Medium and large landowners, traditional and recent	Inner, intermediate and outer rings: consolidated, being consolidated, or in expansion	0.5 to 100 has. in urban areas. Over 100 has. in rustic areas	Interstitial reserves and areas on the periphery. Lots left over after urban developments for tertiary, industrial or residential activities. Lots in gated communities.	Local bourgeoisie and businessmen, political class, land-hoarders and drug traffickers behind fronts.	Inheritance, purchase, adverse possession, dispossession	Passive speculative retention, also patrimonial (reserve of value). Beneficial (inducted) speculative retention, hoarding. Money laundering.

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	Type of owner	Location of property	Typical area of individual properties	Kind of land (principal, actual or potential use)	Examples of owners	Principal means of acquiring the land	Predominant forms of behavior and rationalities
Corporate property	D. Civil, mercantile or real state businesses and associations, some of them with foreign capital links	Intermediate and outer rings: being consolidated or in expansion	0.5 to 100 has. (urban lands). Over 100 has. (rustic lands).	Leftover lots, and areas of land on the periphery. Urbanizable land, mainly housing and industrial. Lots in urban development projects.	Consortio Hogar, Consortio Terrenos, Geo, Aramara, GiG	Purchase, association with landowners, contributions by participating members.	Inducted speculative retention: productive investment (urbanizations and buildings). Also passive speculation (long term land reserves).
	E. Institutions linked to the financial sector (banks, trusts, investment societies, special funds ...).	Inner and intermediate rings: consolidated or being consolidated	90 to 100,000 m ² 0.5 to 50 has.	Lots in housing developments, plots in commercial and industrial corridors and enclaves.	Banamex, Bancomer, HINES, Consortio Inter Real Estate, Corporate Property of the Americas, CB Richard Ellis	Mortgage repossession, contribution of a trust holder, investment purchase.	Inducted and passive speculative retention. Speculative investment. Recuperation of capital on loan.
Public (property) Collective (social)	F. Ejidos and communities	Intermediate and outer rings: areas being consolidated or in expansion	Variable. Single holdings of 0.5 to 10 hectares; 0.5 to 50 has. or more for common use lands.	Interstitial reserves and agricultural lands in transition. Land that is urbanizable or not, with potential for diverse uses (housing, industry, services). Irregular subdivisions.	Ejido San Juan de Ocotán, Ejido Tesistán, Comunidad Indígena de San Sebastianito	Agrarian redistribution: assignation or restitution by presidential decree. Inheritance, assignment or sale of rights.	Patrimonial retention. Passive and semi-inducted speculative retention: subdivision and commercialization in the informal market.
	G. Public or decentralized organisms and institutions of the federal, state or municipal government	Inner and intermediate rings: consolidated or being consolidated	90 – 100,000 m ² 0.5 to 50 has.	Lots in housing or industrial developments. Interstitial lands, areas left over for public service installations or as open spaces.	CORETT INFONAVIT IPROVIPE State pensions Local councils	Donations or else ceded by developers for public use; easements; purchase; expropriation. Original property of the Nation.	Retention: store of public heritage. Passive speculative retention: reserves of land for housing and urban development.

The differentiation of ownership on the basis of a property's legal classification not only determines differences in the way it is managed by its owners, but also implies different forms of management by public institutions: registration systems, fixing tax rates, dispositions affecting property rights, conflict resolution. At any rate, the inefficiency of land management, combined with a lack of information and the lack of transparency in public administration, makes it hard to establish policies that would help to bring about greater social equity, through the protection of basic rights – such as access to land and housing by the most vulnerable – or the coercion that can guarantee the fulfillment of obligations deriving from the possession or exploitation of land.

