

Report No. 35749-BR

Brazil

Inputs for a Strategy for Cities

A Contribution with a Focus on Cities and Municipalities
(In Two Volumes) Volume II: Background Papers

November 10, 2006

Brazil Country Management Unit
Finance, Private Sector and Infrastructure Management Unit
Latin America and the Caribbean Region



Document of the World Bank

CURRENCY EQUIVALENTS

(Exchange Rate Effective June 28, 2006)

Currency Unit	=	BRL (R\$)
BRL\$2.23	=	US\$1
US\$0.448	=	BRL\$1.00

Fiscal Year:

January 1 - December 31

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ACKNOWLEDGEMENTS

This report was produced under the supervision of John Briscoe, Country Director, Makhtar Diop, Sector Director, John Stein, Sector Manager Urban, by a World Bank team led by Mila Freire, and comprised of Somik Lall, David Dowall, Fernando Blanco, Suhas Parandekar, Edesio Fernandes, Fernanda Furtado, and Paulo Avila. Additional background papers were prepared by Benjamin Darche and Roberto Santouro. Silvia Delgado assisted with the production of the report. The peer reviewers for this task are Robert Buckley, Christine Kessides, Omar Razzazz and Ricardo Lima. Valuable inputs and suggestions were received from Jennifer Sara, Jose Guilherme Reis, Fernanda Ruiz, Bruce Ferguson, Dean Cira and Sarah Anthony.

This report was produced in partnership with the Lincoln Institute of Land Studies (under the leadership of Martim Smolka and Greg Ingram) and with the *Instituto de Pesquisa Econômica Aplicada* (IPEA, Marcelo Piancasteli, Alexandre Carvalho, Daniel Da Mata, Piedade Morais). Management and staff of both institutions were directly involved in the concept of the tasks, collection of data, definition of methodology and discussion of results. The working papers prepared for this report were presented and discussed at various seminars and meetings. Many useful comments were received and are appreciated. The team wishes to thank all individuals in the Government and the World Bank, who contributed their time and comments to this report. Special thanks are due to the team in the Brazilian Ministry of Cities, notably Inês Magalhães (National Secretary for Housing Development), and Raquel Rolnik (Secretary for Urban Development) as well as Diana Motta, Secretary of Urban Development of the Federal District for their constant support and encouragement.

The work was conducted between June 2004 and February 2006. The final discussions in the Bank and Brazil took place in February 2006. The report is organized in two volumes. Volume 1 is based on the background papers prepared for the task. References are often made to the background papers in the main text. The background papers are included in Volume 2 for easy consultation.

This volume comprises ten background papers prepared as contribution to the main report. The authors of the papers are the following:

Chapter	Title	Author
Chapter 1	Urbanization, Growth, and Welfare in Brazil	Somik Lall
Chapter 2	City Performance and Policy Actions	Somik Lall
Chapter 3	<u>Urban Policies and Slum Formation</u>	Somik Lall
Chapter 4	The Evolution of Brazilian Municipal Finances, 2000-2004 Second Draft/January 2006	Fernando Blanco
Chapter 5	<u>Municipal Credit Markets, Issues and options</u>	Benjamin Darche
Chapter 6	Efficiency of Brazilian Municipalities	Suhas Paradekar
Chapter 7	Main Aspects of the Regulatory Framework Governing Urban Land Development Processes in Brazil	Edesio Fernandez
Chapter 8	Land Markets in Brazil: Capturing Land Value to Finance Infrastructure Improvement	Fernanda Furtado and Pedro Jorgensen
Chapter 9	Urban Land Use Regulation in Brazilian cities – Impact on Urban Land Markets and access of Low Income People to Land and Housing	Paulo Avila
Chapter 10	Brazil's Urban Land and Housing Markets How well are they working?	David Dowall

ABBREVIATIONS

ABS	Asset Backed Securities
ADR	Age Grade Distortion Rate
BACEN	Banco Central (Central Bank)
BNDES	National Development Bank
CDO	<i>Collateralized Debt Obligation</i>
CEF	Federal Loan and Savings Bank (<i>Caixa Econômica Federal</i>)
CMN	National Monetary Council
CVM	<i>Comisión de Valores Inmobiliarios</i> (Stock Exchange)
DEA	Data Envelopment Analysis
FAT	<i>Fundo de Amparo ao Trabalhador</i> (Workers' Support Fund)
FDH	Free Disposal Hull
FDIC	<i>Fondos de Inversiones de Derechos Creditos</i>
FGTS	Workers Severance Fund (<i>Fundo de Garantia do Tempo de Serviço</i>)
FJP	Joao Pinheiro Foundation
FPE	<i>Fundo de Participacao Estadual</i>
FPM	<i>Fundo de participacao municipal</i>
FRL	Fiscal Responsibility Law
GDP	Gross Domestic Product
HDI	Human Development Index
IBGE	Brazilian Institute of Statistics and Geography (<i>Instituto Brasileiro de Geografia e Estatística</i>)
ICM	<i>Imposto sobre valor de mercadorias</i> (Value added tax)
IMR	Infant Mortality Rate
IPEA	Institute for Applied Economic Research (<i>Instituto de Pesquisa Econômica Aplicada</i>)
IPTU	Urban Property Tax (<i>Imposto Predial Territorial Urbano</i>)
MDF	Municipal Development Fund
MIC	Middle Income Countries
MP	Market Potential
NCR	Net Current Revenues
NGO	Non-Governmental Organization
OECD	Organization for Economic Cooperation and Development
OODC	<i>Otorga Onorosa do Direito de Construir</i> (Sale of Building Rights)
PFI	<i>Private Finance Initiative</i>
PNAD	<i>Pesquisa Nacional aos Domicilios</i> (National Household Survey)
PNUD	United Nations Development Program (<i>Programa das Nações Unidas para o Desenvolvimento</i>)
RM	<i>Região Metropolitana</i> (Metropolitan Region)
SPE	Special Purpose Entity
STN	<i>Secretaria do Tesouro Nacional</i> (Treasury Secretariat)
TC	Tribunal de Contas
ZEIS	Zone of Special Social Interest (<i>Zona de Especial Interesse Social</i>)

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1. Urbanization, Growth, and Welfare in Brazil¹

by

By Somik Lall

1.1 Brazil had undergone a phenomenal change in its spatial structure. Over the last 30 years, the share of population living in urban areas rose from 56% in 1970 to 82% in 2002. The urban system has also changed, as new urban forms, cities and metropolitan regions have emerged exploiting the economic and social potential awakened by liberalization, democratization and improvement in infrastructure. Cities are an integral part of Brazil's landscape. Not only does the majority of the population live in urban areas, the entire growth in population that is expected over the next three decades will be in cities (Figure 1.1). This will add about 63 million people to Brazil's cities, and the urban population will cross 200 million. While over 35 million people live in the three largest metro areas, there are about 34 million people who live in 15 metro areas of a million to 5 million, and 10 million who live in medium metro sized areas (500,000 – 1 million). (Figure 1.2).

Figure 1.1: Urban and Rural Population Dynamics
(population in thousands)²

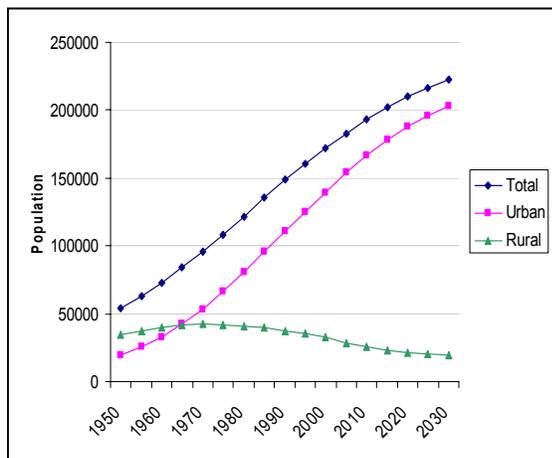
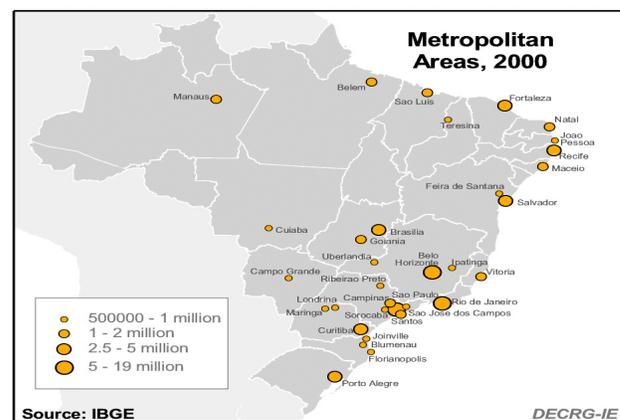


Figure 1.2: Metro Areas, 2000



1.2 While urbanization is accompanied by economic growth (90% of the country's GDP is generated in cities), not all urban dwellers benefit from the growth process. Limited opportunities due to human capital deficiencies, limited assets, locational disadvantages, as well as land, credit and housing market distortions lead to pockets of poverty in cities. According to the national household survey (Pesquisa Nacional por Amostra de Domicílios, PNAD), there were 18.3 million urban poor in Brazil in 1996, which accounted for more than half of Brazil's overall poor population. The urban poor also receive disproportionately low access to services. While 86% of the overall urban population has access to solid waste management services, only 56.4% of the poor do. This problem of unequal access to services varies by city size.

¹ The findings reported here are a result a joint research program between the World Bank and the Instituto de Pesquisa Econômica Aplicada (IPEA), Brasília. Preliminary findings from this research have been presented at the World Bank/ IPEA urban research symposium in Brasília and also discussed with representatives from the Ministries of Cities and Territorial Integration. The research program has been partly funded through a World Bank Research Grant and by the Urban Cluster of the World Bank's Latin America and Caribbean Region. Main contributors to the research are: Somik Lall (TTL), Uwe Deichmann, Hyung Wang (World Bank); Alexandre Carvalho, Daniel Da Mata (IPEA, Brasília), J. Vernon Henderson (Brown University) and Christopher Timmins (Duke University).

² Source: UN World Urbanization Prospects 2003.

1.3 Across the urban system, there is a need for strategic interventions to meet backlogs in infrastructure, service delivery, and amenity provision, as well as to enhance growth and reduce poverty in Brazil. Policy instruments and programs need to be prepared in a rapidly changing environment. They will also need to be tailored for different size cities. As a basis of such interventions, there is a need first to undertake a diagnostic on the performance of the urban system and provide a framework around which it will be possible to develop and evaluate strategic interventions.

1.4 Part I aims at providing this diagnosis and framework. The work is organized around three topics: how cities grow (in population and productivity) and become more competitive – Chapter 1; the impact of policy interventions on city performance – Chapter 2, and factors that explain slum formation across cities– Chapter 3.

Chapter 1. Urban Growth and Competitiveness

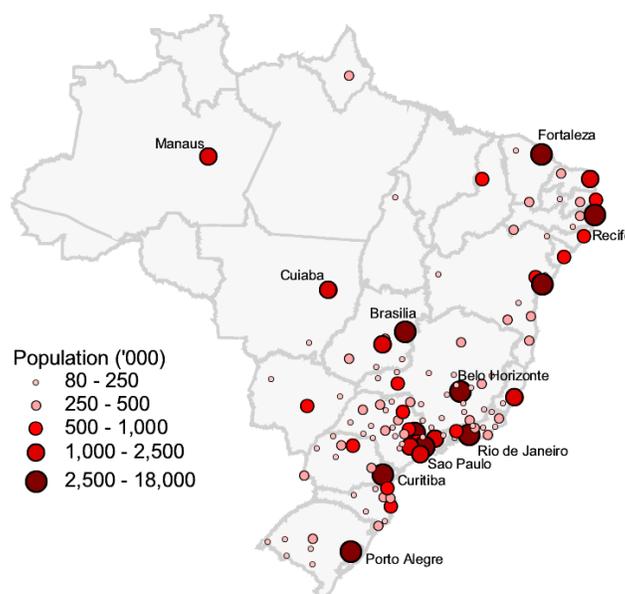
1.5 In Brazil, public debate has recently centered on the role of the urban system in driving regional economic dynamics. In particular, various levels of government have examined the potential for balancing growth by promoting “secondary cities”. The concern is, both, to distribute economic gains more broadly and to relieve the increasing strain experienced by fastest growing cities. This debate occurs at the national level, where the focus is on second tier cities in the lagging regions of the North and Northeast, as well as at the regional level, where states promote development of smaller and medium sized towns.

1.6 The objective of Chapter 1 is to contribute to this debate by analyzing the dynamics of the Brazilian urban system over the last several decades. The analysis is mostly descriptive and focuses on two aspects of urban growth—population and income of agglomerations—that can be consistently measured over the last three to four decades. We begin by describing urban growth patterns between 1970 and 2000 and then investigate two processes in the productive sectors of the Brazilian economy that have accompanied the maturing of the Brazilian urban system. These are industrial specialization and employment deconcentration both across the urban hierarchy and within agglomerations. Finally, we provide a simple analysis of some of the proximate correlates of urban growth.

Urban Growth Patterns

1.7 Our examination of urban growth patterns in Brazil focuses on changes in population size and economic productivity. Both are interrelated indicators of city “success”. In the presence of free movement of labor and capital, factors of production will move to the areas that promise highest returns. Workers and employees will therefore seek out places in which they can maximize wages given their skills and experience. Successful cities are also able to provide infrastructure and administrative support to businesses which will enhance productivity and, in turn, raise wages. High quality public services and amenities will also attract new residents, especially higher skilled workers that add disproportionately to productivity gains.

1.8 **Defining Urban Areas:** Before describing population and income dynamics for the urban system, it is essential to develop a working definition of city, urban area or agglomeration, since there is no official statistical or administrative entity in Brazil that reflects the concept most appropriate for economic analysis: a contiguous built up area that operates as a functional economic entity. Socioeconomic data in Brazil tend to be available for *municípios*, the main administrative level for local policy implementation and management. *Municípios*, however, vary in size. In 2000, São Paulo *município* had a population of more than ten million, while many other *municípios* had only a few thousand residents. Furthermore, many functional agglomerations consist of a number of *municípios*, and the boundaries of these units change over time. Our analysis therefore adapts the concepts of agglomerations from a comprehensive urban study by IPEA, IBGE and UNICAMP (2002) resulting in a grouping of *municípios* to form 123 urban agglomerations (Figure 1.3). Details about the geographic definitions employed and construction of the database are included in. Throughout this part of the report we refer to these units of analysis as agglomerations, urban areas, or cities.

Figure 1.3: Urban Agglomerations by Population Size

Source: IPEA, IBGE

1.9 Population growth is occurring across the Brazilian urban size distribution (Table 1.1, see also Lemos *et al.* 2003). Of the 123 major urban agglomerations in Brazil, only three were above 2 million people in 1970 versus ten in 2000. In the middle of the size distribution in 2000, there were 52 agglomerations with population between 500,000 and 2 million people compared to 25 in 1970. Since we are limiting analysis to cities that were agglomerations in 1991, we cannot track dynamics at the lower end of the distribution. This is because our set includes cities that were not yet agglomerations in 1970, while excluding cities of similar size in later years. However, among the 72 agglomerations that had at least 100,000 people in 1970 (Table 1.2), the average population more than doubled from 553,000 to 1,250,000 over the thirty year period.

Table 1.1: City Size Distribution

Population size	1970	1980	1991	2000
> 5 million	2	2 ¹⁾	3 ²⁾	3
2 million - 5 million	1	3	7	7
1 million - 2 million	4	5	5	8
500,000 - 1 million	5	10	15	14
250,000 - 500,000	16	21	23	30
100,000 - 250,000	44	43	44	46
< 100,000	51	39	26	15
Total number of cities	123	123	123	123
Average size	350,857	507,242	657,602	788,222
Min	20,864	41,454	76,816	86,720
Max	8,139,705	12,588,745	15,444,941	17,878,703

1) "São Paulo" and "Rio de Janeiro".

2) "Porto Alegre" is newly added.

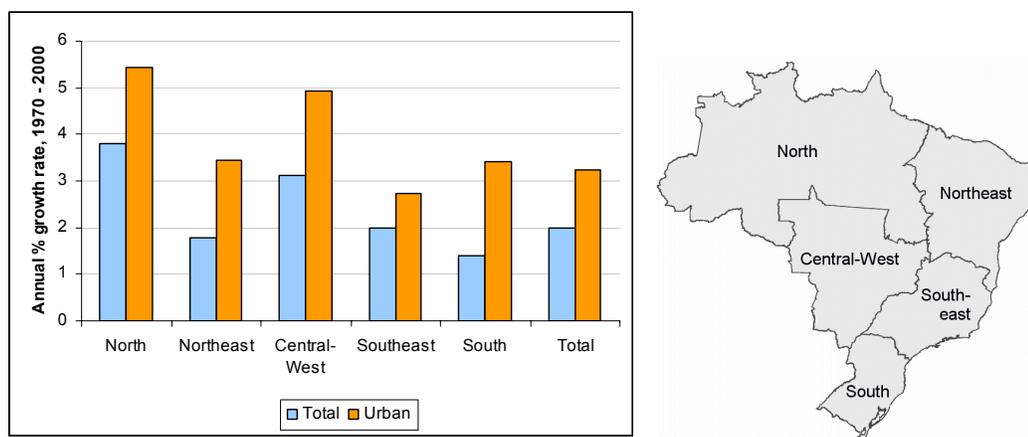
Table 1.2: The 7 Fastest Growing Cities between 1970 and 2000*

Top 7 Cities	Region	Population in 1970	Population in 2000	Annual pop growth (1970-2000, %)
Campo Grande	Central-West	140,233	663,621	5.2
Cuiabá	Central-West	226,437	1,051,183	5.1
Brasília	Central-West	761,961	2,965,951	4.5
Goiânia	Central-West	450,538	1,651,691	4.3
Manaus	North	534,060	1,865,901	4.2
Petrolina	Northeast	122,900	428,841	4.2
Grande Vitória	Southeast	385,998	1,337,187	4.1
Average of the top 7 cities		374,590	1,423,482	4.5
Average of others (65)		571,805	1,231,759	2.5
Total (72)		552,631	1,250,398	2.7

* For the cities with population greater than 100,000 in 1970. 72 cities meet this cutoff criterion.

1.10 Geographically, the strongest population growth has been in the North and Central West regions (Figure 1.4). Growth has been slowest in the South and Southeast, where rapid urban expansion occurred in an earlier period. The Central-West region experienced the second highest urban population growth (4.9 percent annually), but has only 11 agglomerations—compared to 60 in Southeast, and 25 and 24 in the Northeast and South, respectively. In Table 1.2 we list the seven fastest growing cities between 1970 and 2000 among the 72 existing cities in 1970. Over the period the average annual city population growth of the top seven cities was 4.5 percent, considerably higher than for all other cities with population above 100,000 in 1970. Most of the high growth agglomerations (four out of seven) are located in the Central-West region. The fastest growing agglomeration was Campo Grande, with an increase from 140,000 in 1970 to 664,000 in 2000 (5.2 percent annually). Like Campo Grande, the seven fastest growing agglomerations did so from relatively small based populations in 1970, except for Brasília (762,000) and Manaus (534,000).

Figure 1.4: Population Growth in Urban Agglomerations by Region

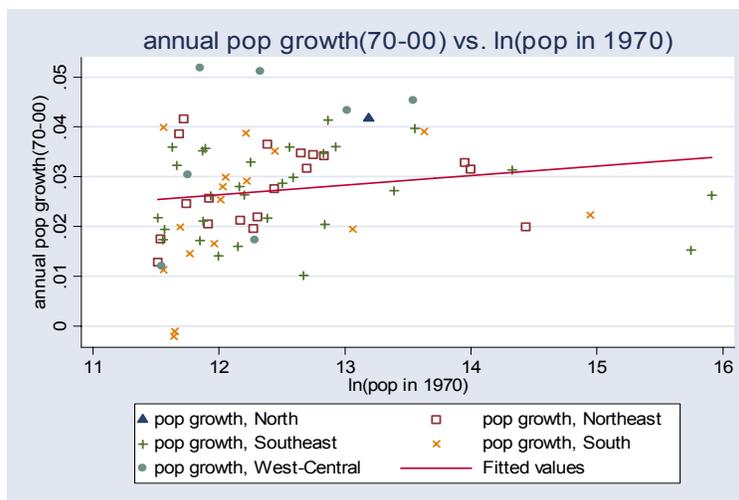


Source: Population Censuses of 1970 and 2000.

1.11 Figure 1.5 shows that, overall, the initial agglomeration size in 1970 does not influence population growth afterwards. There is a positive relationship between agglomeration growth and its manufacturing share in non-agricultural employment. Growth is also positively related to the average years of schooling in 1970 which is used as a measure of human capital accumulation in a city. Regional differences, after controlling for initial size and

education are important in explaining city size growth as indicated by the Wald test that shows that regional dummies are jointly significant. These differences may be due to institutional factors or from natural advantages.

Figure 1.5: Individual City Size Growth between 1970 and 2000¹⁾



1) For the cities with population greater than 100,000 in 1970. 72 cities meet this cutoff criterion.

1.12 The rapid growth of Central-West cities is related to changes in their industrial composition.³ As shown in Annex 2, the three fastest growing agglomerations have experienced rapid increases in the employment shares of food and beverage manufacturing, business services (finance service, transportation/ ware housing/ communication services, commerce and construction) and public services including education and health services. It suggests that their success in attracting new residents comes from their roles as hubs for serving rural demand in the rapidly expanding soybean growing regions (Motta, Muelle and Torres, 1997).

1.13 Table 1.3 shows the spatial Gini coefficients (Krugman, 1991) for the country and each of the regions for 1970 and 2000. These coefficients are a measure of inequality of population distribution across the 123 agglomerations. The larger the coefficient, the further is the urban system from an equal size distribution. Overall, the spatial Ginis have increased slightly over the period, which is mainly due to the downward movement of small size cities. While the highly concentrated Southeast region has virtually no change in spatial inequality around 0.76, there has been a significant increase in spatial inequality in the Central-West region, which had been the least concentrated in 1970. As a result, the entire southern region, including the Southeast (0.76), South (0.66) and Central-West (0.58), was more spatially concentrated in 2000 than the North (0.46) and Northeast (0.57).

Table 1.3: Spatial Gini Coefficients in 1970 and 2000

	1970 (a)	2000 (b)	(b-a)
Total (123)	0.692	0.700	0.008
North (3)	0.456	0.463	0.007
Northeast (25)	0.561	0.569	0.008
Southeast (60)	0.760	0.761	0.001
South (24)	0.626	0.658	0.032
Central-West (11)	0.441	0.583	0.142

Number of cities in parentheses.

³ We exclude Brasília, since its growth is mainly due to its role as the capital city in Brazil.

1.14 Another way to examine changes in agglomeration size in Brazil is via a transition matrix. It helps examine the degree of mobility of cities up and down the urban hierarchy and test for the stationarity of 123 agglomerations (Eaton and Eckstein, 1997; Dobkins and Ioannides, 2001). Following Black and Henderson (2003), we divide the 1970 agglomeration size distribution into five groups or cells containing approximately 35%, 30%, 15%, 10% and 10% of all cities starting from the bottom, with fixed relative cell cut-off points.⁴ Table 1.5 presents the resulting transition matrix. The transition probabilities of the transition matrix, P_{jk} , are calculated as the total number of cities moving from cell j to k over three decades divided by the total number of cities starting in cell j in the three decades. Diagonal elements are the probabilities of staying in the starting state, and off-diagonals the probabilities of moving lower or upper cells.

Table 1.4: The Transition Matrix

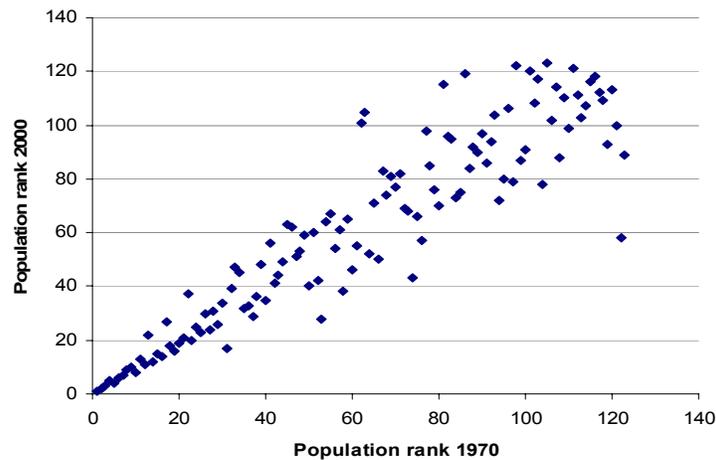
		cell in t+1 (2000)				
		5 (smallest)	4	3	2	1 (largest)
Cell in t (1970)	5	0.987	0.013	0.000	0.000	0.000
	4	0.183	0.720	0.098	0.000	0.000
	3	0.000	0.091	0.800	0.109	0.000
	2	0.000	0.000	0.029	0.882	0.088
	1	0.000	0.000	0.000	0.000	1.000

1.15 The probability of staying in the same state is the highest at 100 percent for the cities at the top of the hierarchy (cell 1), which implies no downward mobility for the largest agglomerations. Also the mobility is extremely low for the smallest agglomerations in cell five. This extremely high probability of smallest cities in cell five staying in the same state (98.7 percent) is quite different from the finding of Henderson and Wang (2004).⁵ The cities in the middle portions of the hierarchy have a relatively high degree of mobility moving up and down in response to changing demands of their products, product readjustment, and local entrepreneurship or lack thereof. In particular the lower-medium size cities in cell 4 have only 72.0 percent probability of staying in the same state and the probability of moving down a state exceeds that of moving up (18.3 percent versus 9.8 percent). However the upper-medium size agglomerations in cell two have a higher probability of moving up a state than moving down (8.8 percent versus 2.9 percent). The stationarity of the transition matrices is barely accepted,⁶ implying the city size distributions evolve over time according to a homogeneous stationary first-order Markov process. Figure 1.6 provides a continuous view of the dynamics of city rankings between 1970 and 2000. The largest changes are among the middle and lower ranked agglomerations.

⁴ The relative size (city population/mean(city population)) upper cut-off points are 0.256, 0.469, 0.812, 1.340 and the maximum.

⁵ For the metro areas of the world with population over 100,000, the probability of the smallest cities staying in the same state was 78 percent, and that of the largest cities 96 percent (Henderson and Wang 2004).

⁶ The χ^2 statistic is 27.07 with 40 degrees of freedom (p-value 0.059).

Figure 1.6: Changes in Population Rank Order between 1970-2000

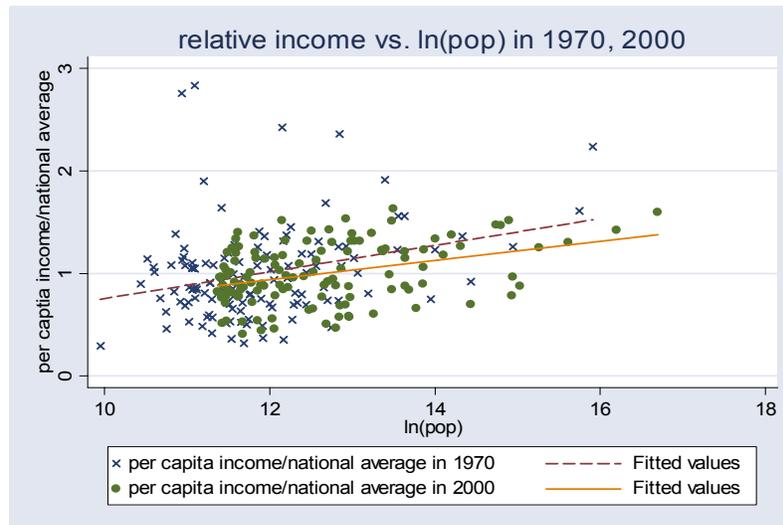
Patterns of Income Growth

1.16 The second aspect of city performance is investigated here relates to economic performance. Average household income is used as a proxy for productivity increases, since neither firm level factor productivity, nor data on real wage rates are consistently available for the time period 1970-2000. However, income and wages are strongly correlated in both levels and rates of growth for the years in which both are available at the municipio level (1991 & 2000). Annex 1 provides details.⁷

1.17 During the period 1970-2000, Brazil's economic performance has fluctuated considerably, ranging from economic boom in the 1970s to a sharp decline in the 1980s and a recovery in the 1990s. We focus on the broad trends between 1970 and 2000. The first pattern discussed here is that relative to the national average, wages are higher in larger agglomerations. Figure 1.7 plots per capita income levels relative to national averages in 1970 and 2000 against the agglomeration populations in those periods. The figure and the corresponding OLS regression result indicate a positive relationship between the per capita income level and the size of a city. A Chow test shows no statistical difference between the 1970 and 2000 patterns.

⁷ As a second caveat, our data represent “nominal” incomes per capita, not “real” incomes. While the average agglomeration income figures have been adjusted for inflation over time, they do not reflect purchasing-power-parity [PPP] estimates across space—i.e., they do not consider local price indexes. Housing costs vary significantly across cities, reflecting commuting costs and rent gradient shifts. As land prices rise, asset price increases will spill over into the prices of retail goods sold in the city. If everyone is a home owner, as land prices rise, residents will recoup implied rent increases in the form of returns on land investment. But many people working in Brazilian cities are renters. Thus a rise in “nominal” incomes may overstate the rise in “real” incomes that translates into tangible welfare gains. Despite these qualifications, however, we believe that the broad patterns discussed in the following paragraphs hold.

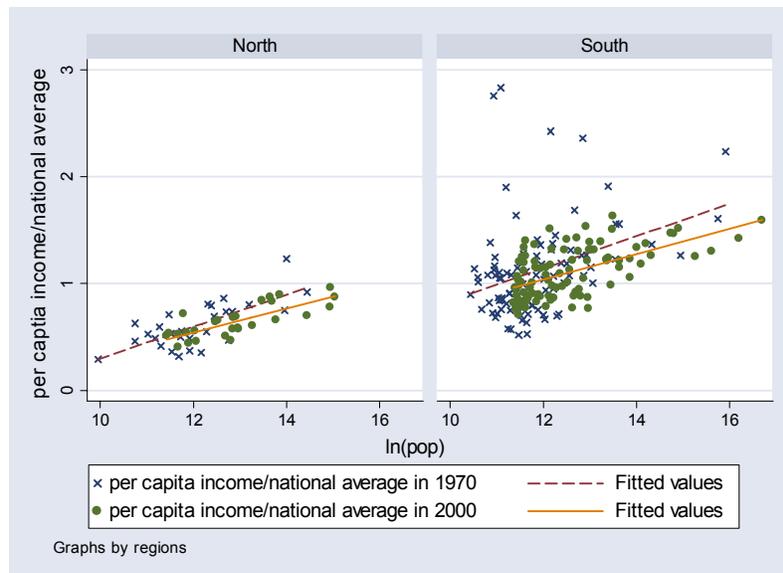
Figure 1.7: Relative Income Level and City Population in 1970 and 2000



Pooled 1970 & 2000 OLS Results

Dependent variable: ln(Income / Average agglomeration income)

	Coefficient	t-value	
ln(Population)	0.130	4.04	Adj R ² = 0.09
ln(Population)*Year2000 Dummy	-0.037	-0.85	N = 246
Dummy for year2000	0.369	0.69	
Constant	-0.542	-1.41	



1.18 At the same time, trends in income growth indicate a convergence process, i.e., agglomerations with lower wages in 1970 are growing relatively faster. Recently, Andrade et al. (2004) tested income convergence across Brazilian municipalities from 1970 to 1996.⁸ Their empirical finding suggests a club convergence (a conditional convergence) between the agglomerations in the poorer Northern region (the North and the Northeast) and the richer Southern region (the Southeast, the South and the West-Central).

⁸ They evaluated convergence of Brazilian municipalities by directly examining the cross-section distribution of income, suggested by Quah (1993, 1997).

1.19 reports the OLS estimation results for convergence across urban agglomerations. The speed of convergence is calculated using the coefficient estimate and is reported in the last row in the table.⁹ The results strongly suggest “ β convergence” across Brazilian agglomerations. The speed of convergence, when regional dummies are added, is stable around 3.4 percent, which is slightly higher than other countries.¹⁰ In the last two columns, we examine the possibility of conditional convergence between agglomerations in the Northern and the Southern regions as a group. The coefficient of the Southern dummy is significantly positive when the same speed of convergence is assumed (column (3)), potentially indicating a higher steady-state growth rate of the Southern region cities. This is consistent with the finding of Andrade et al. (2004). However, overall, we cannot reject the hypothesis of identical speed of convergence and steady state growth rates between the two regions (column (4)).

1.20 Figure 1.8 and Figure 1.9 confirm these findings. Figure 1.8 shows a negative (linear) relationship between the annual income growth rate between 1970 and 2000 and the log of per capita income level in 1970. Figure 1.9 shows the pattern between 1991 and 2000. The fitted lines of the Northern and the Southern regions seem to have a similar slope but different intercepts.

Table 1.5: β Convergence of Per Capita Income¹⁾

	(1)	(2)	(3)	(4) (Chow test)
	Basic equation	Basic equation + 5 regional dummies ²⁾	Basic equation + 2 regional dummies ²⁾	Basic equation + 2 regional dummies ²⁾
ln(income in 1970)	-0.015 (-10.21)	-0.021 (-12.63)	-0.022 (-13.62)	-0.018 (-5.43)
ln(income in 1970)* Dummy(south)				-0.005 (-1.20)
Constant	0.104 (14.66)	0.136 (16.72)	0.126 (18.32)	0.111 (7.77)
Dummy(south)			0.011 (6.75)	0.031 (1.84)
Number of observations	123	123	123	123
Adj. R ²	0.46	0.60	0.60	0.61
Speed of convergence (%)	2.03	3.44	3.47	

1) Dependent variable = $(1/30) * \ln[\text{income}(2000)/\text{income}(1970)]$

2) Five regional dummies correspond to the North, the Northeast, the Southeast, the South and the West-Central regions, with the West-Central as a base. Two regional dummies are for the northern (the North and the Northeast) and the south (the others) regions, with the northern regions as a base. The estimated coefficients for five regional dummies in eq. 2 are not reported.

3) t-values are in the parentheses.

⁹ The speed of convergence (β) is calculated using the formula of Barro and Sala-i-Martin (1995), such that

$$\hat{\beta} = -\frac{1 - e^{-\beta T}}{T} \text{ where } \hat{\beta} \text{ is the coefficient estimate and } T=30.$$

¹⁰ Most published studies have investigated convergence across administrative regions rather than urban areas. With regional dummies added, the convergence speed across U.S. states for 9 subperiods between 1880 and 1990 was 1.9 percent, Japanese prefectures for 7 subperiods between 1930 and 1990 was 2.3 percent, and European regions for 4 subperiods between 1950 and 1990 was 1.9 percent (Barro and Sala-i-Martin (1995)).

Figure 1.8: Annual Income Growth and Initial Income Level for 1970-2000

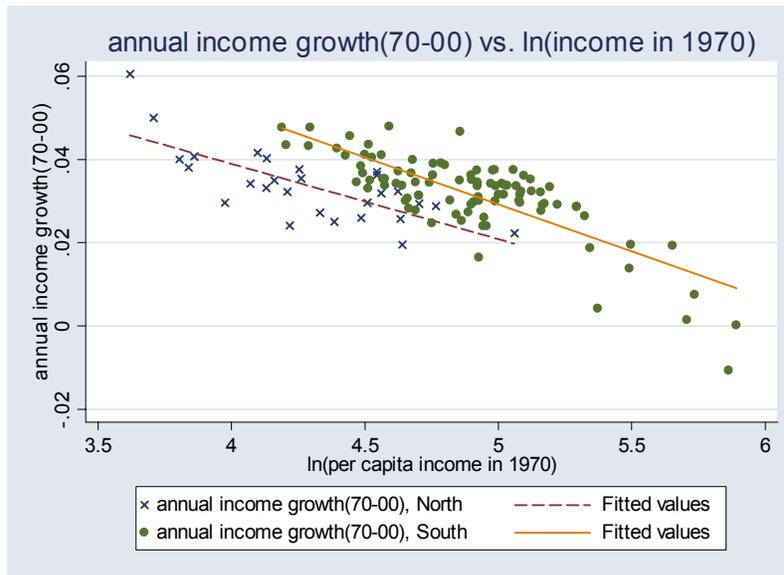
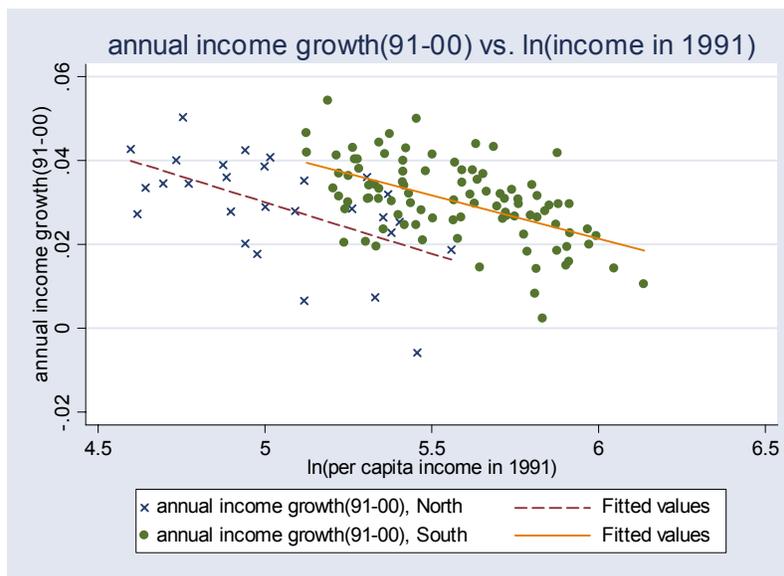


Figure 1.9: Annual Income Growth and Initial Income Level for 1991-2000



Specialization Across Cities

1.21 Urban productivity is influenced by economic composition. Both, a concentration in closely related industries (*localization economies*) and a diversity of economic activities (*urbanization economies*) tend to enhance the productivity of urban areas. As a country develops, industrial deconcentration tends to increase as a result of improvements in transport, utilities and communication. In earlier stages of development, most modern economic activity is located in one or a few centers where scarce labor and capital can be employed most productively. Manufacturing and higher end services will spread to smaller cities in later stages, allowing these places to specialize in sectors where they have a comparative advantage. As these cities continue to grow in size,

other modern-sector activities will locate there, resulting in a diversified economy that offers greater economic opportunity and a lower susceptibility to sector specific downturns. Table 1.6 shows urban concentration for each two-digit level industry across the urban hierarchy. The concentration index shown here has a value of zero if an industry is spread evenly across all cities according to their sizes, as is typical for personal and retail services. If an industry is highly concentrated it has a value approaching two.

1.22 The first column reports the measure of industry concentration, G_j of each 2-digit level industry j . Industry concentration is relatively low for “ubiquitous” industries which are hard to transport and available in many places. Food and beverage manufacturing (0.0042), Metal products manufacturing (0.0046), Furniture and miscellaneous manufacturing (0.0041), and service industries (excluding Finance service) are in this category. The concentration is higher for the natural resource based industries (Tobacco product (0.3698) and Leather products (0.2013)) and the technology intensive industries (Electrical and electronic machinery/equipment (0.0417) and Transportation equipment (0.0486)).

1.23 The third column of Table 1.6 shows the shares of each industry in the total employment of all urban agglomerations, and the last five columns show the relative importance of each sector in urban agglomerations of a given size category. Shares above 100 percent indicate that the industry is more prominently represented in that group of agglomerations compared to the national average share. Several patterns emerge. First, high and medium-high technology industries are concentrated in large cities (Publishing and printing, Chemical products, Electrical and electronic machinery/equipment and Transportation equipment). In particular, computer related industries and financial services are heavily concentrated in large cities. Second, medium technology industries are relatively more concentrated in medium size cities (Textile products and Pulp and paper products). Third, low technology industries that are usually related to natural resource extraction are concentrated in small cities (Agriculture and forestry, Mining and wood products). Finally, “ubiquitous”, industries producing non-tradable goods and services are fairly evenly distributed across the urban hierarchy. Overall, among 123 cities in Brazil 65 percent of national employment is concentrated in the 15 largest cities, whereas the 57 smallest cities accommodate only eight percent of national employment.

Table 1.6: The Concentration of Industry in 2000

2-digit Industry Classification	G_j	Share relative to the national average, % ¹					Cell 5 (small cities)
		Share in national employment	Cell 1 (large cities)	Cell 2	Cell 3	Cell 4	
Agriculture and forestry	0.0452	5.0	63.0	118.0	172.2	177.6	238.7
Fishing	0.0500	0.2	83.8	145.3	126.8	173.7	76.7
Mining	0.0240	0.3	77.6	98.8	118.2	135.0	238.3
Food and beverage manufacturing	0.0042	2.3	88.9	111.8	128.8	116.6	129.7
Tobacco product manufacturing	0.3698	0.1	128.8	60.8	60.6	22.7	27.2
Textile product manufacturing	0.0102	3.4	88.4	107.6	161.6	115.7	107.5
Leather processing and products manufacturing	0.2013	1.0	101.6	34.7	43.2	286.8	95.7
Wood products manufacturing	0.0199	0.4	80.3	110.5	137.5	134.4	179.0
Pulp, paper and paper products manufacturing	0.0296	0.3	103.5	60.6	144.1	84.5	99.0
Publishing, printing, reproduction of recordings	0.0282	0.9	118.4	72.7	73.3	53.7	55.8
Coal products, petroleum refining, alcohol prod.	0.0262	0.1	110.2	66.0	66.1	109.9	96.0
Chemical products manufacturing	0.0291	1.0	120.0	67.9	62.3	67.2	50.4
Rubber and plastics product manufacturing	0.0484	0.7	114.0	79.6	102.5	55.4	49.9
Metal product manufacturing	0.0046	2.9	95.3	104.5	144.9	73.1	107.3
Machinery and equipment manufacturing	0.0185	0.8	104.6	103.6	116.9	74.5	59.6
Electrical, electronic machinery & equipment	0.0417	0.5	123.3	69.8	70.4	31.1	41.7
Transportation equipment manufacturing	0.0486	1.1	123.6	48.9	65.1	40.0	69.5
Furniture and miscellaneous manufacturing	0.0041	1.5	98.2	98.3	120.4	98.6	97.2
Finance service	0.0230	2.0	121.3	72.9	60.7	48.5	49.0
Transportation, warehouses, communication	0.0030	6.9	109.2	86.5	79.8	85.5	77.5
Commerce	0.0003	21.4	100.2	101.5	99.0	103.4	94.3
Construction	0.0005	8.7	99.6	101.3	99.7	103.1	99.3
Domestic service	0.0010	9.1	99.8	101.7	91.6	102.8	105.7
Public service	0.0063	6.1	99.6	121.8	84.5	87.7	95.5
Education service	0.0006	6.7	99.0	110.9	98.7	94.7	97.3
Health service	0.0020	4.8	108.2	97.5	80.2	72.9	78.8
Other service	0.0013	5.0	106.2	94.5	84.5	90.6	81.5
Other industry	0.0013	6.8	103.7	96.5	88.4	96.4	90.0
(High tech industry) ²		(0.8)	(126.2)	(69.6)	(54.1)	(35.1)	(30.3)
Number of cities		123	15	14	17	20	57
Employment share in a cell		100.0	65.2	12.2	8.2	6.4	8.0

¹ The relative size cutoff points are calculated for 1970 city size distribution to be divided into five cells containing approximately 35%, 30%, 15%, 10% and 10% of all cities starting from the bottom.

² High tech industry covers; (i) Manufacture of machines and equipment of computer science (CNAE 30000); (ii) Activities of computer science - exclusive maintenance and clerical repairing of machines and computer science (CNAE 72010); and, (iii) Maintenance of machines clerical and computer science (CNAE 72020).

1.24 Another dimension of manufacturing deconcentration is decreasing specialization of cities over time and city size. Smaller and medium size cities tend to be fairly specialized, for instance in food and beverage production, textiles, shoes, or pulp and paper products. *Bigger cities tend to have a more diverse industrial base, with providers of niche products and services who can find a market in a large agglomeration.* High-tech, specialized production and complex business services also tend to be found more in larger cities, since they require an educated, highly skilled workforce that is attracted to places that offer a greater range of amenities. As development proceeds, manufacturing processes become more complex with more stages of production and

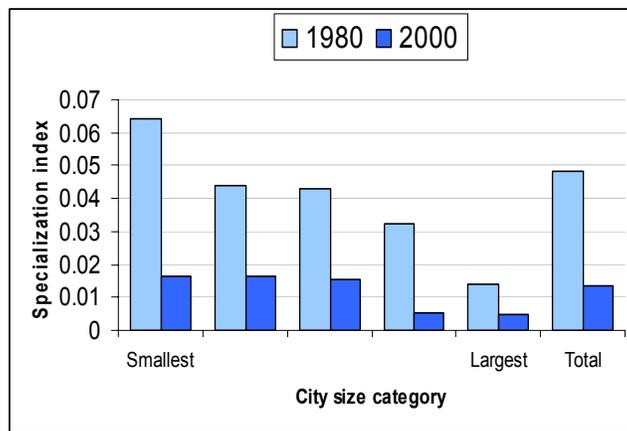
greater out-sourcing. This allows smaller and medium size cities to capture some of these activities and become more diverse.

1.25 Specialization and diversity is measured by (Henderson, Lee and Lee 2001).

$$SP_i = \sum_{j=1}^k (s_{ij} - E_j)^2$$

where E_j is the share of industry j in national employment, s_{ij} is the share of industry j in total employment of agglomeration i , and the sum is over k industries locally. The index measures for each industry how much the local production share differs from the national share. If all industries mimic the national share the index has a value zero and the city is perfectly diverse. A highly specialized city would have an index approaching two.

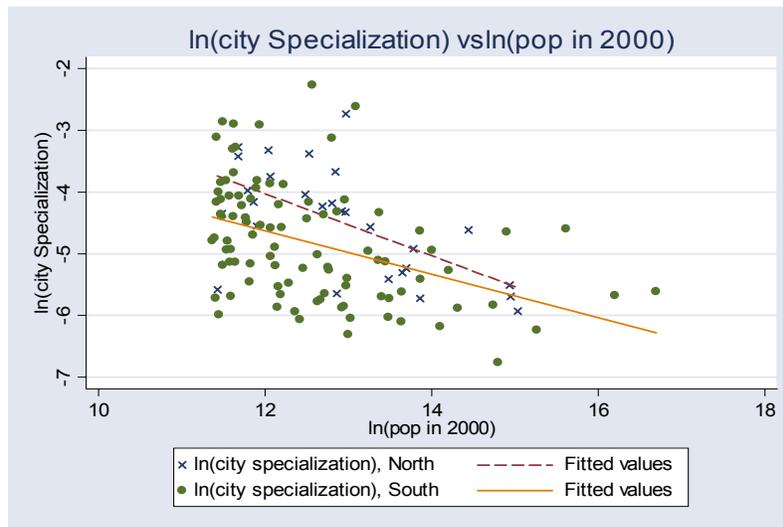
Figure 1.10: Index of Specialization by Agglomeration Size Group



Source: Brazilian Population Censuses of 1970 and 2000; urban size categories as defined before.

1.26 Figure 1.10 shows how this index varies across the urban hierarchy in Brazil. Specialization has decreased across all size categories in the last 20 years. As expected, the specialization index is negatively related to agglomeration size. As a city becomes bigger, diversification increases. In 2000, the specialization index in the largest agglomerations (0.0047) is just 28 percent of that in the bottom agglomerations (0.0166). Figure 1.11 and the corresponding regression also show a significant negative relationship between agglomeration specialization and size in 2000. A Chow test shows no statistical difference between the Northern and the Southern regions.