Not even in the case of public ownership is there complete control over the properties that form part of the assets of the institutions, as they have often been consolidated over the years, without the mediation of a specific policy. In other words, these assets have been added to even when there are not always legal documents to prove ownership, or even a record of the administrative actions or the judicial proceedings modifying tenure, present or past, as many properties are publicly owned thanks to private donations, cessions or the transfer of federally owned land to local governments, or because they are legally defined easements, residual plots from expropriations or areas for public service installations. Unfortunately this presents conditions that have favored the illegitimate appropriation of public lands by officials or private individuals, as well as the irregular occupation by various social groups. It is only in recent years that some municipalities and dependencies of state government have undertaken actions to produce an inventory and to regularize the property in their charge.

The insufficient coverage of the urban and rural cadastres and the failure to update them¹⁵ or to coordinate them properly with the Public Property Registry Office - aggravated by the velocity of urban growth (as in the case of Zapopan), or by the reduced technical and financial capacity of the municipality (as in the cases of Tonalá and Tlaquepaque) - have made a complete and efficient register impossible. Hence there are frequent problems relating to the tenure of lands on the urban periphery, which means that they are in an irregular legal position due to: the lack of reliable and updated registers (of ownership, subdivisions, sales, cessions); overlapping boundaries; missing title deeds; old documents problematic as to legal validity or the location of the lands that they certify claims to; other documents that do not correspond to the lands, or else the same plot may have two titles; the owners may be unidentified or intestate; or there are no original owners; bequests were not recorded, etc. Also, properties are often located outside the limits of growth set out in the urban development plans, thus making them rural and not subject to urban regulations. So although many of them are sold and are used for urban purposes (informal settlements, warehouses, industries, leisure homes...) the corresponding taxes are not paid and they avoid development, environmental or safety controls.

In situations of this kind it is possible to find highly priced peri-urban zones selling for *campestre* type development (i.e. plenty of open space) and gated communities; other interstitial vacant lands with great price appreciation find themselves in ownership litigation and are still registered as rustic when they are really semi-urbanized. In these cases, regularization procedures differ from one kind of tenure to another. If tenure is *ejido* or communal and the land has already been occupied by human settlements, then the regularization depends on federal institutions and programs (PROCEDE or CORETT)¹⁶. If the land is

¹⁵ Urban cadastral offices are operated by municipal governments. Rural cadastre is managed by a federal institution, the Agrarian National Registry. Each state of the Mexican republic operates a Public Property Registry Office.

¹⁶ The Ejidal Rights Certification Programme (PROCEDE) is set up by the Agrarian National Registry. The Commission for Land Tenure Regularization (CORETT) in charge of regularizing ejido land is a dependency of the (federal) Ministry of Social Development.

privately owned, there are other programs and special committees of agencies of the state and municipal governments that operate in one way for rural land on the periphery and in another way for land that has already been informally urbanized¹⁷.

Vacant land within urbanized areas of the *ejidos* that have not been regularized escape the official controls over these properties. As it is the cadastre that registers the ownership or the possession of real estate goods, it is up to the administration of each municipality to conduct programs of delimitation and valuation of properties in city areas that are being regularized, whatever the type of ownership (whether *ejido*, private or public). Nevertheless, in these cases there is a reluctance to register empty lots, because of the risks and difficulties involved in accrediting possession to people who are not actually making use of them.

It is a mistake to allow vacant land and the empty lots located in irregular areas under any type of ownership to avoid being made the object of inventories or preventative registers¹⁸, on the pretext that they cannot be occupied until the process of judicial regularization has been completed. There is a fundamental lack of interest and a failure of leadership on the part of municipal governments, who are unwilling to face the problems of irregular settlements from a wider perspective which would take into account not only the granting of title deeds, but the needs for infrastructure and urban services, housing improvements, the relocation of housing in areas subject to hazards, etc. From such a point of view, the regulation (before the regularization) of vacant land in these settlements might represent one of the very last chances for providing public spaces that would substantially improve living conditions in popular settlements.