Figure 1.11: City Specialization in 2000



Pooled 1970 & 2000 OLS Results
Dependent variable: ln(Specialization index for 2000)

	(1)	(2)
ln(Population 2000)	-0.358 (-5.28)	-0.502 (-3.37)
ln(Population)*South dummy		0.151 (0.91)
Dummy for South region		-2.413 (-1.12)
Constant	-0.220 (-0.25)	1.997 (1.03)
Adj. R²	0.18	0.22

t-values in parentheses

Industrial Decentralization

1.27 As the urban system develops, typically manufacturing decentralizes out of the biggest cities first into their suburbs and nearby ex-urban transport corridors and then into smaller cities, with their lower cost of living, lower wages, and lower rents (Henderson *et al.* 1995, Deichmann *et al.* 2005). Decentralization as noted above is spurred by inter-city and hinterland infrastructure investment and increasing overall sophistication of the labor force. In a modern system of cities the share of manufacturing in local economic activity tends to rise as we move down the urban hierarchy. As part of a domestic product cycle, traditional standardized products are manufactured in smaller cities and more high tech, innovative products in the biggest cities. In contrast to manufacturing, as we move down the urban hierarchy, the share of business services such as financial and legal activities in local economic activity declines. Conversely, the ratio of manufacturing to business services falls as we move up the urban hierarchy, reflecting the service orientation of bigger cities (Kolko 1999).

1.28 As suggested by theory, Brazil has experienced a manufacturing decentralization process between 1970 and 2000. In Table 1.7 we list the ratios of employed population working in the secondary and the tertiary industries in 1970 and 2000 (see also Figure 1.12). We group agglomerations into five size groups as before based on the relative population cutoff points. A comparison between 1970 and 2000 employment shares shows a typical manufacturing decentralization process, albeit less than we anticipated. In 1970 the secondary industry share in overall local employment was positively related to agglomeration size. Similarly, the manufacturing share in total non-agricultural employment increases from 28.9 percent among the smallest agglomerations to

34.7 percent in the top group as we move up the urban hierarchy in 1970. But by 2000 there is a dramatic drop in the manufacturing share of the cities in the top two cells to about 25 percent. While the manufacturing share drops in smaller cities as well, the decline is more modest, so that by 2000 smaller cities have more local manufacturing concentration than bigger ones. We therefore observe decentralization of manufacturing industry out of big cities.

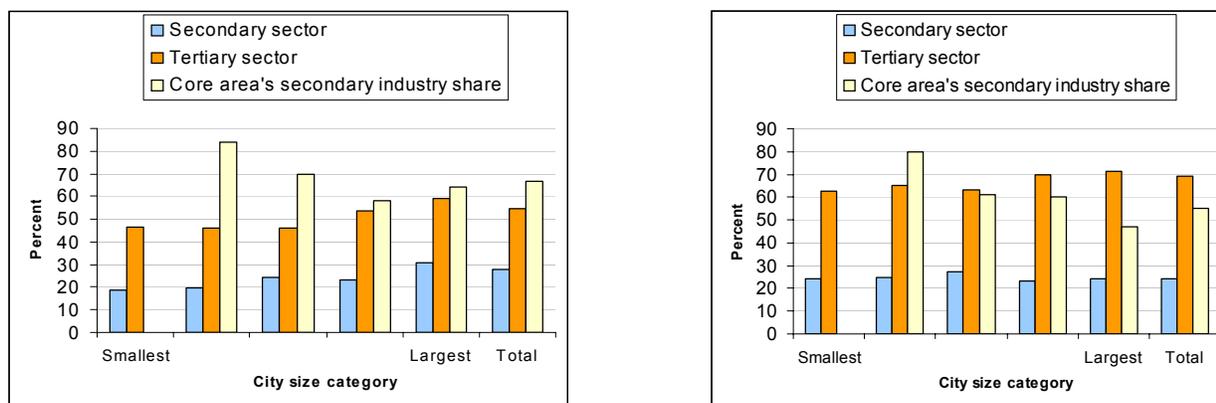
Table 1.7: Employment Share by Industry in 1970 and 2000

Agglomeration size groups ¹	Number of cities	Employment share, %			Core area's secondary industry share ²⁾	Core area's tertiary industry share ²⁾
		Secondary industry (a)	Tertiary industry (b)	$\frac{a}{a+b} \times 100$		
1970						
Largest: 1.340 ≤ pop/mean	12	30.9	58.1	34.7	64.2	76.1
0.812 ≤ pop/mean < 1.340	12	23.4	53.8	30.3	58.0	72.1
0.469 ≤ pop/mean < 0.812	19	24.1	46.1	34.4	69.7	71.9
0.256 ≤ pop/mean < 0.469	36	19.7	46.1	30.0	83.8	86.7
Smallest: pop/mean < 0.256	44	18.9	46.5	29.0	.	.
Total	123	27.8	54.8	33.7	66.6	77.1
2000						
Largest: 1.340 ≤ pop/mean	15	24.1	71.2	25.3	47.0	61.3
0.812 ≤ pop/mean < 1.340	14	23.0	69.8	24.8	60.0	70.9
0.469 ≤ pop/mean < 0.812	17	27.3	63.1	30.2	61.1	70.3
0.256 ≤ pop/mean < 0.469	20	24.6	65.3	27.3	79.8	81.4
Smallest: pop/mean < 0.256	57	24.0	62.8	27.7	.	.
Total	123	24.2	69.4	25.9	55.2	66.5

1) The relative size cutoff points are calculated for 1970 city size distribution to be divided into 5 cells containing approximately 35%, 30%, 15%, 10% and 10% of all cities starting from the bottom.

2) Core area's secondary (tertiary) industry share (%) is the ratio of the secondary (tertiary) industry employment in core areas to the total secondary (tertiary) industry employment in an agglomeration. The ratio of the number of suburb to core areas (MCAs) in each cell is 13.7, 4.0, 3.4 and 0.9 for 1970, and 11.7, 4.0, 2.5 and 1.5 from the top cell to cell 4. The last cell with relative population less than 0.256 is not calculated since the core areas have too small suburb areas (on average 0.3).

Figure 1.12: Sector Employment Shares by Agglomeration Size Distribution



Source: Brazilian Population Census of 1970 and 2000

1.29 Overall, the share of tertiary industry has increased rapidly from 54.8 percent in 1970 to 69.4 percent in 2000. The city size decomposition of the tertiary industry shows concentration of service sector employment in bigger cities. As we move up the urban hierarchy, the service industry share in 2000 increases from 62.8 percent among the smallest agglomerations to 71.2 percent among the largest. The manufacturing industry share in non-agricultural employment is highest in the medium size cities (30.2 percent in 2000). It suggests that manufacturing decentralization was relatively more intense from large to medium size cities.

1.30 Industrial decomposition within agglomerations shows a pattern of manufacturing suburbanization from the core to the suburb areas. The manufacturing industry share in the core areas, relative to the total city manufacturing industry employment, decreased from 64.2 percent in 1970 to 47.0 percent in 2000 (Table 1.7). The relative manufacturing employment share of the core areas decreases as a city becomes bigger. Manufacturing suburbanization is more distinct in bigger agglomerations and this process is also observed in the tertiary sector. The suburbanization of service industry shows a similar pattern as those of manufacturing. The service industry has experienced an overall increase in suburbanization over the period, and the suburbanization is relatively more intense in the largest cities. Still, overall, the service industry in 2000 is more concentrated than manufacturing in the core areas (66.5 percent versus 55.2 percent).

Summary of Findings

1.31 In this chapter, we describe patterns of population and income growth across urban agglomerations in Brazil. In general, the Brazilian urban system follows a dynamic trajectory that has also been found in other countries. Urban growth happens throughout the urban system, but with regional differences in magnitudes. In particular, cities in the Central-West and North have recently grown faster than the already established urban agglomerations in the traditional industrial regions of the south. Per capita incomes tend to be larger in bigger cities, a pattern that has not changed over the three decades since 1970. However, there is some indication of income convergence with smaller, lower income cities experiencing relatively faster income growth.

1.32 Cities of different size tend to show a different mix of economic activity. Small urban areas are dominated by non-tradables sectors and lower level services. Some small and medium size agglomerations also host industries that depend on the natural resource base. Medium size cities are typically more specialized in a few industries such as textiles and pulp and paper products. Large agglomerations are much more diversified with a mix of higher technology manufacturing and specialized business services. These require increased labor skills and yield higher profits which translate into higher wages, which in turn attract qualified workers.

1.33 Within larger agglomerations, manufacturing sector tends to be decentralized. As land prices and congestion in the center increase, enterprises move out. Rather than moving into smaller towns, where wages are low, they locate in the periphery of large cities to continue to reap agglomeration benefits, such as proximity to buyers, suppliers and specialized services.

Annex 1: Data Sources and Definitions

1.34 There is no official definition of “city” or “agglomeration” in Brazil. The lowest administrative level consists of more than 5000 municipalities. However, these vary greatly in size and many functional economic and population agglomerations consist of a number of municipalities. In this paper, we therefore follow the example of a study of Brazilian urban dynamics by IPEA, IBGE and UNICAMP (2002). It defined agglomerations based on their place in the urban hierarchy from “World Cities” (Sao Paulo and Rio de Janeiro) to subregional centers. For each agglomeration, this study identified the municipalities that were a functional part of the urban area. The municipalities belonging to each agglomeration were then further classified into eight categories according to how tightly they are integrated in the agglomeration, from “maximum” to “very weak”. The main criteria used in these classifications were centrality, function as a center of decision making, degree of urbanization, complexity and diversification of the urban areas, and diversification of services. These were measured by a range of census and

other variables such as employed population in urban activities, urbanization rate, and population density. We modified this classification slightly by also including smaller municipios to existing agglomerations if their population exceeded 75,000 population and more than 75 percent of its residents lived in urban areas in 1991, or if they were completely enclosed by an agglomeration.

1.35 The agglomeration definitions developed by IPEA, IBGE and UNICAMP (2002) are based on the Brazilian Bureau of Statistics (IBGE) Population Census of 1991 and the Population Count of 1996, while our study captures dynamics from 1970 to 2000. During this time, many new municipios were created by splitting or re-arranging existing ones. In fact, the number of municipios increased from 3951 to 5501 during these three decades. In order to create a consistent panel of agglomerations for the 1970 to 2000 period, we therefore used the Minimum Comparable Area (MCA) concept. MCAs group municipios in each of the four census years so that their boundaries do not change during the study period. All data have then been aggregated to match these MCAs. The resulting data set represents 123 urban agglomerations that consist of a total of 447 MCAs.

1.36 The sources for the majority of data employed in this paper are the Brazilian Bureau of Statistics (IBGE) Population and Housing Censuses of 1970, 1980, 1991 and 2000. We used the full Brazilian census counts to get information about total population and housing conditions (urbanization rate). Other data were collected only for a sample of households. We used this census sample information for income, industrial composition, education, piped water provision, and electricity availability. The sample sizes varied across census years (1970: 25 percent; 1980: 25; 1991: 12.5; 2000: 5). but all are representative at the municipio level, and thus are also reliable at the MCA level employed in this study. Table 1.8 reports the variables, their source and the years available.

Table 1.8: Variable Definitions and Data Sources

Data	Source	Years
Population	Population Censuses	1970, 1980, 1991, 2000
Urbanization rate	Population Censuses	1970, 1980, 1991, 2000
Income per capita (monthly deflated to 2000 values)	Population Censuses (sample)	1970, 1980, 1991, 2000
Industrial composition (percentage of labor force employed in an economic activity sector)	Population Censuses (sample)	1970, 1980, 1991, 2000
Years of schooling (average)	Population Censuses (sample)	1970, 1980, 1991, 2000
Percent of households with access to piped water provision	Population Censuses (sample)	1970, 1980, 1991, 2000
Percent of households with access to electricity	Population Censuses (sample)	1970, 1980, 1991, 2000

Income vs. wages

1.37 As discussed in the text, per capita income is not the preferred proxy for productivity growth as it includes not only real wage income, but also transfer payments and dividends or capital gains that were not necessarily generated locally. However, we used income because consistent wage data are available only for 1991 and 2000, and the overall quality of income data is better than the wage information. Overall, we do not believe that the use of income data significantly affects our analysis, since the correlation of income and wage data, both in terms of levels and growth rates, is very high for the two years in which both are available Table 1.9

Table 1.9: Correlation Coefficients – Wages Versus Income

	Wage 1991	Wage 2000	Income 1991	Income 2000	Wage growth	Income growth
Wage 1991	1.000					
Wage 2000	0.953	1.000				
Income 1991	0.993	0.948	1.000			
Income 2000	0.948	0.989	0.958	1.000		
Wage growth	-0.238	0.051	-0.227	0.032	1.000	
Income growth	-0.419	-0.147	-0.412	-0.148	0.937	1.000

Annex 2: Industrial Composition of the 3 Fastest Growing Cities in the West-Central (excl. Brasília)*

2-digit Industry Classification	2000		1980		Change in industrial composition (a-b)/b*100
	Employment share of the 3 cities in West-Central	Ratio relative to the national average, % (a)	Employment share of the 3 cities in West-Central	Ratio relative to the national average, % (b)	
Agriculture and forestry	6.56	132.02	12.09	145.78	-9.44
Fishing	0.09	36.29	0.45	62.98	-42.38
Mining	0.23	80.90	1.41	42.54	90.19
Food and beverage manufacturing	2.70	119.10	1.26	35.95	231.29
Tobacco product manufacturing	0.02	23.18	0.60	81.32	-71.49
Textile product manufacturing	4.24	125.71	14.22	142.59	-11.83
Leather processing and products manufacturing	0.46	46.21	11.96	162.38	-71.54
Wood products manufacturing	0.54	123.33	6.07	118.66	3.93
Pulp, paper and paper products manufacturing	0.10	28.22	3.95	138.48	-79.62
Publishing, printing and reproduction of recordings	0.73	81.47	0.11	17.10	376.33
Coal products, petroleum refining and alcohol production	0.06	54.91	1.58	113.73	-51.72
Chemical products manufacturing	0.54	56.12	5.40	116.85	-51.97
Rubber and plastics product manufacturing	0.19	27.14	7.44	98.62	-72.48
Metal product manufacturing	1.80	61.81	2.45	57.27	7.92
Machinery and equipment manufacturing	0.35	43.81	15.24	160.52	-72.70
Electrical and electronic machinery, equipment manufacturing	0.11	22.78	2.61	122.68	-81.43
Transportation equipment manufacturing	0.22	20.69	1.41	73.94	-72.02
Furniture and miscellaneous manufacturing	1.30	86.67	3.07	107.53	-19.40
Finance service	1.62	78.99	0.18	32.82	140.63
Transportation, warehouse and communication service	6.01	86.57	0.88	30.70	182.02
Commerce	23.63	110.36	0.15	13.58	712.47
Construction	9.11	104.90	0.09	23.48	346.66
Domestic service	9.48	104.32	1.22	84.86	22.93
Public service	7.47	122.18	1.28	24.11	406.80
Education service	6.68	99.65	0.38	18.18	448.03
Health service	4.35	90.02	0.73	42.37	112.44
Other service	5.28	105.68	3.06	43.08	145.28
Other industry	6.16	90.35	0.72	107.37	-15.85
(High tech industry)	0.61	74.66			

* The 3 fastest growing cities in the West-Central region are Campo Grande, Cuiabá and Goiânia.

2. City Performance and Policy Actions

by

By Somik Lall

2.1 **Relevant Issues:** *Which factors make some cities perform better than their peers? What is the impact of infrastructure and service delivery on urban growth? How does it impact large metro areas? What are the prospects for secondary city growth? Is the development of secondary cities fiscally viable? What is the role of institutions and governance in promoting urban growth?*

Background

2.2 *Why are some cities more successful than their peers?* Is the ‘success’ of individual cities driven by factors mostly external to any city’s immediate control (location, growth in market potential, being a port in a period of national trade growth, national level decentralization and improved governance), or do individual city policies and politics influence growth and development? Disentangling the relative contribution of regional and local efforts is important for understanding the potential of alternate policy interventions for stimulating growth of cities across the national urban system. At this time, there is little clarity on the effectiveness of local and national policy environments on urban growth in Brazil, as well as most developing countries.

2.3 The scale of urbanization and the distribution of population across the urban hierarchy (as discussed in Chapter 1) will challenge policy makers to devise appropriate policies for cities of different sizes. Across the urban system, there will be need to meet backlogs in infrastructure, service delivery, and amenity provision, as well as accommodate further growth. In addition to population increases across the urban system, fiscal and administrative decentralization has increased the role of individual cities in attracting investments and in providing services that are responsive to the needs of local residents. Brazil is one the most decentralized among developing countries. The 1988 Constitution established municipalities as the third level of government, and provided states and municipalities with more revenue raising power and freedom to set tax rates. However many local governments have limited administrative and institutional capacity, and have not been able to effectively use their autonomy to improve service delivery or attract new investment. A recent study by the World Bank (World Bank 2002) identifies that maximizing urban competitiveness from agglomeration economies and minimizing congestion costs from negative externalities are key challenges facing national and local governments in Brazil.

2.4 Under this backdrop of rapid population growth and decentralization of administrative and fiscal responsibilities, it becomes essential to identify what types of interventions stimulate growth of individual cities. In addition, we want to find out the consequences of favoring investments in secondary cities on aggregate efficiency and economic growth. There is an ongoing debate in Brazil’s policy circles that the largest agglomerations have become too big leading to significant negative externalities of crime, social conflict, and high land costs, and policies should be designed to actively stem the growth of these large agglomerations and favor investments in secondary cities. It is however not clear if net agglomeration economies in large cities can be offset by incentives and other measures to divert growth to smaller cities.

Measuring City Growth

2.5 To examine these issues, we consider a model of a city, which consists of a demand side—what utility levels a city can pay out—and a supply side—what utilities people demand to live in a city. For the empirical analysis, we construct a dataset of Brazilian agglomerations to examine city growth between 1970 and 2000. Much of the underlying data come from the Brazilian Bureau of Statistics (IBGE) Population Censuses of 1970, 1980, 1991, and 2000. The details of the dataset are provided in Chapter 1, Annex 1.

2.6 Urban growth is represented by both individual city productivity growth and city population growth, which are different indicators of city “success” and represent two interconnected dimensions of successful urban

growth. However before we can look at any individual city's success, we need to understand the broader context, in which the economy as a whole is changing. Cities from an economic perspective represent the way modern production is carried out in a country and, as such, reflect what is occurring in the country as a whole.

2.7 Production composition of cities varies by city size, where different types of goods are best produced in bigger versus smaller cities. If national output composition changes, altered by changing trade demand or domestic demand that changes with economic growth, then demand moves away from goods produced in smaller types of cities and those cities will suffer a setback. Some will falter; others will adjust what they produce and perhaps upgrade, moving up the urban hierarchy. Which ones adjust well may depend on "luck", but it may also depend on observable attributes such as education of the labor force. A better educated labor force may allow for more nimble adjustment and up-scaling of products produced what is called the reinvention hypothesis. Similarly the skill composition of the labor force will vary across cities in systematic ways, as output composition and skill needs vary. More generally, national productivity growth comes from productivity growth within cities, which engender the close social-spatial interactions inherent in innovation, knowledge accumulation and technological improvements. To understand individual city success, we need to account for the external, national factors driving urban changes, as well as to understand the sources of local productivity growth.

2.8 At the same time we need to be able to measure when cities are being "successful" versus less successful and what drives success. Much of success may be driven by conditions external to the city, as just noted. In addition to demand changes, changes in national institutions, for example providing smaller cities with greater autonomy in local public sector decision making and greater access to fiscal resources may make it easier for smaller cities to finance the infrastructure and public sector services demanded by firms (transport and telecommunications) and by higher skilled workers (e.g., better schools) and compete successfully with bigger cities for certain industries. For terms of city level conditions, better run cities with more efficient use of public sector revenues will be more attractive to both firms and migrants. And better run cities will co-ordinate better with local businesses to help service their needs and make them more productive. So part of measuring city success is measuring what local producer and consumer amenities are valued and what cities are better at providing these amenities.

2.9 In related work, Glaeser et al. (1995) examined how urban growth of the U.S. cities between 1960 and 1990 is related to various urban characteristics in 1960, such as their location, initial population, initial income, past growth, output composition, unemployment, inequality, racial composition, segregation, size and nature of government, and the educational attainment of their labor force. They showed income and population growths are (1) positively related to initial schooling, (2) negatively related to initial unemployment, and (3) negatively related to the initial share of employment in manufacturing. Racial composition and segregation are not correlated with later city population growth. Government expenditures (except for sanitation) are also not associated with subsequent growth. However, per capita government debt is positively correlated with later growth.¹¹

2.10 In a long run analysis, Beeson et al. (2001) examine the location and growth of the U.S. population using county-level census data from 1840 and 1990. They showed access to transportation networks, either natural (oceans) or produced (railroads), was an important source of growth over the period.¹² In addition, industry mix (share of employment in commerce and manufacturing), educational infrastructure, and weather have promoted population growth.

2.11 In a recent paper for developing countries, Au and Henderson (2005b) take a slightly different approach. They model and estimate net urban agglomeration economies for cities in China, which can be postulated by

¹¹ They attributed this correlation to higher expected growth which made it cheaper to borrow, or government invest heavily in infrastructure to serve that growth.

¹² Transportation network is represented by a group of dummy variables indicating ocean, mountain, confluence of two rivers, railroads, and canals.

inverted-U shapes of net output or value-added per worker against city employment. They find urban agglomeration benefits are high – real incomes per worker rise sharply with increases in city size from a low level, level out nearer the peak, and then decline very slowly past the peak. The inverted-U shifts with industrial composition across the urban hierarchy of cities. Larger peak sizes are for more service oriented cities, but smaller for intensive manufacturing cities. In addition, (domestic) market potential and accumulated FDI per worker have significant and beneficial effects on city productivity, measured by value-added per worker. However, percentage of high school graduates, distances to a major highway and to navigable rivers, and kilometers of paved road per person have no effects, once market potential is controlled for.

Model and Estimation Strategy

2.12 The model that is used to examine determinants of city growth consists of a demand side—what utility levels a city can pay out—and a supply side—what utilities people demand to live in a city. We estimate aspects of the demand and supply side; and then a reduced form equation that describes city sizes and their growth. In the end the focus is on the last item.

Demand Side

2.13 The demand side is given by the schedule of utility levels a city can offer workers, as city size increases. A prime determinant of that is income, I , which consists of wage income and income from rents and other non-labor sources. In addition in an indirect utility function we also have a vector of items, Q , such as commuting costs, housing rents, local taxes, and local public services and amenities, so that

$$U_i^D = U(I_i, Q_i)$$

(1)

For wage income there is a wage rate component and then a work effort component discussed momentarily. The wage rate component comes from value of marginal productivity relationships, where

$$w_i = w(MP_i, r_i, e_i, N_i) \quad (2)$$

2.14 In (2) r is the rental rate on capital, e is the quality or education level of workers, MP is market potential reflecting the demand for a city's output and hence the price it receives, and N is a measure of scale, such as city employment. MP from the new economic geography and monopolistic competition literature has a specific form with components we can't measure. We make two adjustments. First we use "nominal" market potential, which is simply the distance discounted sum of total incomes of all MCAs in Brazil for city i , or

$$MP_i = \sum_{j, j \neq i} \frac{TI_j}{\tau_{ij}} \quad (3)$$

2.15 TI is total income and τ_{ij} represents the transport cost between i and j .¹³ The calculation of market potential is described in Appendix A, where we use distance as the measure of transport costs. However travel times and costs vary by more than distance. Brazil for 1968, 1980 and 1995 has a measure of the transport cost from each city to its state capital. We divide that variable by distance from the city to the state capital to get a city specific measure of local *unit* transport costs which producers in a city face in selling in the local region. The variable "inter-city transport costs", $i\tau_i$, will be determined by intercity road infrastructure investment.

2.16 The major items from urban theory affecting worker well-being, apart from the wage rate are rents and commuting costs. Commuting costs are time costs, of which part will be reflected in lost work time or energy for work, and part in out-of-pocket commuting costs. So total wage income is a function of both the wage rate and

¹³ The MCAs (Minimum Comparable Areas) are groups of municípios. The detailed description is in Appendix C.

hours and energy available to work, where the later will be negatively affected by commuting times. Housing costs are tricky, since higher housing rents are also reflected in higher non-labor income earned by landowners.

2.17 For demand side estimation, what we know from the data is total income per worker in each city. We model that as a function of the determinants of the wage rate and then factors affecting work time/energy and housing rental income. Both are a function of city size. In sum we estimate:

$$I_i = I^D(MP_i, i\tau_i, e_i, N_i) \quad (4)$$

2.18 The scale variable, N , captures three things, scale externality effects on wage rates, increasing housing rental incomes, and reduced work time/energy. As such its sign is uncertain—if cities are at a size where the commuting cost aspects of urban living weigh heavily, at the margin increases in scale could detract from incomes. That will be the case in our estimation (which is also good for “stability” given supply curves are upward sloping—being on the rising part of the “demand curve” can be problematical and also makes sign interpretations in the city size equation more difficult as discussed later).

Population Supply

2.19 The population supply relationship we estimate has population supplied to a city increasing in utility offered per worker, which we approximate by income per worker. This will tell us the supply elasticity of people to a city. In addition supply is shifted by attributes, Z_i , of the surrounding area—or substitutes of places to work for population in the area. We have supply to a city of population from nearby rural areas. It is decreasing in surrounding rural incomes where we use a gravity measure of surrounding rural incomes, and it is increasing in surrounding rural population supply where again we use a gravity measure of surrounding rural population. The calculation details are in Appendix B.

The supply equation is given by

$$N_i = N^S(U^S(I_i), Z_i), \text{ where } \partial N^S / \partial I > 0, \partial N^S / \partial Z > 0 \quad (5)$$

Note the inverse we will use later is

$$I_i = I^S(N_i, Z_i) \text{ where } \partial I^S / \partial N > 0, \partial I^S / \partial Z < 0. \quad (6)$$

Determinants of Growth

2.20 **Urban Demand:** Results from estimating the demand side model are presented in Table 2.1, pooling three years (1980, 1991, and 2000). In columns 1 and 2 the scale measure is total workers in each city. In column 3, population instead of total workers is used to represent urban scale. In column 4, we provide the effects on outcomes of a one standard deviation increase in covariates. All variables have significant impacts on total income per worker. For market conditions, average schooling and ln(market potential), a one standard deviation increase (1.26 and 1.01) raises total income per worker by 33% and 11% respectively. (Of course for covariates in log form we already have elasticities.) For ln(number of workers), we have the classic simultaneity problem where larger cities per se are “more efficient” so we get a positive coefficient in OLS, but in fact we expect negative scale effects at the margin, because we should be on the downward sloping portion of inverted U’s (of

income against city size).¹⁴ A reduction of one standard deviation (-1.13) in ln (number of workers) increases total income per worker by 18%, with similar results when the size measure is population (column 3).

Table 2.1 Demand Side: Determinants of Income Per Worker

(robust standard errors in parentheses)

Dependent variable:	ln(income per capita)			
	(1)	(2)	(3)	(4)
	GMM-IV	OLS	GMM-IV	The effects of 1 s.d. increase in covariates of (1)
Average Schooling	0.263*** (0.018)	0.236*** (0.025)	0.255*** (0.017)	0.331
ln(market potential)	0.108*** (0.020)	0.015 (0.013)	0.095*** (0.017)	0.109
ln(no. workers)	-0.158*** (0.029)	0.002 (0.011)	-0.141*** (0.025)	-0.179
[ln(population) for (3)]				
ln(inter-city transport costs)	-0.075** (0.029)	0.034 (0.027)	-0.055** (0.028)	-0.033
state capital dummy	0.158** (0.068)	0.040 (0.054)	0.169** (0.067)	
ln(distance to São Paulo)	-0.075*** (0.006)	-0.077*** (0.009)	-0.071*** (0.006)	-0.077
time dummies	yes	yes	yes	
Observations	369	369	369	
R ²		0.853		
Hansen J statistic (overidentification test)	3.781		3.829	
(p-value)	(0.436)		(0.430)	
Average of Partial R ²	0.572		0.575	
Average of Partial F's	58.10		57.16	

*** significant at 1% level; ** significant at 5% level; * significant at 10% level.

2.21 Other variables may reflect *policy conditions*. Cities further from Sao Paulo, over and above declines in market potential, suffer. While this could reflect some aspect of Sao Paulo's huge, modern business service sector market that is critical to access for other cities, it might reflect other items like cost of capital or state provided production amenities that respectively rise and fall as one moves further from the center of the political elites and power in Sao Paulo. The intercity-transport cost variable, reflecting relative investments of transport infrastructure is significant where a reduction of one standard deviation (-.344) increases total income per worker by 3.3%. For intercity-transport costs we use the 1980 value for years 1980 and 1990; and we use the 1995 value for 2000. We give zero values to ln(inter-city-transport costs) of state capital cities and insert a dummy for state capitals. Note the coefficient on state capitals of .16 is much larger than would be expected (.075*.68= .051), if we assigned state capitals mean unit transport costs (.68), given that latter variable has a coefficient of .075. This may suggest state capitals are larger than expected, perhaps favoring themselves (or being favored by the national government) with investment in unobserved production amenities.

¹⁴ Theory suggests that, under free migration within a country, if particular cities are not at their peak of inverted U's, they will be to the right of the peak, due to either "stability" conditions in migration-labor markets or conditions on what constitutes a Nash equilibrium in migration decisions (Au and Henderson, 2004; Duranton and Puga, 2004).

Table 2.2 Population Supply
(robust standard errors in parentheses)

Dependent variable:	ln(population)				
	(1)	(2)	(3)	(4)	(5)
	GMM-IV	OLS	GMM-IV (1980)	GMM-IV (1991)	GMM-IV (2000)
Ln(income per capita)	2.997*** (0.413)	1.813*** (0.378)	2.700*** (0.402)	2.937*** (0.417)	3.335*** (0.420)
Ln(rural income opportunities: market potential)	-6.892*** (0.997)	-4.152*** (0.819)	-7.645*** (1.195)	-6.236*** (0.850)	-6.678*** (0.965)
Ln(rural pop. supply market potential)	7.555*** (0.936)	4.878*** (0.752)	8.330*** (1.133)	6.901*** (0.788)	7.325*** (0.908)
time dummies	yes	yes	yes	yes	yes
Observations	369	369	123	123	123
R ²		0.745			
Hansen J statistic (overidentification test)	1.341 (0.854)		2.401 (0.663)	0.161 (0.997)	2.444 (0.655)
Average of Partial R ²	0.708		0.735	0.693	0.701
Average of Partial F's	47.26		30.14	36.70	41.02

*** significant at 1% level; ** significant at 5% level; * significant at 10% level.

2.22 **Supply Side:** Results for population supply are provided in Table 2.2. Again, for the estimation we pool three years (1980, 1991, and 2000). Columns 1 and 2 give the GMM-IV and then OLS results. In column 1, a 1% increase in a city's total income per capita increases city population by 3%, suggesting an elastic supply curve, but one that is definitely not perfectly (or highly elastic). The gravity measures of surrounding rural population supply and rural income opportunities have the expected opposite effects with similar magnitudes. A 1% increase in surrounding rural population supply increases city population by 7.6%, and a 1% increase in surrounding rural income opportunities decreases city population by 6.9%. Thus, city populations are very sensitive to rural population supply and earning opportunities.

2.23 In columns 3-5, we present supply elasticities by year. The point estimates of the income coefficient increases over time, indicating increasing mobility. But as just noted even in 2000, the elasticity, 3.3, is far from a perfect mobility elasticity.¹⁵

2.24 **City Growth:** A growth formulation allows us (i) to separate out labor force quality improvements from the effect of base period education on local technology (knowledge accumulation spillovers); (ii) to difference out time invariant unobservables affecting city size that are difficult to instrument for; and (iii) to incorporate adjustment processes, where city growth is affected by base period size and industrial composition, as well as changing economic conditions. Table 2.3 shows the growth results pooling 1991-1980 and 2000-1991 differenced equation years for equation (7). Covariates are differenced; in addition, before differencing, we now normalize market potential measures with the mean for that year to emphasize how each city's relative conditions are changing over time. For differenced intercity-transport costs, we use the difference between 1995 and 1980 for

¹⁵ Under perfect labor mobility, we expect a horizontal population supply curve. All the cities offer the same utility level, and city sizes are only determined by demand-side factors.

2000-1991; and the difference between 1980 and 1968 for 1991-1980. All covariates, except changes in rural population supply have strong and expected sign coefficients. The poor performance of rural population supply is most probably due to the limited variance in relative market potential measures over time and their high degree of correlation (negative between changes in rural income and population supply conditions, as would be expected). Controlling for population allows for dynamic adjustment to steady state levels from the base, and introducing industrial composition allows for adjustment relative to changes in national output composition. Initial city size has a negative coefficient, suggesting either mean reversion or some conditional convergence in population growth across cities, or both. Also, cities with high manufacturing ratios in the base period experience faster growth. We also find that once base period population and industrial composition are controlled for, state capitals are growing faster than other cities, perhaps reflecting favoritism as noted earlier.

2.25 For changes in basic demand and supply conditions, we find *that decreases in rural income opportunities and increases in market potential of goods and labor force quality (measured by changes in educational attainment) increase the growth rate of city population*. As a new effect, educational attainment in the base period increases city population growth rates afterwards, confirming spillover effects of knowledge accumulation. Reductions in inter city-transport costs have a fairly strong effect on city population growth rates: a 10% decrease in inter city unit transport costs increases city population growth by 1.4% over a decade. In the next section we discuss in more detail the magnitudes of effects on growth of different covariates.

2.26 In Table 2.3, columns 3 and 4, we introduce one additional local characteristic to the base specification, the base period *homicide rate*, an amenity which may affect city growth. Results suggest that higher homicide rates have a detrimental effect on city growth. For example, a 10% increase in base period homicide rates reduces city growth by 1.5% over the next decade.

Table 2.3 City Size Growth Equation

(robust standard errors in parentheses)

Dependent variable:	$\Delta \ln(\text{population})$			
	(1)	(2)	(3)	(4)
	GMM-IV	OLS	GMM-IV	OLS
$\Delta \ln(\text{rural pop. supply market potential}) / \text{mean}$	-0.160 (0.264)	0.221** (0.079)	-0.126 (0.218)	0.272*** (0.092)
$\Delta \ln(\text{rural income opportunities: market potential}) / \text{mean}$	-0.517*** (0.095)	-0.059 (0.035)	-0.672*** (0.110)	-0.098** (0.035)
$\Delta \ln(\text{market potential}) / \text{mean}$	2.874*** (0.670)	0.853*** (0.159)	2.723*** (0.863)	0.694*** (0.130)
Average schooling (t-1)	0.056*** (0.020)	0.023* (0.012)	0.093*** (0.019)	0.040*** (0.011)
Δ Average schooling	0.474*** (0.100)	0.098*** (0.032)	0.432*** (0.120)	0.098*** (0.033)
$\Delta \ln(\text{inter-city transport costs})$	-0.138** (0.061)	-0.089** (0.040)	-0.105** (0.052)	-0.077** (0.035)
state capital dummy	0.211*** (0.048)	0.129*** (0.036)	0.150*** (0.031)	0.112*** (0.030)
$\ln(\text{population}) (t-1)$	-0.051*** (0.009)	-0.019* (0.010)	-0.060*** (0.009)	-0.026*** (0.009)
Manu / service (t-1)	0.129*** (0.037)	0.101*** (0.018)	0.076* (0.040)	0.087*** (0.022)
$\ln(\text{homicide} / \text{pop}) (t-1)$			-0.150*** (0.035)	-0.093*** (0.025)
time dummies	yes	yes	yes	Yes
Observations	246	246	245	245
R^2		0.384		0.431
Hansen J statistic (overidentification test)	10.502		8.038	
(p-value)	(0.232)		(0.430)	
Average of Partial R^2	0.469		0.457	
Average of Partial F's	499.0		1160.4	

*** significant at 1% level; ** significant at 5% level; * significant at 10% level.

2.27 **Decomposing City Growth:** In Table 2.4, we decompose the city population growth results of Table 2.3, column 1 into contributions of each covariate. We focus on the covariates which are statistically significant. The contribution of each covariate is calculated as a fitted value (the mean value multiplied by the estimated coefficient) relative to the sum of all the fitted values. Column 5 shows the overall contributions for all cities. There is a strong negative effect of city size in base period (-24%). The key positive component to growth comes from increases in market potential (108%); much of what happens to cities is determined by conditions external to them—*demand for their products as driven by what is evolving geographically around them*. Changes in educational attainment (21%), along with base period's educational attainment (10%) which affects local technology growth also matter.

Table 2.4 Decomposition of City Size Growth

	Coef. of Table 2.5 (1), (a_i)	Mean $(b_i)^a$			Decomposition of city growth $(a_i \times b_i / c), \%$		
		Total	Large cities ^b	Small cities ^b	Total	Large cities ^b	Small cities ^b
No. cities		123	61	62			
$\Delta \ln(\text{city pop})$		0.226	0.264	0.188			
$\Delta \ln(\text{rural income opportunities}) / \text{mean}$	-0.517	1.000	0.991	1.009	-19.3	-19.0	-19.7
$\Delta \ln(\text{market potential}) / \text{mean}$	2.874	1.000	1.003	0.997	107.5	106.9	108.0
Average schooling (t-1)	0.056	4.568	4.773	4.366	9.6	9.9	9.2
Δ Average schooling	0.474	1.208	1.215	1.201	21.4	21.4	21.5
$\Delta \ln(\text{inter-city transport costs})$	-0.138	-0.215	-0.191	-0.239	1.1	1.0	1.2
State capital dummy	0.211	0.171	0.344	0.000	1.3	2.7	0.0
$\ln(\text{population}) (t-1)$	-0.051	12.339	13.172	11.520	-23.5	-24.9	-22.1
Manu / service (t-1)	0.129	0.406	0.428	0.385	2.0	2.0	1.9
$c = \sum_i a_i \times b_i$		2.674	2.695	2.654			
sum					100.0	100.0	100.0

a. Means are for 2000-1991 and 1991-1980. For average schooling (t-1), it is for 1991 and 1980.

b. We define large (small) cities if they have greater (less) than median city population in each year.

2.28 The estimated effects of market potential and technology spillovers support the new economic geography emphasis on local markets and the endogenous growth literature emphasis on human capital accumulation. These results are also consistent with cross country findings in Henderson and Wang (2005).¹⁶ Columns 6 and 7 compare city growth decompositions of large versus small cities. We find no major difference in these effects across city size.

2.29 **Decomposition of City Growth Residuals:** We now use the residuals from the GMM estimations in Table 2.3, column 3, and examine if they have any systematic association with time invariant local characteristics. Our main interest is in examining if local management or governance, and inter industry linkages are associated with city growth. In principle, autonomous local government would actively work to provide local public goods for its constituents, and develop policies to stimulate growth and manage externalities. For our analysis, we have

¹⁶ Henderson and Wang (2005) analyzes how urbanization in a country is accommodated by increases in numbers versus population sizes of cities. Using a worldwide dataset on all metro areas over 100,000 population from 1960-2000, they show market potential, educational attainment, and the degree of democratization strongly affect growth in both city numbers and individual city sizes.

two measures of local government efforts: (1) existence of laws to collect property [IPTU] taxes and (2) percentage of population under land zone laws.¹⁷

Table 2.5 Regression of City Growth Residuals

(Robust standard errors in parentheses)

Dependent variable:	Residuals of Table 5 (3)	
	OLS	OLS
Laws to collect property tax	0.014 (0.047)	-0.086 (0.055)
% of population under land zone law	0.036* (0.020)	0.031* (0.017)
Public industry capital / total industry capital in 1980	-0.666 (0.504)	-0.034 (0.748)
(No. formal firms / No. workers in formal firms) (t-1)		0.955** (0.387)
time dummy	Yes	No
Observations	245	122
R-squared	0.017	0.041

*** significant at 1% level; ** significant at 5% level; * significant at 10% level.

2.30 In terms of inter industry linkages; we expect a clustered or densely populated region to provide a rich environment for competition and collaboration among firms and workers in the region, which leads to economic growth. As Saxenian (1994) observes, regional development is more distinct in a region consisting of many small size, more competitive firms than that of a few large firms.¹⁸ We measure the density of economic activities by $\ln(\text{no. firms relative to workers}) = \ln(\text{no. formal firms} / \text{no. workers in formal firms})$. We also experimented with the ratio of public industrial to private industrial capital in 1980 (the only year we have it recorded) to see if cities which are more state capitalist are less efficient, or grow more slowly.¹⁹

2.31 The basic estimation results from decomposing the residuals are reported in Table 2.5. Due to the lack of longitudinal data for local characteristics, the estimation result should be interpreted as associations of contemporary variables rather than a causal relationship. Column 1 is for city growth residuals in (2000-1991)

¹⁷ Those two measures are as of 1999.

¹⁸ Saxenian (1994) examined different regional economic performances between Silicon Valley in California and Route 128 in Massachusetts. Dense social networks and open labor market in Silicon Valley have facilitated informal communication and collaborative practices, and produced a regional network-based industrial system. The Route 128 region, in contrast, is dominated by autarkic (self-sufficient) corporations that internalize a wide range of productive activities. She concluded that this difference in regional socio-economic structure accounts for the divergent prosperity of two regional economies, in spite of their common origins in postwar military spending and university-based research, and even though they enjoyed roughly the same employment levels in 1975.

¹⁹ La Porta and López-de-Silanes (1999) showed privatization in Mexico in 1980s and 1990s led to a significant improvement in firm performance, as profitability increased 24 percentage points and converged to levels similar to those of private firms.

and (1991-1980) regressed against time invariant city characteristics. Column 2 is for (2000-1991) adding to regressors a density measure of economic activities in 1991.²⁰

2.32 We find that population growth is higher in cities with better enforcement of land use and zoning laws – the estimates suggest that city growth is associated with increases in the percentage of city population under land zone laws.²¹ However, we do not find any statistically significant association between city growth and existence of laws to collect IPTU (property tax). This is most likely because there is almost no variation in the IPTU collection data – most cities have laws to collect the property tax. A richer set of inter industry linkages is also associated with growth – the OLS coefficient for the number of (formal) firms relative to (formal) workers is statistically significant and has the expected sign. A higher number of firms relative to workers stimulate competition and collaboration among firms and workers in a city, and is associated with higher city growth. The coefficient of public industry capital ratio has a negative sign suggesting a detrimental effect on city growth. However, it is not statistically significant.

Policies Favoring Secondary Cities

2.33 Using the results from the regressions of city growth, let us consider the following policy experiment. There is considerable policy debate in Brazil that investments need to be directed towards secondary cities to stimulate local economic development and limit the growth of the largest metropolitan areas. However, the impact of these initiatives on overall economic growth and urban efficiency is unclear.

2.34 Suppose the Brazilian government invests in transportation infrastructure in order to decrease inter-city transport costs. An issue is whether favoring investments in small cities vis-à-vis large cities increase overall productivity growth, and therefore higher overall economic growth in Brazil. To make the analysis tractable, we first assume that the amount of transportation investment to reduce one unit of inter-city transport cost (per mile) is proportional to city population. So one unit decrease in inter-city transport costs for a city of 1 million is assumed to cost the same amount of government expenditure as those for 10 cities of 100,000 people.

2.35 In 2000, the largest city, São Paulo, has 17.9 million residents, which is equivalent to the total population of the 88 smallest cities (Table 2.6). The total population of the 7 largest cities is the same as that of remaining 116 small cities (Our data consist of 123 cities). Our assumption says that total transportation investment needed to decrease one unit of transport costs for São Paulo will also reduce one unit of transport costs for the 88 smallest cities, if invested in those cities.

²⁰ We only have 1991 and 2000 data for $\ln(\text{no. formal firms} / \text{no. workers in formal firms})$.

²¹ We can get a similar result when we use a dummy variable indicating more than 50% of population is under land zone laws.

Table 2.6 Policy Simulation: Favoring Largest Cities Versus Smallest Ones

(1 standard deviation decrease in inter-city transport costs in 2000)

Comparison	Total urban income relative to the baseline income (%)		(b-a, %p)
	Favoring largest cities (a)	Favoring smallest cities (b)	
1 largest vs. 88 smallest	102.514	102.809	0.296
2 largest vs. 104 smallest	103.823	104.366	0.543
3 largest vs. 109 smallest	104.951	105.239	0.287
4 largest vs. 112 smallest	105.658	105.987	0.330
5 largest vs. 113 smallest	106.202	106.294	0.091
6 largest vs. 115 smallest	106.560	106.944	0.384
7 largest vs. 116 smallest	107.114	107.408	0.294

2.36 Table 2.1 describes the determinants of income per worker, in which average schooling, market potential, city population, and inter-city transport costs affect income per worker. From this equation, we can calculate the total urban income in Brazil, s. t.

$$\begin{aligned} \text{total urban income} &= \sum_{i=1}^{123} \text{income per worker}_i \times \text{no. workers}_i \\ &\approx \sum_{i=1}^{123} X_i \hat{b}_{GMM} \times \text{no. workers}_i. \end{aligned}$$

2.37 Now suppose the government invests in transportation infrastructure. In Table 2.6, we compare the effect on total urban income of investments favoring big cities versus small cities. The first column is the total urban income relative to the baseline income when infrastructure investments favor largest cities, specifically a 1 standard deviation (.8) decrease in inter-city unit transport cost of largest cities. The baseline income is the predicted value of Table 2.2 (3). The second column is the total urban income when the same amounts are invested in the smallest cities to decrease those cities' transport cost by the same magnitude (.8). We experiment with several combinations of cities in Table 8.

2.38 The simulation results show that there are very small differences in total urban income from favoring small cities vis-à-vis large cities. These income differences range around 0.1 ~ 0.5%p of total urban income growth in 2000. The difference is highest when we favor the 104 smallest cities vis-à-vis than the largest two cities (.543%p). These results tell that there are no major gains in terms of overall urban income from diverting investments from the largest cities to secondary cities.

Summary of Findings

2.39 In this chapter, we examine the determinants of Brazilian city growth between 1970 and 2000. For the analysis, we construct a dataset of 123 agglomerations, and examine factors that influence wages and labor supply. Our main findings are the following:

- Increases in rural population supply is a major driver of city growth.
- Inter-regional transport improvements that lead to increases in the market potential of goods and reduce inter city transport costs stimulate growth. In fact, increases in market potential have the strongest impact on city growth.

- Improvements in labor force quality and the spillover effects of knowledge accumulation (measured by initial levels of education attainment) also have strong growth impacts.

2.40 In terms of inter regional transport improvements, the Brazilian government has made significant investments in infrastructure to integrate the national economy and lower business costs in peripheral regions. Most of the improvements in the road network occurred between the 1950s and 1980s, leading to significant reduction in transportation and logistics costs. Castro (2002) measures the benefits of improvements in highway infrastructure from 1970-1995 as the change in equivalent paved road distance from each municipality to the state capital of São Paulo, accounting for the construction of the network as well as the difference in vehicle operating costs between earth/gravel and paved roads. He shows that transport cost reductions were quite significant for the Northern region and Central region state of Mato Grosso, with numbers varying from 5,000 to 3,000 equivalent kilometers of paved road. Average reductions fall to the 1,000 km range in the Central region states of Goiás and Mato Grosso do Sul, the southern states, and the coastal northeastern states. Using this measure, Castro (2002) finds that the reduction in interregional transport costs was one of the major determinants of both the expansion of agricultural production to the central regions of Brazil after the 1960s as well as increases in the country's agricultural productivity.

2.41 Moving from regional initiatives to city level characteristics and innovations, our main findings are that local land use and zoning enforcement is positively associated with city growth, where as over-accumulation of public industrial capital which appears to crowd out private capital is negatively associated with growth. City growth is lower in cities which have high homicide rates.