Policy tools related to vacant property in the MAG

The local governments of the metropolitan area of Guadalajara have shown little interest in promoting the renovation and optimization of the existing city. Renovation requires significant initial investments to counter obsolescence: buildings need to be refurbished, roads rebuilt, new public service fixtures need to be put in, and infrastructure networks have to be improved. What is more, urban renewal may provoke immediate conflicts with local inhabitants. In urban expansion, conflicts may be diminished or postponed, for as long as the new urban areas still have no residents. Expansion also means new income for the municipal coffers (not to mention a few private pockets) through taxes, permits and contributions. These conflicts of interest would also explain why the metropolitan municipalities have not undertaken actions to restrict expansion, not even in areas of great ecological or agricultural value.

In fact the instruments of urban policy are designed for urban expansion and not for rationalizing the existing city. With every new revision of an urban development plan comes a systematic extension of the limits set to urban growth, even to the detriment of zones of ecological value or agricultural potential, without stopping to analyze the situation of the vacant interstitial lands – which is eventually done in quantitative terms, just to calculate the new areas that will have to be incorporated in the city limits. In fact the practices followed to elaborate one urban plan after another, are turning the planning of the MAG into an assembly line. The zoning plans have displaced the master plans or general directives, impeding the definition of policies for the whole metropolitan area. The few policy tools that might help with the insertion of vacant

¹⁷ See Fausto, 2005b.

¹⁸ This is a type of register included in the laws for the public registration of property, specifically for properties involved in legal or administrative procedures imply limitations of ownership.

property into the urban dynamic are more virtual than real, as most of them have not been applied, although they have been in the laws for years.

The most recent proposal (made in 2003) for the municipality of Guadalajara, proposes to promote the densification of the central areas through a scheme to transfer development rights (TDR). This and other land tools, based on disaggregating property rights (such as the preemption right) have been on the books of local legislation for at least ten years, but this is the first time an attempt has been made to apply them in Guadalajara. However, the strategies for densification have never been clearly set out; there are no inventories and there is no basic information on vacant lots and unused buildings that might be reused; the local rates (property taxes paid to municipal governments) have not been modified to encourage greater density; and there is no connection between this proposal and the large supply of developable land in the other municipalities around the city, etc.

The other three municipalities of the metropolis have never put TDR into effect, possibly because they find it hard to understand and it is difficult to estimate the benefits, or because of the little interest there is in the conservation of the natural and built heritage of the city, or else the zero diffusion and promotion by the authorities of such rights. Although the Law of Urban Development (LUD) of the State of Jalisco makes it possible for development rights to be transferred from property in one metropolitan municipality to property in another, municipal autonomy (which translates in practice into a lack of coordination between them) may act against any attempt to do so. For example, the municipality of Guadalajara has issued its own regulation for the TDR, which eliminates some of the requirements of the state law, such as the creation of a trust to manage the transfers. According to the municipal regulation, it is the zoning plans that will determine which areas may exchange development rights. But as we said earlier, these plans do not respond to policies contained in any Master or Metropolitan Plan, so there is a risk that the TDR will be used in a discretionary manner to benefit particular owners.

Thus the metropolis of Guadalajara does not have the elementary conditions that would guarantee a technical mastery of the TDR, which are, according to Renard (1999): a) strong stable institutions, b) the definition of a medium term perspective on the process of distributing rights, c) the intervention of an organism to manage the market of rights, and d) information for the interested parties. Lane (1998) also stresses the importance of having a long term urban development plan, which would need the support of politicians and the population. The TDR programs would then form part of such a plan.

Other instruments also face disadvantageous conditions or a lack of interest from planners and officials. The preemption right of the authorities to acquire land and form their own urban reserves has existed since 1982 in the General Law of Human Settlements, a federal law, and was later included in state legislation for urban development. The way this instrument is presented implies serious limitations on how it can be used. To start with, it requires for there to be a plan in force that will mark the land as an urban reserve, the owner has to offer the land for sale and if a local government wants to acquire it, the land must be paid for at commercial prices.