Appendix A. Market potential measures

(1) Basic Market Potential

Market potential of agglomeration i is defined as the sum of its member MCAs' market potential. Therefore the market potential of agglomeration i in year t is

$$\sum_{k_i \in i} \left(\sum_{j=1}^{3659} \frac{y_j(t) \times pop_j(t)}{(Ad_{k_i,j}^\delta)^{\sigma-1}} \right).$$

where $y_j(t)$ is per capita income of MCA j in year t , and $pop_j(t)$ population of MCA j in year t . $d_{i,j}$ is the distance between MCA i and j (100 miles). The distance of own MCA ($d_{i,i}$) is the average distance to city center, which is equal to $\frac{2}{3} \sqrt{\frac{area}{\pi}}$. σ is assumed to be 2, δ is 0.3 (0.22 between two port cities), and A is such that $Ad_{i,j}^{0.3} = 1$ for the smallest land area city (Au and Henderson, 2004; Hummels, 2001).

(2) Incomes offered in local rural areas competing with own city for local population

The gravity measure of surrounding rural per capita incomes is a market potential measure of agglomeration i in year t , such that

$$\sum_{k_i \in i} \left(\sum_{\substack{j=1 \\ j \neq i}}^{3659} \frac{\text{rural GDP}_j(t) / \text{rural pop}_j(t)}{(Ad_{k_i,j}^\delta)^{\sigma-1}} \right).$$

The MP calculation does not include the rural per capita MCA incomes of the same agglomeration. All parameters are the same as (1). Rural GDPs of (1970, 1980, 1985, and 1996) are assigned to those of (1970, 1980, 1991, and 2000).

(3) Potential supply of people to the city from local rural areas

The gravity measure of surrounding rural population is also a market potential measure of agglomeration i in year t , such that

$$\sum_{k_i \in i} \left(\sum_{\substack{j=1 \\ j \notin i}}^{3659} \frac{\text{rural pop}_j(t)}{(Ad_{k_i,j}^\delta)^{\sigma-1}} \right)$$

The MP calculation is the same as (2).

(4) Market potential measure of agricultural land availability

The agricultural land market potential is calculated in the same way as (1), such that

$$\sum_{k_i \in i} \left(\sum_{j=1}^{3659} \frac{\text{agri land}_j(t)}{(Ad_{k_i,j}^\delta)^{\sigma-1}} \right)$$

where $\text{agri land}_j(t)$ is agricultural area of MCA j in year t . All parameters are the same as previous ones.

3. Urban Policies and Slum Formation

by
Somik Lall

3.1 **Relevant Issues:** *What is the impact of policy interventions on household welfare, especially among slum dwellers? How effective are the urban poverty-targeted programs?*

3.2 An estimated one-third of all urban residents live in informal settlements or slums – the vast majority in developing countries. Globally, almost one billion people live in slums (United Nations, 2003). In some developing country cities, one-half or more residents live in these inadequate settlements. Conditions in such areas vary widely from dismal, temporary shelter in squatter settlements to relatively well-constructed, informal housing that may persist for many decades. Common characteristics include uncertain tenure status, poor basic services such as water and sanitation, low-grade construction and overcrowded living conditions. Apart from physical deprivation, slum dwellers also often face more subtle disadvantages such as poor labor market integration and the social stigma attached to an inferior residential location. Children living in slums are deprived of access to good quality education and health services, which are not located in reasonably proximity of these settlements.

3.3 With continuing rapid growth of urban areas, improving the life of slum dwellers is a high priority for national and city governments and the international community. The Millennium Development Goals, for instance, advocate significant improvements in the lives of at least 100 million slum dwellers by 2020 (United Nations, 2005). However, at this time there is very little evidence on factors that influence the formation of slums and identifying the local and national policy environments that influence the capacity of cities to manage the growth of slums. In particular, it is essential to know if and how public policy can influence slum formation. The focus in this chapter is on the link between informal settlements (slums) and the supply response of the formal housing market. The proposed argument is that slum formation increases when housing supply in the formal housing market is inelastic and cannot accommodate increases in overall housing demand.

3.4 Across developing countries, housing demand has a number of regularities, which vary with income within and across countries in predictable ways (Malpezzi and Mayo, 1987). However, housing supply has been understudied so far and there is no firm consensus on the price elasticity of housing supply and the nature of housing supply (Green, Malpezzi, and Mayo, 2005). Recent research finds that housing supply elasticity varies significantly across cities within a country and across countries, and that these differences are mainly from restrictive zoning and other land use regulations (Saks, 2005; Glaeser, Gyourko, and Saks, 2005a,b; Green, Malpezzi, and Mayo, 2005; Quigley and Raphael, 2005). Most existing empirical studies are focused on developed countries, particularly the United States, and therefore market clearing is implicitly assumed: housing prices and housing stock adjust to external shocks, and housing market is in equilibrium. However, this market clearing assumption cannot be held in many developing countries where the capacity of the formal housing market is so limited that the urban poor and even middle income households resort to informal housing solutions.

3.5 We distinguish formal and informal housing sectors. When the formal housing sector in a city cannot provide enough housing stock due to various bottlenecks, city residents will solve housing demand from the informal sector and slums grow. In this regard, the price elasticity of housing supply measures the capacity of the formal housing sector to absorb urban migrants into the system. Inelastic housing supply limits housing stock adjustment in response to urban migration and expansion, and therefore bring about massive slum dwellings. We develop a slum formation model which accounts for this housing market disequilibrium. This model provides a framework for the empirical work. We estimate a reduced form equation for the formal housing market, and then a slum growth equation. By extending the slum growth equation, we examine the effects of local characteristics and local land use regulations on housing supply elasticity and slum growth in cities.

For the empirical analysis, we construct a dataset of Brazilian agglomerations from 1980 to 2000. Much of the underlying data come from the Brazilian Bureau of Statistics (IBGE) Population Census of 1980, 1991, and 2000. For the estimation, we make use of OLS and nonlinear OLS estimations and report robust standard errors when residuals are tested to be heteroskedastic. Our main findings are that the imputed price elasticity of housing supply in the Brazilian formal housing market is very inelastic, and therefore it serves as a major determinant of slum growth. In terms of local characteristics, we find that a city has inelastic housing supply and a higher slum growth rate, if a city (1) is in a semi-arid area, (2) has a centralized urban form where city population is concentrated in city centers rather than dispersed across city areas, (3) has higher transport / commuting costs, and (4) has minimum lot size regulations and land zoning laws which are supposed to be restrictive and excessively regulate urban land use. Similar to previous studies on the housing market in the United States, we draw the conclusion from Brazil that heavily regulated cities exhibit low housing supply elasticities. In addition, we find that the identified local factors, which are supposed to reduce housing supply elasticity, increases the growth of slums. It confirms our proposed linkage between housing supply elasticity and slum growth in cities. To the best of our knowledge, this is the first attempt at modeling slum growth in relation to housing market and examining the effects of local characteristics on housing supply elasticity and slum growth.

Slum Formation Across Cities

3.6 The urbanization and industrialization processes in Brazil began in the 1930s. As coffee prices were severely depressed after the Great Depression, the lack of foreign exchange from coffee export restricted the imports of industrial products and created new domestic demand for industrial production and urban labor. This demand for urban labor and the coffee driven agricultural collapse spurred massive urban migration.²² However, the urbanization process has been largely uncontrolled.²³ The access to urban land and housing has relied mostly on (1) the division of central and peripheral land (*loteamentos*) and (2) the invasion of public and private urban land (*favelas*). As a result, in main cities modern central areas are surrounded by irregular and illegal settlements which lack in drainage and sewerage systems, health and education facilities, and green spaces. Public transport is insufficient and expensive, and the quality of life in slums is very low.

3.7 There are three forms of slums in Brazil: Favelas, cortiços, and irregular/ clandestine loteamentos. Favelas are the most popular form of urban slums in Brazil.²⁴ They are precarious human settlements resulting from the invasion of both public and private urban areas. Those invaded areas are generally located close to city centers, but mostly unsuitable for human occupation due to geographical and ecological factors. They lack in almost every element of urban infrastructure and collective equipment.

3.8 Cortiços are high density collective housing in city centers. They are old and subdivided into small rooms with many fire and explosive hazards, few bathrooms, no formal rental relationships, no proof of payments, and often run by intermediaries connected to the police and criminals (Saule 1999). Irregular and clandestine loteamentos are usually developed in peripheral areas irregularly, if not also illegally. Irregular land divisions are in precarious technical conditions, and not registered in the public registry office. Loteamentos developed in areas of contested ownership are called “clandestine.” They differ from favelas, since the occupiers have bought their plots from whoever presented themselves as landowners, and in most of cases paid all due taxes.

3.9 We review overall slum formation in relation to city growth. The slum data are from the Brazilian Bureau of Statistics (IBGE) Population Censuses of 1980, 1991, and 2000.²⁵ It defines “subnormal

²² Krueckeberg and Paulsen (2000).

²³ Prior to the promulgation of the 1988 Constitution there was no adequate legal planning framework and corresponding institutional apparatus in force (Fernandes, 1997).

²⁴ The name comes from a mountain (Morro de Favela) in the center of Rio de Janeiro, occupied by squatters in 1906.

²⁵ Throughout the paper, we will refer the reader to Appendix B for a discussion of data sources and variable definitions.

agglomeration” as a set of (slums or related) houses that occupies other people's land (either public or private) and that, by and large, are structured in a disordered and densely way and that lack public services and utilities. The sample consists of 123 agglomerations, which includes 447 MCAs (Minimum Comparable Areas). In the empirical analysis, we focus on 72 agglomerations (335 MCAs) where slum data are observed for the sample period. Table 3.1 shows that the largest cities have higher absolute levels of slum formation in 2000. The four largest cities have about 9.1% of their residents living in sub standard dwellings. Slum formation is lower as one goes down the urban size distribution.

3.10 Figure 3.1 displays the ten fastest slum growth cities, which tend to be located along the coastline. This suggests that local and regional characteristics may influence city slum growth. Interestingly, Figure 3.2 and corresponding OLS regression show no statistically significant relationship between slum growth and city population growth. All these suggest that slum formation is a complicated process influenced by various city characteristics, rather than simply proportional to city size growth itself.

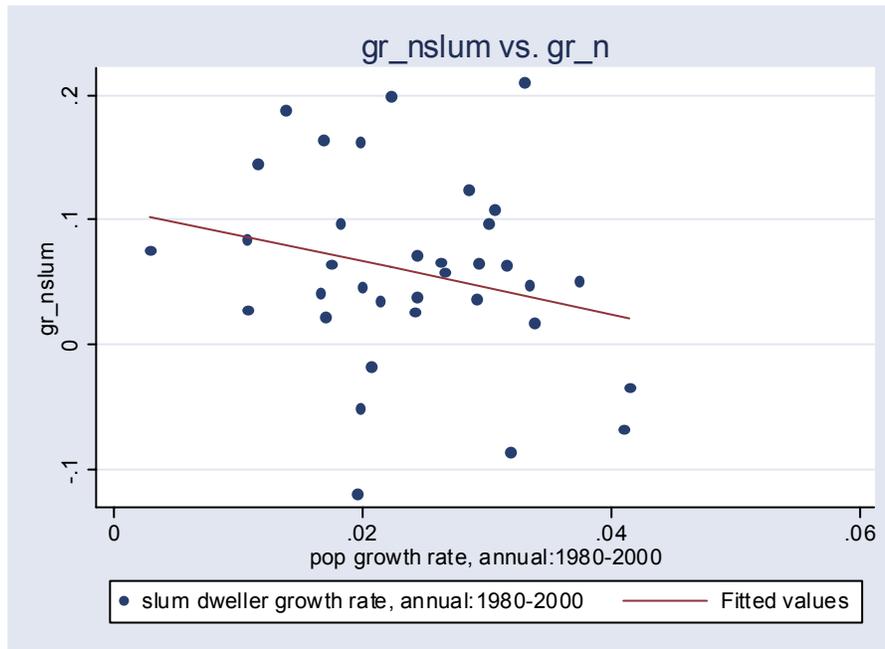
Table 3.1: Slum Formation Across City Sizes, 2000

city size	no. cities	no. population (a), 1000	no. slum dwellers (b), 1000	Slum share (b/a, %)	no. housing stock, 1000	no. formal houses / no. total houses (%)
Largest (5.301 ≤ pop/mean)	4	39,095.6	3,566.4	9.12	11,409.6	91.78
(1.340 ≤ pop/mean < 5.301)	11	25,260.3	1,583.4	6.27	6,786.9	94.18
(0.812 ≤ pop/mean < 1.340)	14	11,682.8	302.5	2.59	3,160.4	97.62
(0.469 ≤ pop/mean < 0.812)	17	7,699.9	154.7	2.01	2,098.7	98.20
(0.256 ≤ pop/mean < 0.469)	20	5,879.1	81.1	1.38	1,624.3	98.80
Smallest (pop/mean < 0.256)	57	7,333.5	87.8	1.20	2,046.8	98.86
Total	123	96,951.3	5,775.9	5.96	27,126.6	94.51

Figure 3.1 Cities with the Fastest Slum Formation between 1980 and 2000



Figure 3.2 Slum Dweller Growth and City Population Growth between 1980 and 2000



OLS:

$$\ln\left(\frac{slum_dwellers_{2000}}{slum_dwellers_{1980}}\right)^{(1/20)} = -2.11 * \ln\left(\frac{pop_{2000}}{pop_{1980}}\right)^{(1/20)} + 0.109$$

(-1.45) (2.92)

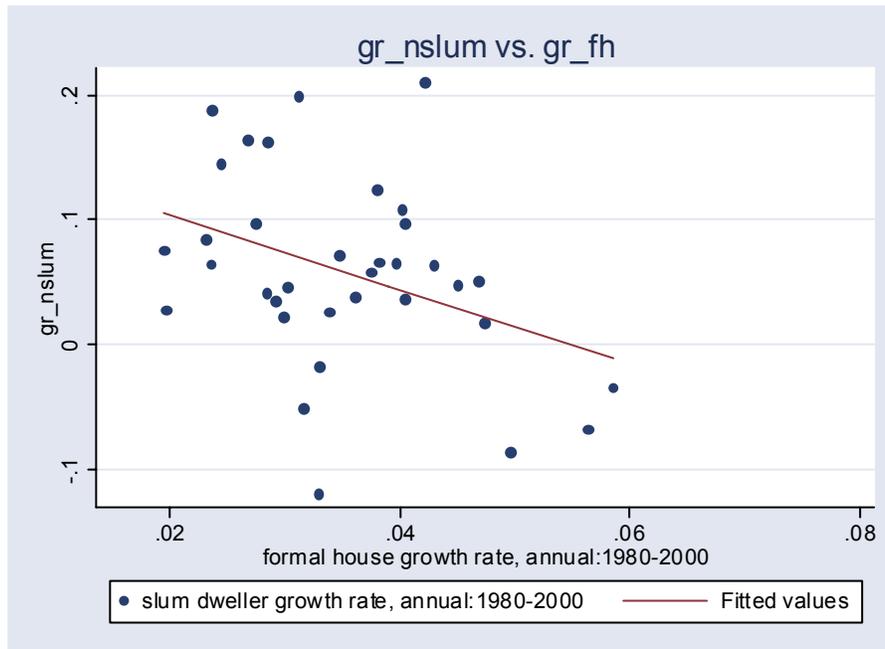
N=35, adj R² = 0.031, t-values in parentheses.

3.11 We propose that slums grow when the capacity of the formal housing market is limited and cannot accommodate an increase in overall housing demand. The capacity of the formal housing market or the housing supply adjustment in response to housing demand changes can be represented by the price elasticity of housing supply. Then a corollary of our proposition is that slum growth rates will differ across cities as cities have heterogeneous housing supply elasticities due to different local backdrops and housing supply bottlenecks.

3.12 Figure 3.3 and corresponding OLS result show a statistically significant and negative relationship between the slum growth and the growth of formal housing stock for 1980-2000.²⁶ For example, the two cities in the bottom right of Figure 3.3 are Cuiabá and Campo Grande. These two cities successfully increased formal housing stock at the annual growth rates of 5.9% and 5.6% respectively between 1980 and 2000, and were able to manage slum formation (slum growth rates are -3.5% and -6.9% annually).

²⁶ Formal housing stock is defined by the difference between the number of total housing units and the number of slum units.

Figure 3.3 Slum Dweller Growth and Formal Housing Stock Growth between 1980 and 2000



OLS :

$$\ln\left(\frac{slum_dwellers_{2000}}{slum_dwellers_{1980}}\right)^{(1/20)} = -2.99 * \ln\left(\frac{formal_houses_{2000}}{formal_houses_{1980}}\right)^{(1/20)} + 0.163$$

(-2.32)

(3.48)

N=35, adj R² = 0.114, t-values in parentheses.

Housing Supply and Slum Formation

3.13 We postulate that slums are a response to close the gap between overall housing demand and formal housing supply of the city. If formal housing supply is elastic, a rise in housing demand will be accommodated by an increase in housing supply without significant rise in housing price. However, if housing supply is inelastic, housing demand increase cannot be met by sizable housing supply increase and therefore housing price will rise significantly. It forces city residents to resort to informal housing solutions and slums grow.

3.14 The slum formation model in relation to the housing market is formulated as follows. The share of people living in slums of city *i* in year *t* can be approximated such that

$$slum_share_{it} = (N_{it} - FN_{it}) / N_{it} \approx \ln N_{it} - \ln FN_{it} . \tag{1}^{27}$$

After solving for $\ln FN_{it}$ and substituting we can get the following equation:

²⁷ $slum_share_{it} = (N_{it} - FN_{it}) / N_{it} = 1 - FN_{it} / N_{it} \approx -\ln(FN_{it} / N_{it}) = \ln N_{it} - \ln FN_{it} .$

$$slum_share_{it} = \frac{\alpha_0\beta_1 + \alpha_1\beta_0}{\alpha_3\beta_1} + \frac{\alpha_2}{\alpha_3} \ln Y_{it} - \frac{\alpha_1 + \beta_1}{\alpha_3\beta_1} \ln FH_{it} + \ln N_{it}. \quad (2)$$

3.15 In the model, slums are created to close the gap between the overall housing demand and the formal housing supply in a city. This specification is also consistent with a general agreement that, in principle, city (population) growth could be completely determined by other variables, with the housing supply simply responding to those factors.²⁸ Slum growth is an outcome of city population growth and housing supply adjustment. By log transformation and simple manipulation, we get the following slum formation equation.²⁹

$$\ln(slum_share_{it}) = \left(\frac{\alpha_0}{\alpha_1} + \beta_0 b_1 + \ln \left(\frac{\alpha_1}{\alpha_3} \right) - 1 \right) + \frac{\alpha_2}{\alpha_1} \ln Y_{it} - \left(\frac{1}{\alpha_1} + b_1 \right) \ln FH_{it} + \frac{\alpha_3}{\alpha_1} \ln N_{it} \quad (3)$$

, where $b_1 \equiv 1/\beta_1$. An advantage of this transformation from eq. (4) to eq. (5) is that we can directly estimate key parameter values.

The demand and supply shift terms of the formal housing market (α_0, β_0) may vary across years. With a simple approximation such that $\alpha_0 = \overline{\alpha_0} + \overline{\alpha_0} \cdot t$ and $\beta_0 = \overline{\beta_0} + \overline{\beta_0} \cdot t$ in year t , and first differencing, we can obtain a formal housing stock growth equation and a slum growth equation.

$$\Delta \ln FH_{it} = \frac{\overline{\alpha_0}\beta_1 + \alpha_1\overline{\beta_0}}{\alpha_1 + \beta_1} + \frac{\alpha_2\beta_1}{\alpha_1 + \beta_1} \Delta \ln Y_{it} + \frac{\alpha_3\beta_1}{\alpha_1 + \beta_1} \Delta \ln FN_{it} \quad (2')$$

$$\Delta \ln(slum_share_{it}) = \left(\frac{\overline{\alpha_0}}{\alpha_1} + \overline{\beta_0} b_1 \right) + \frac{\alpha_2}{\alpha_1} \Delta \ln Y_{it} - \left(\frac{1}{\alpha_1} + b_1 \right) \Delta \ln FH_{it} + \frac{\alpha_3}{\alpha_1} \Delta \ln N_{it} \quad (5')$$

Heterogeneous Housing Supply Elasticities

²⁸ Glaeser, Gyourko, and Saks (2005b).

²⁹ By substituting $b_1 \equiv 1/\beta_1$, we can get.

$$slum_share_{it} = \left(\frac{\alpha_0}{\alpha_3} + \frac{\alpha_1\beta_0}{\alpha_3} b_1 \right) + \frac{\alpha_2}{\alpha_3} \ln Y_{it} - \left(\frac{1}{\alpha_3} + \frac{\alpha_1}{\alpha_3} b_1 \right) \ln FH_{it} + \ln N_{it}. \text{ Or}$$

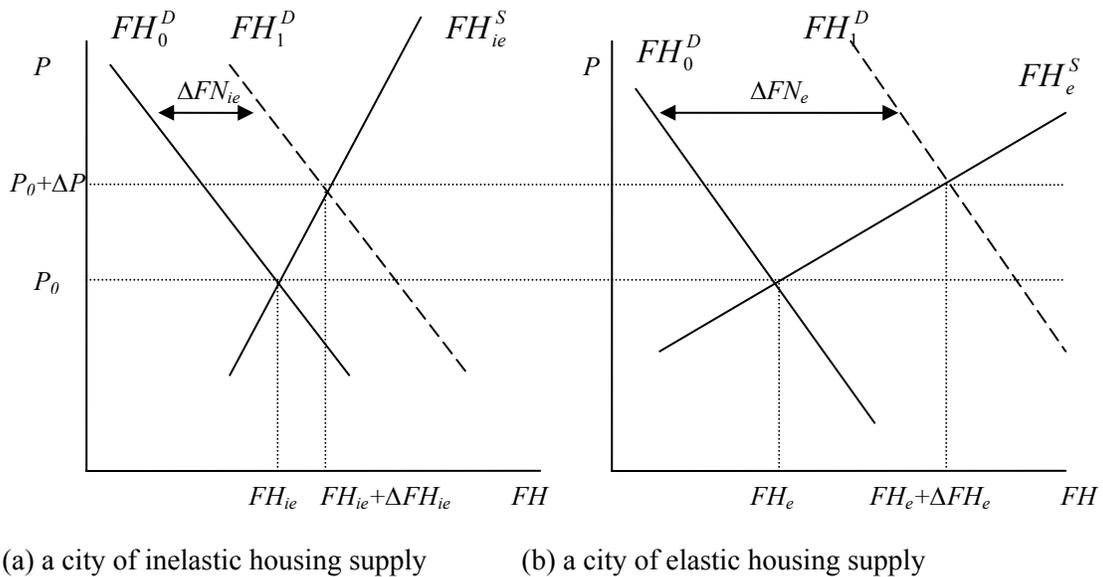
$$slum_share_{it} = \frac{\alpha_1}{\alpha_3} \cdot \left\{ \left(\frac{\alpha_0}{\alpha_1} + \beta_0 b_1 \right) + \frac{\alpha_2}{\alpha_1} \ln Y_{it} - \left(\frac{1}{\alpha_1} + b_1 \right) \ln FH_{it} + \frac{\alpha_3}{\alpha_1} \ln N_{it} \right\} \equiv \frac{\alpha_1}{\alpha_3} \cdot f(b_1).$$

Since $\ln(slum_share_{it}) = \ln \left(\frac{\alpha_1}{\alpha_3} \right) + \ln(f(b_1))$ and $\ln(f(b_1)) \approx f(b_1) - 1$,

$$\ln(slum_share_{it}) = \left(\frac{\alpha_0}{\alpha_1} + \beta_0 b_1 + \ln \left(\frac{\alpha_1}{\alpha_3} \right) - 1 \right) + \frac{\alpha_2}{\alpha_1} \ln Y_{it} - \left(\frac{1}{\alpha_1} + b_1 \right) \ln FH_{it} + \frac{\alpha_3}{\alpha_1} \ln N_{it}.$$

3.16 The price elasticity of housing supply is reported to vary significantly across cities within a country and across countries, as listed above. The effects of different housing supply elasticities on housing supply adjustment and slum growth are illustrated in Figure 3.4. Suppose two cities which are identical except for different housing supply elasticities: (a) a city of low price elasticity of housing supply and (b) a city of high price elasticity of housing supply. And assume that there is the same population growth due to migration ($\overline{\Delta N}$).³⁰ The population growth increases overall housing demand and therefore pushes up housing prices. Suppose two cities have the same housing price increase ($\overline{\Delta P}$). Even though two cities show the same population growth and housing price increase, the housing supply adjustment and slum growth will differ between two cities due to different housing supply elasticities.

Figure 3.4 Housing Supply Elasticity and Slum Formation



3.17 For the city of inelastic housing supply, the supply adjustment responding to housing price increase ($\overline{\Delta P}$) is limited and only accommodate a small fraction of population growth (ΔFN_{ie}). However, the city of elastic housing supply responds to the same housing price rise by a significant increase in housing stock, and therefore accommodate more city population ($\Delta FN_e > \Delta FN_{ie}$). Since $\overline{\Delta N} = \Delta FN + \Delta slums$, the slum growth in the city of elastic housing supply is lower than that of inelastic housing supply ($\Delta slums_e < \Delta slums_{ie}$).

3.18 As illustrated in Figure 3.4, the price elasticity of housing supply may differ across cities in year t such that $\beta_1 = \beta_{1,it}$. We postulate that the price elasticity of housing supply in city i in year t ($\beta_{1,it} \equiv 1/b_{1,it}$) is

³⁰ As discussed above, in principle, city (population) growth could be completely determined by other variables, with the housing supply simply responding to those factors.

influenced by various local characteristics in the base year including local regulatory and policy environments. We approximate it by

$$\frac{1}{\beta_{1,it}} \equiv b_{1,it} = \gamma_0 + \sum_k \gamma_k X_{k,i(t-1)} \quad (6)$$

, where $X_{k,i(t-1)}$ are city characteristics in the base year ($t-1$) which influence housing supply adjustment. Substituting eq. (6) into eq. (5'), we can get a reduced form slum growth equation incorporating local characteristics which affect housing supply adjustment.

$$\begin{aligned} \Delta \ln(\text{slum_share}_{it}) = & \left(\frac{\alpha_0}{\alpha_1} + \overline{\beta_0} \gamma_0 \right) + \sum_k \left(\overline{\beta_0} \gamma_k \right) X_{k,i(t-1)} + \frac{\alpha_2}{\alpha_1} \Delta \ln Y_{it} \\ & - \left(\frac{1}{\alpha_1} + \gamma_0 \right) \Delta \ln FH_{it} - \sum_k \gamma_k \left(X_{k,i(t-1)} \cdot \Delta \ln FH_{it} \right) + \frac{\alpha_3}{\alpha_1} \Delta \ln N_{it}. \end{aligned} \quad (7)$$

3.19 An advantage of this transformation is that from eq. (7) we can directly estimate parameters of $\overline{\beta_0}$ and γ_k by nonlinear OLS estimation. In this way, we can examine the effects of specific local characteristics on local housing supply elasticity and slum growth.

3.20 If the parameter estimate of γ_k is significantly negative, it suggests that the local characteristics $X_{k,i(t-1)}$ increases (formal) housing supply adjustment and therefore reduces slum growth. In the same way, significantly positive parameter estimate of γ_k suggests that the local characteristics $X_{k,i(t-1)}$ is a main bottleneck to elastic housing supply adjustment and therefore a major determinant of slum growth. Local policy priority to manage slum growth should be focused on eliminating major bottlenecks and improving the housing supply capacity of cities to absorb the city poor into formal housing markets and provide them better tenure status, better basic services such as water and sanitation, better labor market integration, and higher quality of life.

3.21 For the city of inelastic housing supply, the supply adjustment responding to housing price increase ($\overline{\Delta P}$) is limited and only accommodate a small fraction of population growth (ΔFN_{ie}). However, the city of elastic housing supply responds to the same housing price rise by a significant increase in housing stock, and therefore accommodate more city population ($\Delta FN_e > \Delta FN_{ie}$). Since $\overline{\Delta N} = \Delta FN + \Delta slums$, the slum growth in the city of elastic housing supply is lower than that of inelastic housing supply ($\Delta slums_e < \Delta slums_{ie}$).

Findings from Empirical Analysis

3.22 Table 3.2 is the results from estimating the **formal housing stock growth equation**. It assumes the price elasticity of housing supply is the same across Brazilian cities: *homogeneous housing supply elasticity*. It pools two periods of formal housing stock growths (2000-1991 and 1991-1980), and reports OLS results with Breusch-Pagan /Cook-Weisberg test for heteroskedasticity. We cannot reject the null hypothesis of homoskedasticity. Column 1 is for all the cities in the sample (123 cities), and column 2 is a subset of 72 cities where we observe slums data. We focus on column 2 results for comparison with the slum growth model results which use a sample of 72 cities. All coefficient estimates in column 2 are significant and have expected signs. Growths in income per capita and city population in formal houses increase the growth rate of formal housing stock in a city.

Table 3.2 Formal Housing Stock Growth Equation

Dependent variable:	(1)	(2)
$\Delta \ln(\text{formal housing stock})$	OLS	OLS
$\Delta \ln(\text{income per capita})$	0.020 (0.016)	0.051*** (0.020)
$\Delta \ln(\text{no. people in formal Houses})$	0.958*** (0.017)	0.948*** (0.019)
time dummies	Yes	Yes
Observations	246	144
(no. cities)	(123 cities)	(72 cities)
Adjusted R ²	0.945	0.956
Test for heteroskedasticity ^a		
$\chi^2(1)$	1.60	0.99
(p-value)	(0.206)	(0.321)

*** significant at 1% level; ** significant at 5% level; * significant at 10% level.

3.23 As illustrated in Figure 3.4, if a city's housing supply is elastic, an outward shift in housing demand results in a larger increase in housing stock and a relatively modest housing price increase. However, if housing supply is inelastic, we expect a shortage of housing stock and housing price will rise significantly. In this regard, the level of price elasticity of housing supply has an important policy implication. However, we cannot directly measure the housing supply elasticity due to a standard identification problem.³¹ Malpezzi and Mayo (1997) and Malpezzi and Macleannan (2001) solved this problem by assuming the housing demand elasticities to be in a certain range.

3.24 Malpezzi and Mayo (1997) suggested that reasonable bounds for the price elasticity of housing demand would be between -0.5 and -1.0, and the long-run income elasticity between 1.0 and 1.5. Malpezzi and Macleannan (2001) also proposed similar bounds for the United States and the United Kingdom: between -0.5 and -1.0 for the price elasticity of demand, and between 0.5 and 1.0 for the long-run income elasticity of demand. Table 5 calculates the imputed price elasticity of housing supply (β_1) based on coefficient estimates. The calculation is from a range of assumptions about housing demand elasticities (α_1, α_2) mentioned above. We assume the price elasticity of housing demand (α_1) to be between -0.5 and -1.0, and the income elasticity of housing demand (α_2) between 0.5 and 1.5. The imputed price elasticity of housing supply based on the coefficient estimates of column 2 in Table 3.2 is reported in column 3. It turns out to be very inelastic ranging between 0.02 and 0.1. Inelastic housing supply suggests that the formal housing market in Brazil could not respond to outward shifts of housing demand from urban migration and created massive slum dwellings in cities.

3.25 When comparing other countries in column 5 and afterwards, the imputed Brazilian housing supply elasticity is similar to those in Malaysia and South Korea, which were regarded to have restrictive regulatory environments. It is quite different from the elastic housing supply of the United States where housing supply

³¹ In eq. (2'), we have 4 parameters ($\alpha_1, \alpha_2, \alpha_3, \beta_1$) and 2 coefficient estimates $\left(\frac{\alpha_2 \beta_1}{\alpha_1 + \beta_1}, \frac{\alpha_3 \beta_1}{\alpha_1 + \beta_1} \right)$.

elasticity ranges between 6 and 19. However, this interpretation has its limitation that the housing supply in Brazil is measured by the number of houses rather than the amount of housing services including quality adjustment.

3.26 **Results for slum growth estimation** are reported in column 1 of Table 3.3. Again, for the estimation we pool two periods (2000-1991 and 1991-1980) and focus on 72 cities where we observe slum data. Since the test for heteroskedasticity shows OLS residuals are not homoskedastic, we report robust standard errors which allow for differences in the variance / standard errors due to arbitrary within-region correlation.³² We assume the observations may be correlated within five regions, but would be independent between regions.³³ As shown in da Mata et al. (2005), clustered estimation results are also robust to residual spatial dependence.³⁴ We use the same error specification for all slum growth estimations.

Table 3.3 Slum Growth Equation
(robust standard errors in parentheses)

Dependent variable: $\Delta \ln(\text{share of people in slum dwellings})$	(1) OLS	(2) Nonlinear OLS	(3) Nonlinear OLS
$\Delta \ln(\text{income per capita})$	0.022** (0.008)	0.019** (0.006)	0.018** (0.005)
$\Delta \ln(\text{no. formal houses})$	-0.513*** (0.097)	-0.505*** (0.105)	-0.498*** (0.109)
$\Delta \ln(\text{city population})$	0.480*** (0.089)	0.477*** (0.095)	0.476*** (0.095)
γ_k :			
Dummy for semi arid area		0.124*** (0.024)	0.127*** (0.017)
Std. dev. / mean of altitude			0.014 (0.048)
$\bar{\beta}_0$		0.315*** (0.013)	0.318*** (0.011)
time dummies	Yes	Yes	Yes
Observations	144	144	144
R^2	0.608	0.621	0.621

*** significant at 1% level; ** significant at 5% level; * significant at 10% level.

³² Breusch-Pagan / Cook-Weisberg test for heteroskedasticity rejects the null hypothesis of constant variance ($\chi^2(1)=59.59$, p-value = 0.00).

³³ Five regions are North, Northeast, Southeast, South, and Central-West regions.

³⁴ da Mata et al. (2005) finds that clustered GMM and OLS results are very similar to two-step spatial GMM and spatial OLS ones which were developed by Conley (1999).

3.27 All variables in column 1 of Table 3.3 have strong and expected sign coefficients. Slum growth is positively related with the growth of a city's total income per capita and city population growth, and negatively related with the growth of formal housing stock. Income growth increases housing demand, and assuming upward sloping housing supply curve it raises housing price. As raised housing prices are not affordable to some urban poor households, they resort to informal housing solutions. However, this effect is not strong: a 10% increase in per capita income raises slum growth by 0.2 % over a decade. Both city population growth and growth of formal housing stock have fairly strong effects on slum growth rates in similar magnitude: a 10% increase in formal housing stock decreases slum growth by 5% over a decade, and a 10% increase in city population raises slum growth by 5% over a decade.

3.28 The imputed price elasticity of housing supply (β_1), which is calculated based on coefficient estimates of column 1 of Table 3.3, is listed in column 4 of Table 5. The calculation is also based on a range of assumptions about housing demand elasticities, mentioned above. The imputed housing supply elasticities range between 0.47 and 0.50, which are higher than those from the formal housing stock growth estimation, but still very inelastic. Two results confirm that the price elasticity of housing supply in Brazil is very inelastic and therefore causing a major bottleneck in housing stock increases in response to urban migration. Slum growth is a natural outcome of this inability of the formal housing sector to increase housing supply.

3.29 Inelastic housing supply adjustment in response to urban migration brings about a shortage of housing units and the urban poor will resort to informal houses in order to solve housing problem. The elasticity of housing supply in a city or the capacity of a city to increase housing stock in response to housing demand shifts will be determined by various city characteristics, such as geographical constraints, densification and centralization of city population and economic activities within a city, infrastructure provisions including transportation systems, and local land use regulations.

3.30 In Table 3.3 and Table 3.4, we examine how various city characteristics influence the capacity of cities to increase housing supply in response to city population increase and therefore the capacity of cities to manage slum growth. Columns 2 and 3 in Table 3.3 examine the effects of geo-climate constraints on housing supply adjustment and slum growth. A dummy for semi-arid areas has a statistically significant and positive coefficient, suggesting cities in semi-arid areas have lower housing supply elasticities and higher slum growth rates. Provision of serviced land with water and sanitation will be difficult in semi-arid areas, and therefore restrict housing supply expansion. Availability of land for housing will also be limited, if a city is located in hilly areas. We do not have an exact measure of geographical steepness or variation in altitude within a city, but can obtain a proxy by calculating the coefficient of variation of average altitudes in MCAs within an agglomeration.³⁵ However, the estimate in column 3 is not significant. It may be because our proxy variable poorly measures the actual land availability.

3.31 In Table 3.4, we examine the effects of city characteristics in detail. First, we look at slum growth in a context of residential location decision. A standard urban residential choice and spatial equilibrium model in monocentric cities predicts higher transport costs push people to live close to city centers where they commute to work. High concentration of city population around city centers limits land availability for housing, and therefore will cause inelastic housing supply adjustment. That negative effects can be alleviated, if jobs are decentralized from city centers, or if a city is polycentric rather than monocentric.

³⁵ The coefficient of variation in a distribution is defined as its standard deviation divided by its mean.

Table 3.4 Slum Growth Equation (II)
(robust standard errors in parentheses)

Dependent variable: $\Delta \ln(\text{share of people in slum dwellings})$	(1) Nonlinear OLS	(2) Nonlinear OLS	(3) Nonlinear OLS
$\Delta \ln(\text{income per capita})$	0.014* (0.006)	0.017** (0.005)	0.016** (0.006)
$\Delta \ln(\text{no. formal houses})$	-0.340** (0.113)	-0.343** (0.103)	-0.318** (0.104)
$\Delta \ln(\text{city population})$	0.481*** (0.076)	0.493*** (0.073)	0.496*** (0.068)
γ_k :			
semi arid area dummy	0.137*** (0.025)	0.119*** (0.017)	0.116*** (0.015)
Std. dev. / mean of Population in a city ($t-1$)	-0.031 (0.018)	-0.040* (0.018)	-0.042** (0.016)
$\ln(\text{inter-city transport costs, } t-1)$	0.232*** (0.021)	0.247*** (0.020)	0.220*** (0.036)
state capital dummy	0.221*** (0.034)	0.233*** (0.025)	0.201*** (0.037)
% of population under minimum lot size regulations ^b		0.067** (0.017)	0.063** (0.022)
% of population under land zoning laws			0.066 (0.035)
$\overline{\beta_0}$	0.333*** (0.015)	0.339*** (0.017)	0.338*** (0.016)
time dummies	Yes	Yes	Yes
Observations	144	144	144
R ²	0.655	0.662	0.667

*** significant at 1% level; ** significant at 5% level; * significant at 10% level.

3.32 We measure transport costs per a unit distance by the variable “inter-city unit transport costs” which is the transport cost from each city to its state capital divided by distance between two cities. Even though it is not an

exact measure of “inner-city” unit transport costs, it represents the quality of transportation infrastructure in a city and therefore can be a proxy for inner-city transport costs. Since we only have 1968, 1980, and 1995 transport cost data, we use 1980 values for slum growth for 1991-1980, and use 1995 values for 2000-1991. We give zero values to $\ln(\text{inter-city transport costs})$ of state capital cities and insert a dummy for state capitals. We measure the city population decentralization by the coefficient of variation of city population, again using MCA level populations within an agglomeration. A higher value represents more job decentralization within a city.

3.33 Column 1 in Table 3.4 indeed shows the patterns we propose. Most of variables are significant and have expected signs: only the coefficient of variation of city population is not significant by a narrow margin, but do have an expected sign.³⁶ However, as shown later, when we control for other city attributes, it becomes significant. Inter-city transport costs in base year reduce housing supply elasticity and increase slum growth rate. Slum growth can be reduced if a city has a more dispersed population distribution.

Columns 2 and 3 in Table 3.4 examine the effect of land use regulations on housing supply elasticity and slum growth. We use (i) percentage of city population under minimum lot size regulations below 125m², (ii) percentage of city population under urban land zoning laws. Minimum lot size regulations restrict the construction of substandard small size housing units which are mainly for the poor, and therefore limit housing supply adjustment and slums grow. Land zoning regulation itself may not bring about inelastic housing supply, if well planned and efficiently implemented. However, in most of developing countries, zoning regulations are too restrictive and rigid to incorporate ever-changing city dynamics, in particular, during massive urban migration. Ill-maintained excessive zoning regulations will limit efficient use of urban land which needs redevelopment and recycling on a regular basis. In this respect, we expect a positive coefficient estimate.

3.34 We use land use regulations as of 1999. Since municipalities enacted land zoning laws and parcel laws, where minimum lot size regulations are stipulated, way back from 1979, we assume those two variables have a historical perspective influencing housing supply adjustment in our sample period. The coefficient estimates of the minimum lot size regulation variables in columns 2 and 3 have statistically significant and positive signs, suggesting a negative effect of minimum lot size regulations on housing supply elasticity and therefore it increases slum growth rate. The coefficient estimate of percentage of population under urban land zoning laws has an expected positive sign, but fails to be significant at a narrow margin (p-value is 0.13).

Summary

3.35 Our main findings are the following:

- The price elasticity of housing supply in the Brazilian formal housing market is very low. Inelastic housing supply significantly limits housing supply adjustment in response to housing demand increases, and therefore slums grow.
- Natural constraints such as semi-arid areas limits a city’s capacity to increase housing supply and raises slum growth rate.
- A standard residential choice model in monocentric cities explains how urban forms and transport costs influence housing supply response and slum formation: high transport costs and large concentration of city population in city centers reduce housing supply expansion and slums grow.
- Urban land use regulations have strong negative effects on housing supply elasticity, and therefore the slum growth is higher in highly regulated cities.

3.36 These findings have significant policy implications for local governments and urban planning authorities, as improving the life of slum dwellers and managing slum growth become high priorities for national and city governments and the international community. Local government’s role should be as facilitator rather than

³⁶ P-value is 0.16.

provider, encouraging development and involvement of the private sector in the housing provision. Local governments need to overhaul and reform inappropriate, excessively detailed and inflexible regulatory and legal frameworks. Existing urban planning strategies and regulations should also be reviewed to utilize the importance of urban form and transportation infrastructure in relation to housing supply elasticity and slum growth.

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4. The Evolution of Brazilian Municipal Finances, 2000-2004

by
Fernando Blanco

Introduction

4.1 The fiscal situation of Brazilian municipal governments has been experiencing a significant improvement. The turnaround on the fiscal stance resulted in the generation of increasing fiscal balances. As a consequence fiscal sustainability indicators improved. This improvement has been observed at the aggregate level as well as at the individual one. In fact, the great majority of the municipal government units have adopted a tight fiscal stance that allowed them to improve their financial indicators.

4.2 However, it is important to point out that the fiscal situation of the largest municipalities has suffered some deterioration. The importance of these municipalities on the aggregate municipal level has partially masked the very sound fiscal performance observed for most of the Brazilian municipalities.

4.3 The fiscal adjustment of the public sector, the enactment of the Fiscal Responsibility Law in 2000 and the imposition of strong credit access restrictions have favored the improvement of municipal fiscal accounts. First, municipal governments have accompanied the adjustment efforts of the federal government to generate increasing primary surpluses, which have in turn contributed to the overall improvement in Brazil's fiscal accounts.

4.4 Besides the own improvement on fiscal balances, the fiscal adjustment has promoted positive developments in municipal public finances. The difficult financial situation stimulated the enhancement of tax collection effort which was expressed in a strong increase on municipal tax revenues and made municipalities less dependents on transfers from federal and state governments.

4.5 On the expenditure side, municipalities have tried to interrupt the increasing path of personnel expenditures with partial success. Lack of new enrollment processes, better control on payroll bills and a conservative wage adjustment policy were adopted to keep personnel expenditures under control. The outsourcing of some services has shifted part of the personnel expenditures to the other current expenditures category (non-personnel operating expenditures), promoting a seeming reduction of personnel expenditures. However the social security benefits to retired municipal employees and constitutional obligations of minimum levels of expenditures continue to exert an upward pressure on municipal expenditures.

The fall on non-personnel operating expenditures also reflects the adoption of a series of measures aimed at improving the public spending control of purchase and procurement systems that reduced the operating costs. Finally, debt service has not exerted a significant pressure on municipal finances, except for the largest municipalities. The low level of indebtedness of most of Brazilian municipalities and the debt renegotiation agreements between the National Treasury and about 180 largest municipalities that set a ceiling for debt service payments (13% of net revenues) explains the low pressure of this expenditure category on the public finances of most of the municipal government units.

4.6 The increase of current account savings allowed the improvement of municipal financial indicators. The interest payment coverage and the investment coverage indices exhibited significant improvements which indicate that municipalities are able to generate sufficient cash flows to pay their debt service obligations and finance most of their investment expenditures.

4.7 Second, the Fiscal Responsibility Law (FRL) has decisively favored the fiscal adjustment of municipalities. With the landmark Fiscal Responsibility Law, Brazil has made great strides toward institutionalizing fiscal discipline at all three levels of government. The prohibition of refinancing operations between level of government, the establishment of ceilings for key fiscal variables and the enhancement of fiscal transparency promoted a revolution in Brazilian public finances. Additionally, the establishment of ceilings for

indebtedness, for credit operations, for personnel for expenditures, debt service payments and the observance of the golden rule has reinforced the tendency for the adoption of prudent fiscal stances by municipalities.

4.8 Besides the consolidation of fiscal responsibility, the Fiscal Responsibility Law fostered the strengthening of fiscal transparency and planning. The FRL requires the government units the public disclosure of fiscal and planning information including the Multi Annual Plans (PPA), Budgetary Guidelines Laws (LDO); the Annual Budget Law (LOA), and the bimonthly Summary Budget Execution Reports (RREO) and Fiscal Management Reports (RGF).

4.9 In order to fulfill the FRL this requirements, municipalities have continuously improved the quality of its fiscal accounts information. Progress has also been made in the standardization of norms and accounting procedures used in the reports of fiscal management and budget execution by an increasing number of the municipal governments. Also, the coverage of the fiscal information was amplified with the inclusion of the indirect administration in the fiscal accounting systems of municipalities.

4.10 Fiscal planning was also strengthened. The FRL stimulated a closer relationship between multi-annual plans, budgetary guidelines and annual budget laws and also a closer integration of budgeting, accounting and financial execution which should enhance the efficiency of municipal resource management and the creditworthiness of the municipal governments that were successful in the adoption of these FRL requirements.

4.11 Third, the imposition of hard domestic credit supply constraints has guaranteed the generation of municipal positive primary results trough the constraint of municipal public investment. Basically, the CMN resolutions establish two type of limitations: i) set a ceiling of 45% of equity exposure of domestic financial institutions to the borrowing of the public sector and ii) set global limits of domestic credit to the public sector. The first limitation is particularly binding for the *Caixa Econômica Federal* (CEF) and *Banco Nacional de Desenvolvimento Econômico e Social* (BNDES), two federal financial institutions which constitute the most important source of credit supply for municipal governments. Given the very low global ceilings for domestic credit to public entities, the second type of limitation in fact has blocked the access to credit by municipalities³⁷.

4.12 As a consequence domestic credit operations to municipalities were drastically reduced inhibiting municipal investment expenditures. The domestic credit restrictions constrained the municipal investment expenditures and amplifying the gap between municipal investment needs and resource availability. Additionally, given the overall public sector fiscal adjustment, the federal and state governments have reduced the capital transfers to municipalities deepening the gap making current account savings the main financing source for municipal investments.

4.13 The need positive primary balances in a context of increasing budget rigidity led to the reduction of the fiscal space for investments. The increasing share of mandatory expenditures as personnel expenditures and debt service obligation and the establishment of new earmarking schemes in social sectors have reduced the space of maneuver for expenditure cuts, forcing municipal governments to concentrate the expenditure adjustment on discretionary expenditures affecting infrastructure investments.