The most important deficiency is that the laws do not foresee anti-speculative strategies, as measures adopted in other countries where preemption rights have been used, do¹⁹. Generally such strategies allow public

¹⁹ This was the case in France, with the creation of ZADs (zones d'aménagement différé), zones that remained subject to special dispositions to facilitate the acquisition of land. See Comby and Renard (1996), and Merlin (1997).

institutions to purchase areas of land at the prices they had before they were declared urban reserve, in other words, before their appreciation in the market. Although the law obliges owners and solicitors to announce any intention to sell land from the urban reserve, it would also be interesting to follow the trail of particular cases, to verify whether these dispositions have been put into practice, because if they have been fulfilled – which does not seem very likely – it is strange that such announcements have been made without the public noticing.

With regard to renovation through mixed public-private operations, an example is provided by the construction of a large open mall in the center of Guadalajara called *la Plaza Tapatta*, finished in 1982, when the state government associated itself with private investors and land owners to do a *tabula rasa* kind of renovation of the main square and other areas in the heart of the city. Since then this scheme of urbanization has not been used in policies of urban renovation, though it was institutionalized in 1993 in the Law of Urban Development (LUD) of the State of Jalisco as a *public interest association*. Since the modifications made to the LUD in the year 2000, it has allowed *special public-private organisms* to be constituted for the management of urban operations. This surely represents an effort to promote the development of big operations again, under schemes of mixed participation. This would work in what is termed an *area of integrated urban management*, a new category of zoning of a more operative, rather than planning, character.²⁰ It would appear that the zoning plans for the development of these areas are more intent on marking the restrictions and elementary criteria to be respected, than to wish to control all the details of urbanization (principally with regard to land use and densities). However, only three articles of the Law mention these areas, and five years after their appearance they have still not been defined with any precision in special regulations, much less put into practice.

Conclusions and recommendations for the definition of policies

The factors giving origin to vacant property are of various kinds, and there are therefore several lines of approach to them:

- a) *The intrinsic characteristics of these areas and their relation to demand.* The morphological, construction and technical features of vacant property and their location do not by themselves give indications of valorization. *Valorization* and its counterpart, *obsolescence* only become significant when placed in relation with the specific needs of those who demand the urban spaces and with other external conditions.
- b) *Economic cycles and the dynamic of the housing market.* For example, changes in productive economic activities propitiate the demand for property or its abandonment; while transaction costs and the opacity of the property market definitely discourage investment in the development of vacant areas. It would also be necessary to explore the relation between certain economic variables (employment, investments, interest rates ...) and the selling or keeping of land.
- c) *Urban policies and regulations having an impact on the valorization of spaces and of the metropolitan structure.* For example, the construction of infrastructure and public service installations favoring

²⁰ These would be areas of a kind that "because of their natural or historical-cultural features, their urbanistic situation or because they are of strategic importance for urban development ... need to be promoted in a coordinated fashion, which requires an integrated approach to urban management". This category of zoning appears in the 2000 LUD.

residential and urban mobility; the economic and social impact of renovation operations; the legal restrictions on (re-)using spaces; and efficiency in the employment of financial, fiscal, planning and other tools.

d) Socio-cultural and political factors related to the possession of property. To a great extent it is upon these that the forms of valorization in certain zones of the city depend; the significance (whether economic or emotional, patrimonial or having to do with security, prestige, status and power...) acquired for distinct agents by the possibility of having one or several properties, even if they have no physical use. This line of approach should also address the local power games that are behind the way real estate property is handled.

e) The environment and ways of occupying space. The modes of production of the city and the way it works may increase the degradation of the environment, as well as the risks and the vulnerability of the population to natural contingencies. Many areas not fit for building and other vacant properties are linked to factors of environmental risk (inadequate infrastructure, high density with little in the way of public service installations, excessive pollution, unstable plots, urban violence, sanitary dangers, etc.) or to questions of ecological equilibrium, and should therefore be studied, and form a part of any programs of urban management and ecological protection.