4.14 Despite the overall improvement of Brazilian municipal finances important risks still remains. At this respect, the major source of vulnerability of municipal finances continues to be personnel expenditure which is the most important expenditure category. As mentioned above, the Fiscal Responsibility Law restriction on personnel expenditures which set a ceiling of 60% of Net Current Revenues (NCR) for this expenditure category, forced municipalities to adopt a tight control on personnel expenditures. However, as the personnel expenditure containment measures adopted and their effect are temporary, more structural measures need to be implemented to guarantee that the increasing trend of this expenditure item will not be resumed in the medium term.

³⁷ The National Monetary Council issued resolutions 2827 (March 2001), 2920 (December 2001), 2954 (April 2002), 3049 (November 2002), and subsequent resolutions - issued in 2003-2004 – with the objective to limit the access to credit operations by government entities. The subsequent resolutions renewed the period of these credit restrictions and allowed some exceptions for the finance of specific infrastructure investments (sanitation).

4.15 In particular, the upward trend of social security benefits for retired public employees continues to be the structural threat for the continuity of the personnel expenditure containment. The municipal employees' social security system is a pay as you go system and presents very large actuarial deficits that indicate potential increase on personnel expenditures in the future.

4.16 The imbalances in the social security system are a major preoccupation affecting the financial health of all three administrative levels - central, state and municipal - in Brazil. Over the past few years, two Constitutional Amendments were introduced in an attempt to reduce this imbalance by modifying the rules governing social security. However, the impact on municipal personnel expenditures should be limited and further reform measures need to be adopted in order to reduce the imbalances of the social security system for municipal employees.

4.17 Other source of budget rigidity also comes from the proliferation of constitutional revenue earmarking schemes directed to privilege budget allocations in social areas. The enforcement of the achievement of minimum levels of expenditure in health and education is forcing municipalities to expand personnel expenditures as these sectors are labor intensive, pressuring the reduction of current account savings and reducing the fiscal space for municipal infrastructure investments.

4.18 The positive prospects of the Brazilian economy depict a favorable evolution for the municipal fiscal and financial indicators in the next years. In particular, a higher economic growth (with stronger effects on revenues than expenditures) *vis a vis* the population growth (with stronger effects on expenditures than revenues) would favor fiscal sustainability.

4.19 But the guarantee of municipal fiscal sustainability critically depends on the enhancement of municipal revenue collection and on the containment of current expenditures. In the revenue side, many municipal governments have been implementing programs to enhance the efficiency of the municipal revenue services obtaining very good results. However, there is a large space for further improvements especially for medium size municipalities. Also, the disappointing performance of user charges and cost recovery suggest the possibility of substantial gains on this revenue source in the future.

4.20 On the expenditure side, the control of the growth of personnel expenditures and the rationalization of government purchases would consolidate the adjustment and improve the quality of municipal service delivery. The containment of personnel expenditures is the main challenge of municipalities as it constitutes a serious obstacle that threat their fiscal sustainability. Also, the improvement of public sector management in order to increase the efficiency of tax collection, generate other own revenue sources and to promote a more efficient use of municipal resources would allow municipalities to consolidate their fiscal adjustment and to expand and improve the public services delivery.

4.21 This report contains six sections including this introductory part. The second describes the evolution of the municipal fiscal balances and of the main Fiscal Responsibility Law indicators during the period 2000-2004. The third section analyzes the evolution and composition of municipal revenues. The fourth relates the evolution of municipal expenditures by economic categories and functions. The five section analyses the evolution of municipal indebtedness and describes the mechanisms that restrict credit access by municipalities. The final section summarizes the main overall findings and makes a number of policy implications. The Fiscal Adjustment of Brazilian Municipalities, 2000-2004³⁸.

4.22 During the period 2000 to 2004, Brazilian municipal government level fiscal accounts presented a solid improvement expressed in the generation of increasing fiscal balances. Total balance passed from R\$ 4.2 billion

³⁸ For the analysis of the municipal finances two samples were used. For the analysis of the evolution of municipal finances during the period 2000-2004, given the data availability limitations, a sample of 3,208 municipalities were used to make consistent inter temporal comparisons. These 3,028 municipalities respond for 78 percent of the Brazilian population. For the cross comparisons by municipal population size, it was selected the year of 2003 as it has the largest sample (4,967 municipalities) representing 95 percent of the Brazilian population.

or 0.24 percent of GDP in 2000 to R\$ 7.8 billion or 0.44 percent of GDP in 2004. In terms of current account balances, municipalities passed from a surplus of R\$ 12.4 billion or 0.7 percent of GDP in 2000 to a current account surplus of R\$ 18 billion or 1.06 percent of GDP in 2004. Also, Table 4.1 reveals that the primary balance passed from R\$ 6 billion or 0.34 percent of GDP in 2000 to a surplus of R\$ 8.6 billion or 0.48 percent of GDP.

4.23 The improvement resulted from a higher increase in revenues than in expenditures. During the period 2000-2004, total revenues increased by 21 percent, with an increase of current revenues of 23 percent and a decrease of capital revenues of 5 percent. On the expenditure side, total expenditures grew by 18% with current expenditures increasing by 18 percent and capital expenditures growing by 20 percent. The increase of the primary balance resulted from an increase of 19% of primary revenues *vis a vis* an increase of 17 percent of primary expenditures.

4.24 As shown by Table 4.1, the fiscal adjustment was based on the strong increase of current revenues enabling municipalities to increase their ability to generate current account savings. The increased current savings allowed municipalities to meet its debt service obligations and to finance most of their investment expenditures as capital revenues have stagnated during the period.

4.25 It is important to remark, that the improvement of municipal fiscal balances happened in a period of a disappointing economic performance (average growth rate of 2.6 percent) which made more difficult the adjustment. In fact, the slowdown of the economic activity in 2003 determined a temporary interruption of the increasing trend of fiscal balances. The strong recovery of the economic activity in 2004 led to a vigorous revenue increase of 11% of municipal revenues consolidating the fiscal adjustment that had been implementing in the previous years.

Table 4.1 Municipal Fiscal Balances, 2000-2004 (Billion of Reais of 2004)

	2000	2001	2002	2003	2004
1. Total Revenues	96.8	101.3	111.2	108.1	117.6
2. Total Expenditures	92.6	96.7	105.2	103.7	109.8
3. Total Balance (1-2)	4.2	4.6	6.0	5.4	7.8
<i>In Percent of GDP</i>	0,24%	0,26%	0,34%	0,28%	0,44%
4. Current Revenues	92.8	98.7	106.6	105.3	113.8
5. Current Expenditure	80.4	85.6	89.8	90.2	95.1
6. Current Balance (4-5)	12.4	13.1	16.8	15.1	18.7
<i>In percent of GDP</i>	0,7%	0,74%	0,95%	0,85%	1,06%
7. Capital Revenue	4.0	2.6	4.6	2.8	3.8
8. Capital Expenditure	12.2	11.1	15.4	13.5	14.7
9. Capital Balance (7-8)	(7.8)	(8.5)	(10.8)	(10.3)	(10.9)
<i>In Percent of GDP</i>	(0,46%)	(0,48%)	(0,61%)	(0,57%)	(0,62%)
10. Financial Revenues	1.3	2.0	3.7	4.5	3.7
11. Financial Expenditures	3.0	3.9	4.3	4.3	4.4
12. Primary Revenues (1-10)	95.5	99.3	107.5	103.6	113.9
13. Primary Expenditures (2-11)	89.6	92.8	100.9	99.4	105.4
Primary Balance (11-13)	5.9	6.5	6.6	4.2	8.5
<i>In Percent of GDP</i>	0,34%	0,37%	0,37%	0,24%	0,48%

Sample of 3,028 municipalities.

4.26 The improvement of fiscal balances has not been homogeneous among municipal government units. Small and medium size municipalities experienced a stronger improvement than the largest municipalities. In fact,

the municipalities with population superior to 1 million of inhabitants have worsened their fiscal balances. The importance of these municipalities in the aggregate municipal level buried the significant gains obtained by the rest of municipal government units³⁹.

4.27 Excluding the municipalities with more than 1 million of inhabitants, the rest of municipalities increased their total balances by R\$ 5 billion, their current balances by more than R\$ 6 billion and their primary balances by R\$ 3 billion.

Table 4.2 Current and Primary Balance of 2000-03 (Billion of Reais of 2004)

Population	2000			2003		
	Total	Current	Primary	Total	Current	Primary
0 to 5,000	0.05	0.39	0.09	0.41	0.80	0.40
5,000 to 20,000	0.15	1.40	0.35	1.43	3.02	1.51
20,000 to 150,000	0.68	3.66	1.06	2.53	6.72	2.41
150,000 to 1,000,000	1.02	3.51	1.21	1.62	4.70	1.38
More than 1,000,000	2.55	5.42	3.72	(0.11)	3.35	(0.02)
Total	4.46	14.4	6.42	5.88	18.6	5.69

Sample of 4,965 municipalities.

4.28 As a result of its general sound fiscal performance, the aggregated municipal level has complied with the fiscal limits established by the Fiscal Responsibility Law (FRL). In fact, aggregate municipal FRL indicators are well below the legal ceilings. Net consolidated debt as a proportion of net current revenue, used for compliance of the Fiscal Responsibility Law, has fluctuated around 35 percent, far below the legal ceiling of 120 percent.

4.29 Table 4.3 also shows that municipalities have kept within the other limits laid down by the Fiscal Responsibility Law (FRL). In 2000-2004, overall personnel costs represented about 46 percent of net current revenue, also below the ceiling of 60 percent of net current revenue.

4.30 Debt service as a proportion of the net current revenue has oscillated around 4 percent, well below the legally-imposed limit of 11.5 percent. The lack of access to credit operations, made the indicator credit operations to net current revenue to vary around the 1 percent level while the corresponding FRL limit is 16%.

4.31 Besides the Fiscal Responsibility Law figures, other two financial indicators were included to evaluate the cash flows generation of the municipal governments. The first is the interest coverage, which represents the current account cash flow without interest payments, that is the flow of funds generated internally, divided by the interest payments. The minimum level recommended for this indicator is 1.5. The second indicator is the investment coverage, which represents the amount of investment financed with cash flow (current account balance). The minimum level recommended for this indicator is 30%.

4.32 The Brazilian municipal governments have both indicators well above the minimum levels recommended for these two financial indicators. In the case of the interest coverage, Table 4.3 shows that municipalities had large ability to generate cash flows to finance interest payments on their debts. However, it is important to mention that the low level of indebtedness of most of the Brazilian municipalities more than the ability to generate current account cash flow justifies the high value of the interest coverage.

4.33 Also, municipalities were able to integrally finance their investment expenditures as the investment coverage indicator is higher than 1. Again, it is important to mention that the fiscal adjustment and the restrictions to credit determined a low level of investment expenditures which explains the municipal government's high investment coverage.

³⁹ From the 5,500 Brazilian municipalities, more than 1,300 have population below 5,000 inhabitants, 2,700 municipalities have population between 5,000 to 20,000 inhabitants, 1,300 municipalities have population between 20,000 to 150,000 inhabitants, 132 municipalities have population between 150,000 to 1,000,000 and 12 municipalities have a population above 1,000,000 of inhabitants.

Table 4.3 FRL and Financial Indicators

	2000	2001	2002	2003	2004
Debt/NCR* (%)	35.3	29.2	35,7	35,8	-
Personnel Expenditures/NCR (%)	43.5	43.4	45,9	45,5	47,4
Debt Service/NCR (%)	3.1	4.1	4,3	4,4	4,1
Credit Operations/NCR (%)	1.1	0.6	0,7	0,9	1,1
Interest Coverage	8.3	6.9	8.5	7.8	9.1
Investment Coverage	1.3	1.6	1.30	1.39	1.52

*Source: National Treasury. Sample of 3,215 municipalities.

4.34 The heterogeneity among Brazilian municipalities is more evident in the case of the Fiscal Responsibility Law and the financial indicators described above. In particular the extremely concentrated weight of the largest municipalities deserves some attention.

4.35 The municipalities with population higher than 1 million of inhabitants respond for almost 80 percent of municipal debt, for 35 percent of municipal personnel expenditures, for 60 percent of municipal debt service, for 70 percent of credit operations and for 28 percent of municipal investment expenditures.

4.36 Table 4.4 shows that indebtedness is a problem only for the largest municipalities as the net debt to net current revenues for small and medium size municipalities are well below the limits established by the Fiscal Responsibility Law⁴⁰. For large municipalities, it is important to remark that the debt indicator is high because the high indebtedness of São Paulo (251 percent of net current revenue) and the importance of São Paulo on municipal accounts. (Box 4.1).

4.37 Personnel expenditure to net current revenue ratio is distributed more homogeneously among municipal government units varying around 45 percent without a clear association with the population size. However, there are striking differences among active and inactive personnel expenditures. Municipalities with population lower than 1 million of inhabitants are responsible for 72 percent of the municipal active personnel expenditures while municipalities with more than 1 million of inhabitants respond for 61 percent of the inactive personnel.

4.38 These figures have important policy implications: the weight of active personnel expenditures in small size municipalities results from the lack of scale economies and would constitute a real threat to municipal finances as high active personnel implies high social security benefits in the future. For large size municipalities, the high retired personnel expenditures implies the need of containment of the deficit of the social security system of municipal employees and a conservative employment policy in order to maintain under control personnel expenditures.

4.39 Large differences are observed with relation to the debt service and credit operations to net current revenues indicators. Table 4.5 shows that debt obligations are not a problem at all for small size municipalities and that only large size municipalities have some access to credit operations.

4.40 A very interesting result is the low levels of the indicators of indebtedness and debt service to net current revenues ratios compared with the Fiscal Responsibility Law ceilings which is observed for the great majority of Brazilian municipalities with the exception of the largest municipalities. This fact indicates that the FRL ceilings were set looking at the indebtedness situation of the largest municipal governments. In turn, the large difference between the indicators observed in small size municipalities and the FRL ceilings would stimulate a quick and large increase of indebtedness as the space for additional indebtedness allowed by the FRL is substantial. Thus, this observation shows a weakness of the FRL in the sense that it set identical ceilings for very different municipalities.

⁴⁰ . Because the lack of availability of disaggregated municipal debt information, the net debt used in table 4.4 was calculated by WB staff and presents some differences with the Fiscal Responsibility Law indicator presented in table 4.3.

4.41 The interest and investment coverage depict a similar pattern. There is a negative correlation between interest and investment coverage with the population size. The very low or almost inexistent indebtedness of small size municipalities makes them able to face the interest payments obligations. Given the lack of access to credit operations, small municipalities can finance the totality of their investment expenditures. Larger municipalities can also pay their interest payment obligations and finance their investment expenditures with more difficulty.

Table 4.4 FRL and Financial Indicators by Municipal size 2003

	0 to 5,000	5,000 to 20,000	20,000 to 150,000	150,000 to 1,000,000	More than 1,000,000	Total
Debt/NCR (%) FRL = 120%	4.7	12.2	14.3	29.6	136.1	49.6
Personnel Exp/NCR (%) FRL = 60%	43.8	45.7	46.3	47.5	46.9	46.2
Debt Service/NCR FRL=11.5%	1.5	1.9	2.4	3.0	9.4	3.8
Credit Op/NCR FRL = 16%	0.2	0.2	0.3	0.5	2.4	0.7
Interest Coverage	119.1	86.8	41.7	12.4	2.9	9.0
Investment Coverage	1.7	1.7	1.6	1.5	1.0	1.4

Sample of 4,965 municipalities.

4.42 It is important to remember that even among the largest municipalities there are marked heterogeneities. In particular, the importance and high indebtedness of São Paulo and Rio de Janeiro municipalities generate an upward bias on municipal Fiscal Responsibility Law and financial indicators.

Table 4.5 Interest and Investment Coverage by Municipal Size

Population	2000		2003	
	Interest	Investment	Interest	Investment
0 to 5,000	45.13	0.74	116.63	1.74
5,000 to 20,000	30.86	0.72	84.87	1.67
20,000 to 150,000	23.86	0.95	41.03	1.59
150,000 to 1,000,000	10.37	1.15	12.39	1.49
More than 1,000,000	5.49	1.94	2.93	1.00
Total	9.00	1.18	8.87	1.43

Sample of 4,965 municipalities.

Box 4.1 São Paulo Indebtedness

As São Paulo net consolidated debt represents more than 70 percent of Brazilian municipal net consolidated debt, its evolution has a strong impact on the aggregated indebtedness indicators of Brazilian municipalities.

At the end of 2004, São Paulo net consolidated debt was equal to 251 percent of net current revenue, far above the Fiscal Responsibility Law ceiling of 178%, which should reach 120% of net current revenue in 2016. More than its high level, the problem is that the indebtedness has followed an increasing trend in the last years.

Federal Senate Resolution 40/2001, complying Fiscal Responsibility Law, establishes a ceiling for net consolidated debt to net current revenues of 120 percent for municipal governments. For municipalities above this ceiling, a decreasing path for the next fifteen years was set. In 2001, São Paulo municipal government was above the 120 percent ceiling by 73 percent of net current revenue. As a result, the legal requirement establishes that São Paulo municipality indebtedness level should decrease by 4.9 percentage points each year since then to achieve 120 percent in 2016.

In contrast to this legal requirement, from 2001 to 2004, there was a significant indebtedness increase. During this period, indebtedness level rose by 54 percentage points of the net current revenues (the legal requirement was an accumulated reduction of 14.7 percent of net current revenue). Several factors contributed to this unsustainable trend: automatic rollover of part of due interest of debt contracts with the National Treasury, debt indexation above consumer price index and the generation of net borrowing requirements (deficits).

The debt refinancing agreement between federal government and regional and local governments set a maximum amount of debt service to be paid 13 percent of real net revenue, for a set of debt contracts. Any due debt service above this would be incorporated to the debt stock.

As a result of this ceiling, amortization payments were very low, around 1 percent of debt stock each year. At the same time, new credit operations were contracted with an average increase of 2 percent on debt stock per year from 2002 to 2004. Thus, as new credit operations were higher than the amortization payments, the municipal debt increased. Also, debt service ceiling at renegotiation agreement meant an automatic refinancing of part of interest due, the capitalization of interest payments also contributed to the indebtedness increase.

Debt indexation was another factor for the debt increase. As 95 percent of contractual debt is indexed by IGP (90 percent) and the exchange rate (6 percent), this indexation was responsible for an important part of the increase on the debt level. Although its aim was only to correct the stock level according to inflation, the general price index (IGP) presented in the last years a higher elevation than other price indexes such as consumer indexes and gross domestic product (GDP) deflator.

Finally, the positive contribution of net borrowing needs implied that there was no fiscal effort to decrease the indebtedness level during the period.

The Evolution of Municipal Revenues

4.43 As mentioned above, the improvement in the municipal fiscal balances was based on the good performance of revenues, in particular on the increase of current revenues. From 2000 to 2004, total revenues

grew by 21 percent with current revenues increasing by 23 percent while capital revenues experienced a fall of 5 percent. The strong increase of municipal current revenues needs to be remarked. Brazil's accumulated GDP growth was of 9.5 percent during the period, indicating that municipal current revenues grew 13 percent above GDP during this period.

4.44 On the contrary, the declining performance of capital revenues reflects the hard credit restrictions imposed by the federal government on credit operations. At the same time, capital transfers from federal and state governments also suffered a strong containment given the fiscal adjustment effort of the three levels of government.

Table 4.6 Municipal Revenues, 2000-2004 (Billion of Reais of 2004)

	2000	2001	2002	2003	2004
Current Revenues	92.8	98.7	106.6	105.3	113.8
Capital Revenues	4.0	2.6	4.6	2.8	3.8
Total	96.8	101.3	111.2	108.1	117.6
Current Revenues per capita (R\$)	772	821	887	876	946
Capital Revenues per capita (R\$)	33	22	38	24	32
Total – per capita (R\$)	805	843	925	900	978

Sample of 3,028 municipalities.

4.45 The classification of municipalities by population size shows large disparities in two dimensions. First, the municipalities with population larger than 1 million respond for more than 25 percent of municipal total, current and capital revenues while the smallest municipalities have a very low participation in municipal revenues (about 4 percent). Second, despite their low participation on municipal revenues, these smallest municipalities have municipal revenues per capita 20 percent higher than the 12 largest municipalities and 50 percent higher than the national average.

4.46 Clearly, the concentration of municipal revenues in the largest municipalities results from the concentration of population, tax bases and economic activity in these cities while the intergovernmental transfers system is the main cause for the high municipal revenues per capita of small municipalities.

Table 4.7 Municipal Revenues by Municipal Size, 2003 (Billion of Reais of 2004)

	0 to 5,000	5,000 to 20,000	20,000 to 150,000	150,000 to 1,000,000	More than 1,000,000	Brazil
Current Revenues	4.7	19.2	39.4	33.6	33.2	130
Capital Revenues	0.14	580.6	0.87	0.7	1.1	3.4
Total	4.8	19.8	40.2	34.2	34.4	133.5
Current Revenues per capita (R\$)	1,202	738	718	793	1,027	816
Capital Revenues per capita (R\$)	36	22	16	16	35	21
Total – per capita (R\$)	1,238	760	734	810	1,063	837

Sample of 4,965 municipalities.

4.47 Analyzing the components of current revenues it is possible to observe that the three main categories exhibited a strong growth. Tax revenues increased by 22 percent, intergovernmental transfers by 20 percent while other current revenues by 36 percent. Tax revenues and intergovernmental transfers exhibited the same growth pattern growing permanently until 2003, when the economic slowdown determined the interruption of the increasing trend. In 2004, the strong recovery of the economic activity fostered the strong revenue growth. An

important implication of this pattern is that the structure of current municipal revenues makes them highly correlated with the economic activity cycle. The low importance of property taxes is behind this high sensitiveness of municipal revenues to the economic activity.

4.48 Municipal taxes exhibited a very strong growth of 28 percent while user charges declined by 15 percent. The good performance of tax revenues can be explained mostly by the incorporation of the federal Income Tax (IRRF) of municipal employees as a municipal tax since 2002. The two most important taxes collected by the municipalities, the urban property tax (IPTU) and the tax on services (ISS) also presented a strong growth of 15 percent and 21 percent respectively.

4.49 Even excluding the effect of the incorporation of the IRRF as municipal own tax revenue, the growth rates of IPTU and ISS were well superior to the growth rate of the Brazilian economy, fact that indicates the enhancement of tax collection efficiency. In the last years, many municipal governments launched an aggressive program to enhance the efficiency of the municipal revenue services. Investments in software and the modernization of administrative processes were responsible for the improvement of tax collection effort. In the opposite way, the performance of user charges was disappointing suggesting the weakness of municipal cost recovery policies and the space for a strong improvement of this revenue source in the future.

4.50 Intergovernmental transfers increased by 20 percent. Most of the increase of intergovernmental transfers responds to the increase of multi-governmental transfers. In particular, the re-classification of the FUNDEF (Basic Education Fund) as a multi-governmental transfer explains the strong increase of this category. Federal transfers and state transfers experienced a more modest behavior, specially the transfers from state governments. Federal transfers grew by 8 percent while state transfers decreased by 1.3 percent. The federal transfers from the Municipal Participation Fund (FPM – Fundo de Participação Municipal- revenue sharing of federal income and industrial product taxes) increased by 20 percent. At the state level, the most important transfer is the revenue sharing of the ICMS, which increased by 18 percent. Other transfers both from the federal and from the state governments decreased by 3.5 percent and 46 percent respectively⁴¹.

4.51 Other current revenues exhibited the best performance among current revenue categories (36 percent). This category includes returns of financial assets, tax in arrears recovery, fines and other minor revenue items.

Table 4.8 Municipal Current Revenues, 2000-2004 (Billion of Reais of 2004)

	2000	2001	2002	2003	2004
Current Revenues	92.8	98.7	106.6	105.3	114.8
Tax Revenues	20.1	20.8	23.4	23.3	24.6
Taxes	17.3	18	20.7	20.7	22.2
IPTU	7.1	7.4	7.8	7.9	8.2
ISS	8.5	9.0	9.2	9.1	10.3
Other taxes (IRRF-ITBI)	1.7	1.6	3.7	3.7	3.7
User Charges	2.8	2.8	2.7	2.6	2.4
Intergovernmental Transfers	60.4	64.3	67.8	65.8	72.5
Federal	26.7	28.5	26.3	25.3	28.9
FPM	12.9	14.3	16.1	15.0	15.6
Other	13.8	14.2	10.2	10.3	13.3
State	32.4	34.5	30.6	30.2	32.0
ICMS	22.5	24.1	25.0	25.2	26.6
Other	9.9	10.4	5.5	5.0	5.4

Sample of 3,028 municipalities.