The lack of empirical studies makes it impossible to establish a direct cause-and-effect link between the existence, or the increased number, of vacant intra-urban properties and some of the problems attributed to them, such as the spatial segregation of the popular classes. What can be stated is that individuals or companies with the economic capacity to develop these vacant areas frequently prefer to look for land on the periphery of the city. Their motives may vary. The land a little farther out may be cheaper, the areas available larger, there are less restrictions and controls on land use, and greater freedom in urban design. What ensues is unfair competition for the few areas that might be accessible for the poor, as is the case of the *ejido* lands.

This means that if vacant property is not the direct cause of the multifarious problems it is associated with, it is inadequate urban policies (many of them unwritten, of a *laissez-faire* kind) that explain why these problems continue and are even aggravated. It is not an easy task to say exactly when a vacant lot stops being a problem and becomes an opportunity, or to justify why particular agents should stand to gain or lose in one way or another. If public policies ought to establish the limits between private rights (owners, users, developers) and collective rights (the public interest), they must achieve consensus or agreements with respect to the different forms of valorization and exploitation of vacant property. In fact it is difficult to anticipate the factors that reflect and ponder the value that each agent concedes to specific urban spaces; saying "*value*" does not exactly mean we refer to the price of a property in money, but the importance that is given to a certain area in terms of its features and as part of a personal or collective project.

The multifaceted notion of value (emotional, patrimonial, "hopeful", utilitarian, architectonic-cultural, economic, image promoting, etc.) certainly merits a social investigation to find what its practical and even symbolic implications might be on a metropolitan scale. A study of the forms of valorization should also take into account the logic of each of the owners and the benefits that they expect from their real estate goods: to have an accumulation of wealth, to be able to depend on an instrument for investment, to leave a family inheritance, to cover a need for housing or for work that has not yet had to be met, to conceal illicit operations, to possess an ingredient for housing production, or to re-appropriate spaces and impress

a certain identity upon them. That is, the category of real estate owners might distinguish between asset building, opportunists, speculators, investors, name lenders (providing fronts for money laundering, etc.), businessmen, and others.

It should be noted that in the MAG speculation has never been seriously attacked through the use of urban policies and norms, and is only addressed in rhetorical and fatalistic speeches. This is largely due to the fact that many of the agents forming part of the State apparatus have benefited directly or indirectly from keeping things as they are: officials controlling public works, the granting of permits for urban developments, changes in land use and planning procedures. This includes councilors from different political parties and even municipal presidents. Many of them really have a dual role as they also participate as real estate owners, or as agents linked to the construction industry, to urban planning consultancies, or with an interest in judicial matters pertaining to real estate ownership, etc.

At any rate, public policies ought to recognize the plurality of agents and the multiple forms of valorization of urban space because, as the various studies in the compilation by Gourdon *et al.* (1995) show, the notions of general interest and public utility used by governments to justify their interventions can be questioned and evaluated on the basis of identifying these values. To justify that something is done in the public interest, it is necessary to identify and make explicit the multiple interests to be found behind this notion, and to recognize that it is not a concept to be generally applied, but one that varies from one situation to another.

In the definition of policies for the exploitation of vacant property questions that have to do with the redistribution of wealth and with social justice ought not to be left out, for example: which agents concentrate or monopolize land rights, and how were their rights obtained, which makes it possible to sanction not only the legality but also the legitimacy of the procedures followed. It is also necessary to find out how to regulate the mechanisms that allow inordinate profiteering from property: and deal with the inequitable conditions prevailing in the housing market that exclude over half the population from the opportunity to acquire a plot or a house. Finally, something will have to be done about the feeble position in which local governments find themselves when they are up against the supremacy of private property, which makes them desist from any attempt to implement value-capture policies.

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