⁴¹ Again, the re-classification of Fundef as a multi-governmental transfers explain the strong fall of other state transfers.

4.52 The similar growth pattern of municipal tax revenues and intergovernmental transfers maintained practically constant the municipal current revenue structure. The participation of tax revenues was constant at 21 percent of current revenues while the better performance of other current revenues led to a higher participation of this revenue category.

Table 4.9 Current Revenue Composition (%) Brazil, 2000-04

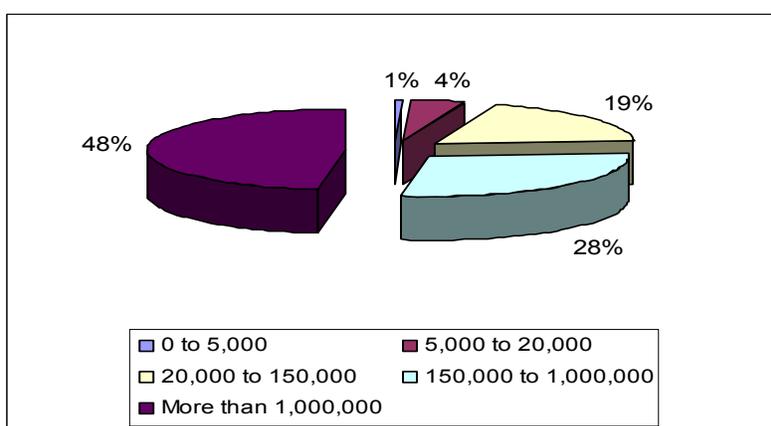
	2000	2001	2002	2003	2004
Current Revenues	100,00	100,00	100,00	100,00	100,00
Tax Revenues	21,61	21,08	21,93	22,09	21,55
Intergovernmental Transfers	65,13	65,10	63,57	62,46	63,73
Other Current Revenues	13,26	13,81	14,50	15,45	14,72

Sample of 3,028 municipalities.

4.53 The high participation of intergovernmental transfers on municipal current revenues shows a high dependence of municipal finances on transferred revenues. However, it is important to stand out that most of the transfers are constitutionally sanctioned (FPM, ICMS and IPVA); other are legally regulated transfers (SUS – the Health Unique System – and FUNDEF – the Educational Fund). Both are established at the Constitution but the amount of transfers is regulated by infra constitutional legislation. Only a small fraction of intergovernmental transfers are voluntary transfers. This may indicate less risk on the revenue side than it seemed at first sight. In any case, the dependence of municipal finances on the tax collection effort and tax policies of federal and state governments which are clearly not controlled by the municipality, makes municipal finances vulnerable as revenue increases not only depends on municipal own tax collection effort but also on the these transfers.

4.54 The classification of municipalities by size of population shows again the strong concentration of tax revenues inn the largest municipalities. The 12 largest municipalities respond for almost 50% of municipal tax revenues while the smallest municipalities collect only 1% of municipal tax revenues.

Figure 4.1 Municipal Tax Revenue Collection by Municipal Size, 2005

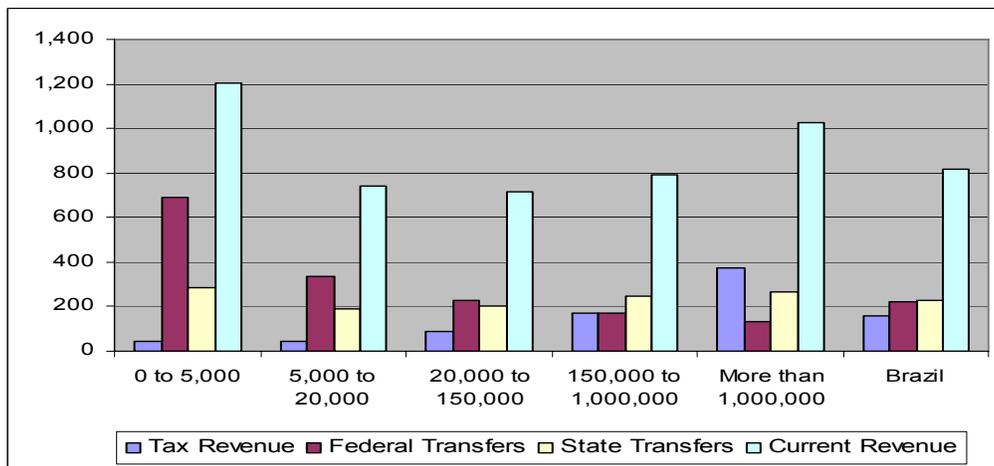


4.55 Disparities are also evident using per capita figures but in this case, favoring small municipalities. Current revenues per capita in small municipalities are 50 percent higher than in medium size municipalities and about 15 percent higher than in the largest municipalities.

4.56 However, tax revenues per capita in the largest municipalities are nine times the tax revenue. On the opposite direction, the redistributive nature of federal transfers and the distortions provoked by the rules of

distribution that favor the creation of small municipalities explain the fact that federal transfers per capita in the smallest municipalities are five times the federal transfers per capita in the largest municipalities and three times the medium size municipalities. Transfers per capita from state governments are more equally distributed among different size of municipalities.

Figure 4.2 Municipal Current Revenues per Capita by Municipal Size (Reais of 2004)



4.57 The strong disparities described above can be expressed in terms of the composition of municipal current revenue. Own revenues (tax revenues plus other current revenues) represent only 8.8 percent of current revenues of small municipalities. A very low participation of own revenue sources can also be observed for municipalities with population up to 150,000 inhabitants. On the contrary, Table 4.10 shows the extreme dependence of small and medium size municipalities on intergovernmental transfers, with a weight of transfers varying between 91 percent to 74 percent levels. On the other side, largest municipalities have a more balanced current revenue composition with own resources responding for 55 percent of municipal current revenues.

Table 4.10 Current Revenue Composition (%) by Municipal Size, 2003

	0 to 5,000	5,000 to 20,000	20,000 to 150,000	150,000 to 1,000,000	More than 1,000,000	Brazil
Current Revenues	100,00	100,00	100,00	100,00	100,00	100,00
Tax Revenues	3,52	5,83	12,14	21,63	36,56	19,58
Intergovernmental Transfers	91,11	87,12	73,93	62,25	45,30	66,17
Other Current Revenues	5,37	7,05	13,93	16,12	18,14	14,25

Sample of 4,965 municipalities.

Box 4.2: The Effects of Intergovernmental Transfers on Recipient's Tax Effort and Expenditure

While the Brazilian intergovernmental transfer system promote the decentralization of public resources and the reduction of regional fiscal disparities, the design of the Brazilian intergovernmental transfer system generates distortions on the behavior of recipient units.

In particular, the predominance of intergovernmental transfers in the finance structure of municipalities is associated to: i) a low interest on exploiting own revenue sources (tax revenue); ii) expenditure expansions as a result of the disconnection between cost and benefits of public goods and expenditures; iii) low quality of public expenditures by the recipient units explained by the lack of control and transparency of the transferred resources and iv) the creation of a large number of new local governments stimulated by the federal transfers to municipalities distribution rules.

Municipalities that rely on transfers as their main revenue source are not concerned with the enhancement of its tax collection efficiency, given the low importance of own tax revenue. Blanco (1998) estimated the effect of transfers in the tax collection effort of states and municipalities and found a strong negative correlation between the share of transfers on current revenue and the tax collection efforts. The automatic nature of the intergovernmental transfers generates a perception that the transferred resources are assured, perception that accentuates the negative effect on the recipient's tax collection effort.

Because transfers are (supposedly) not financed by local taxpayers, there is an undervaluation of the cost of public goods. As a result, there is an expansionary bias of transfers when compared with own revenue sources. Known as the *flypaper effect*, the finding that one additional unit of revenue coming from transfers have a stronger effect on expenditures than an additional unit of income of taxpayers, was confirmed by a large set of empirical evidences. Blanco and Carvalho (2000) found strong evidences of the presence of the flypaper effect in the municipal public finances in Brazil.

A study on the impact of the revenue structure of municipalities on the expenditure composition showed that the share of intergovernmental transfers on the available revenue is positively correlated with overhead expenditures and negatively correlated with municipal infrastructure and social expenditures. This result can be explained because small municipalities (that are highly dependent on intergovernmental transfers) have high overhead cost given the difficulties to explore scale economies.

Finally, Shikida (1997) demonstrated that the fiscal decentralization process trough the strengthening intergovernmental system promoted by the Constitution of 1988 and the distribution rules of the federal transfer to municipalities (FPM) resulted in the creation/ emancipation of municipalities. The higher federal transfers per capita received by small municipalities created incentive for the emancipation of municipalities. From 1988 to 1997, more than 1,400 municipalities were created.

In summary, while recognizing that the intergovernmental transfer system is the most important mechanism for the decentralization and the redistribution of fiscal resources in a federation characterized by strong regional disparities as Brazil, the redesign of the rules to alleviate the negative incentives provoked by transfers constitute a challenge for the Brazilian fiscal federalism.

4.58 However, small and medium size municipalities have improved their tax collection performance more than large municipalities. Table 4.11 shows a strong negative correlation between municipal size and the increase of tax revenue during the period 2000 to 2004. It is noteworthy the improvement of tax revenue collection of small and medium size municipalities which exhibited an accumulated growth varying between 78 percent to 42 percent, well above the national average increase. The growth of intergovernmental transfers was higher in medium size municipalities as well as the growth of other current revenue. The higher growth of tax revenues *vis a vis* the growth of intergovernmental transfers should reduce the dependence of small municipalities on transfers which is a good development.

4.59 Table 4.11 also reveals that medium size municipalities experienced the higher growth of current revenues which resulted from a good tax revenue performance, a significant increase of intergovernmental

transfers and an exceptional performance of other current revenues. On the opposite side the largest municipalities' current revenues had a disappointing performance that explains the worsening of their fiscal situation.

Table 4.11 Current Revenues Growth by Municipal Size, 2000-2004 (%)

	0-5,000	5,000-20,000	20,000-150,000	150,000-1,000,000	More than 1,000,000	Brazil
Current Revenues	26.06	28.17	35.36	19.01	14.25	22.61
Tax Revenues	78.11	48.10	42.28	28.46	12.59	22.31
Intergovernmental Transfers	24.52	26.60	30.05	13.98	10.48	19.97
Other Current Revenues	27.74	33.22	63.07	27.52	29.39	36.09

Sample of 3,028 municipalities

4.60 On the capital account side, capital revenues experienced a strong volatility during 2000-2004, varying between R\$ 4.6 billion (highest level in 2002) and R\$ 2.6 billion (lowest level in 2001) without a defined trend. In 2004, capital revenues were 5 percent lower than the observed level in 2000. Its main components, credit operations and capital transfers experienced a similar volatile behavior.

4.61 The domestic supply credit constraints imposed by the National Monetary Council (CMN) since 2001 practically blocked the access to credit operations by municipalities, while the fiscal adjustment of the federal government and state governments limited the capital transfers from these higher levels of governments to municipalities. Other capital revenues which mainly include municipal asset sales were kept at low levels.

Table 4.12 Capital Revenues, 2000-2004 (Billion of Reais of 2004)

	2000	2001	2002	2003	2004
Capital Revenues	4.02	2.62	4.61	2.83	3.81
Credit Operations	1.01	0.56	0.73	0.88	1.25
Capital Transfer	2.28	1.62	3.38	1.27	2.05
Other / Asset Sales	0.73	0.44	0.50	0.69	0.51

Sample of 3,028 municipalities.

4.62 Using the stratification by size of population, it is possible to see a very similar pattern than the observed for the municipal current revenues. Capital revenues are highly concentrated in the largest municipalities which respond for 30 percent of them. Credit operations are even more concentrated in the largest municipalities which contracted more than 70 percent of municipal credit operations during the period. In fact, small municipalities do not have access to credit operations. Capital transfers are more evenly distributed among municipalities while asset sales are also highly concentrated in the largest municipalities.

Table 4.13 Capital Revenue by Municipal Size, 2003 (Billion of Reais of 2004)

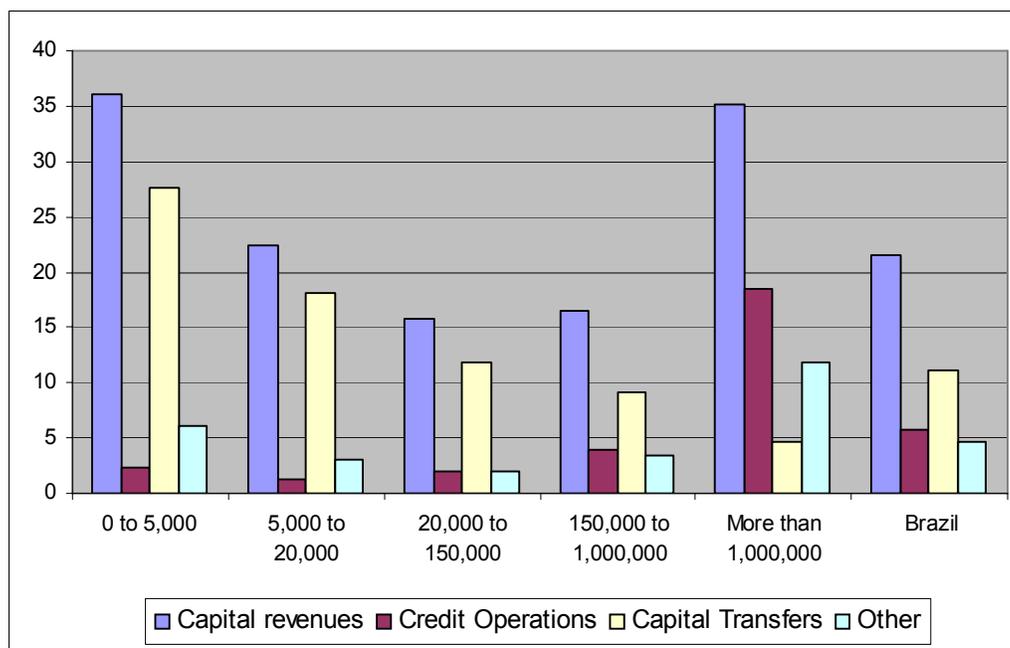
	0 to 5,000	5,000 to 20,000	20,000 to 150,000	150,000 to 1,000,000	More than 1,000,000	Brazil
Capital Revenues	0.14	0.58	0.87	0.70	1.13	3.42
Credit Operations	0.01	0.03	0.10	0.17	0.60	0.91
Capital Transfers	0.11	0.47	0.65	0.39	0.15	1.77
Other / Asset Sales	0.02	0.08	0.11	0.14	0.38	0.74

Sample of 4,965 municipalities.

4.63 The per capita figures also show a similar pattern than the observed for municipal current revenues. While capital revenues per capita are higher for the smallest and largest municipalities, credit operations per capita in the largest municipalities are seven times the same figure for small municipalities, confirming the lack of access to

credit operations by small municipalities. Capital transfers per capita exhibit a similar pattern than current transfers per capita: are higher in small municipalities (six times than the capital transfers to largest municipalities). In summary, large municipalities tend to use credit operations to finance investment expenditures while the only source of capital revenues for small municipalities is the capital transfers from the federal and state governments.

Figure 4.3 Municipal Capital Revenues per Papita by unicipal Size, 2003 (Reais of 2004)



The Evolution of Municipal Expenditures

Municipal Expenditures by Economic Category

4.64 As mentioned in section A, the improvement in municipal fiscal accounts resulted from the lower increase of expenditures than of the observed in the revenue side. From 2000 to 2004, total expenditures revenues grew by 18 percent. Current expenditures increased by 18 percent while capital expenditures grew by 20 percent. As in the case of revenues, Table 4.14 shows that between 2000-2004 it was observed a permanent expenditure increase which was interrupted in 2003 as a consequence of the economic stagnation that imposed a fall in municipal revenues. In 2004, the recovery of economic activity fostered a strong revenue increase that allowed municipalities to increase their expenditures.

Table 4.14 Municipal Expenditures, 2000-2004 (Billion of Reais of 2004)

	2000	2001	2002	2003	2004
Current Expenditures	80.4	85.6	89.8	90.2	95.1
Capital Expenditure	12.2	11.1	15.4	13.5	14.7
Total	92.8	96.7	105.2	103.7	109.8
Current Expenditures – per capita (R\$)	669	691	704	686	703
Capital Expenditures – per capita (R\$)	101	90	121	103	109
Total – per capita (R\$)	770	781	825	789	812

Sample of 3,028 municipalities.

4.65 The classification of municipalities by population size also shows a similar pattern than the observed in the revenue side. First, it is possible to observe a strong concentration of expenditures in the largest municipalities which execute more than 25 percent of municipal expenditures while the small municipalities have an insignificant participation in municipal expenditures (about 3 percent). Second, as in the case of revenues, the small municipalities have high expenditures in per capita terms, with total, current and capital expenditures per capita about 50 percent higher than the national average and even higher than the per capita expenditures observed for the largest municipalities.

Table 4.15 Municipal Expenditures by Municipal Size, 2003 (Billion of Reais of 2004)

	0 to 5,000	5,000 to 20,000	20,000 to 150,000	150,000 to 1,000,000	More than 1,000,000	Brazil
Current Expenditures	3.91	16.0	32.5	28.8	29.9	111.2
Capital Expenditures	0.55	2.24	5.16	3.78	4.59	16.3
Total	4.45	18.3	37.7	32.6	34.5	127.5
Current Expenditures per capita (R\$)	909	564	543	624	845	639
Capital Expenditures per capita (R\$)	127	79	86	82	130	94
Total – per capita (R\$)	1036	644	629	706	975	732

Sample of 4,965 municipalities.

4.66 The analysis of the evolution of the main components of current expenditures reveals that personnel expenditures and interest payments experienced the strongest growth, 40 percent and 37 percent, respectively, while other current expenditures have stagnated.

4.67 The growth of personnel expenditures can be explained by two main reasons. First, the constitutional requirement to achieve minimum levels of expenditure in health and education (15 percent and 25 percent of net current revenue) forced municipalities to contract new staff in both sectors. Small municipalities were more affected by the compliance of these constitutional requirements. The levels of expenditure in health and education of small municipalities observed in the previous years were lower than the required by this constitutional norm. Thus, the accomplishment of these requirements forced small municipalities to accelerate the increase of expenditures in both sectors that are labor-intensive. As a consequence, personnel expenditures of small municipalities suffered an upward pressure generated by the constitutional obligation of minimum expenditure levels in health and education.

4.68 Second, the increasing imbalance of the social security system of municipal employees determined the increase of personnel expenditures. In this case, large municipalities are most affected by the weight of the social security benefits to retired employees⁴².

4.69 Thus, the containment of the growth of personnel expenditures which is one of the main challenges of municipalities confronts serious obstacles that threaten their fiscal sustainability. Despite the fact that most of the municipalities are reasonably below the Fiscal Responsibility Law ceiling for the personnel expenditures to net current revenue ratios, the increasing trend of this indicator observed in the last years (see Table 4.3 above) needs to be curbed. As mentioned above, other constitutional norms as the establishment of minimum levels of expenditures in certain sectors and the impossibility of reducing the deficit of the social security system for municipal employees constitute obstacles that act against the accomplishment of the FRL requirements in this issue.

⁴² Personnel expenditures figures would be underestimated as many municipalities are classifying personnel expenditures in other current expenditures under the category of outsourced services.

Box 4.3 Social Security Imbalance in Municipal Finances

Social security imbalance constitutes a major risk for the financial situation of the three the levels of federation in Brazil. In the case of municipalities, the aggregated deficit of the social security system for municipal employees has followed an increasing path reaching 0.4 percent of GDP in 2003.

At the individual level, the municipal lending projects that are being implemented by the World Bank, have revealed very large social security actuarial deficits. For example, the municipal governments of Belo Horizonte had in 2004 an actuarial deficit of R\$ 2.5 billion or 120 percent of net current revenue; Uberaba of R\$ 100 million or 40 percent of net current revenue and the municipality of São Paulo of R\$ 34 billion or 270 percent of net current revenues. The high actuarial deficits indicate a very likely increase in personnel expenditures which will put additional pressure on municipal finances harming the ability to generate current account savings.

As the social security imbalances is a major concern for the overall public sector, in the last years, two Constitutional Amendments tried to reduce this imbalance, changing social security rules (the Constitutional Amendment n 20, in 1998 and the Constitutional Amendment n 41 in 2003).

The objective of both constitutional amendments was to reduce the long run deficit of the social security system through the increase of the retirement age, the time of contribution and the imposition of a new system for new entrants. All these measures will have medium and long run effects that will reduce the actuarial deficit of the system.

For the short run, the Constitutional Amendment No 41 established the possibility of the collection of social security contributions charged over retirement and pension benefits. Benefits lower than a threshold level will be exempted from this contribution. This floor is the same for federal, state and municipal governments. The establishment of this contribution represented a great advance to the federal government, but, for states and especially for municipalities the gain is much smaller. Given that municipal social security benefits are lower than the conceded at the federal and the state levels, most of the municipal social security benefits will be exempted from the contribution, reducing the gain of municipal governments on this matter.

The high actuarial deficits of the social security systems for the three levels of government suggest the need for another round of constitutional reform on this area.

4.70 Interest payments also experienced a strong growth. The reason for this increase was the carrying out of the debt renegotiation agreements signed by the National Treasury (STN) with 180 municipal governments in 2001 (MP 2185-38-01). The agreements consist in the refinancing of municipal debt by the federal government and the rescheduling of debt obligations with the National Treasury in better conditions than the observed in the period previous to the debt renegotiation. Despite these agreements set a limit of 13 percent of net revenues for debt service obligations, allowing the capitalization of interest payments that exceed this limit, in fact these agreements implied higher interests payments by the municipalities that had debt refinancing agreements with the National Treasury as in the past municipalities capitalized interest debt almost integrally.

4.71 Other current expenditures were maintained constant. This category includes goods and services purchases (operating costs excluding personnel expenditures). The stagnation of this category is surprising as municipalities have outsourced services shifting expenditures that were previously considered personnel expenditure to the other current expenditures category. Other municipalities simply re-classified part of the payroll bill of the new staff contracted in the health sector as other current expenditures. Thus, operating expenditures that are genuinely non personnel expenditures (material, goods and non personnel services purchases) may have suffered a compression to compensate the increase of personnel services included in this category.

4.72 At this respect, it is important to mention that the rationalization of government purchases trough the improvement of procurement methods, the use of electronic tools and other management measures have been

progressively adopted by large municipalities and can justify part of the reduction of operating costs. However, the advance of personnel expenditures included in the other current expenditures reinforces the concern of the increasing and excessive level of personnel expenditures in municipal finances.

Table 4.16 Municipal Current Expenditures, 2000-2004 (Billion of Reais of 2004)

	2000	2001	2002	2003	2004
Current Expenditures	80.4	85.6	89.8	90.2	95.1
Personnel	34.2	36.0	45.5	45.7	47.9
Interest Payments	1.70	2.23	2.28	2.28	2.34
Other Current Expenditures	44.5	47.4	41.9	42.2	44.8

Sample of 3,028 municipalities.

4.73 The stratification of municipalities by population size shows that the largest municipalities have experienced the highest growth of current expenditures, having contributing negatively to the overall fiscal situation of the municipal government level. The good revenue performance of medium size municipalities allowed them to expand current expenditures. Table 4.17 reveals that personnel expenditures and interest payments experienced a very strong growth in the largest municipalities which was compensated by a strong compression of other current expenditures. In any case, Table 4.17 also confirms that expansion of personnel expenditures is a common problem for all municipalities independent of their size and that interest payments from municipal debt are concentrated in the largest municipalities.

Table 4.17 Current Expenditures Growth by Municipal Size, 2000-2004 (%)

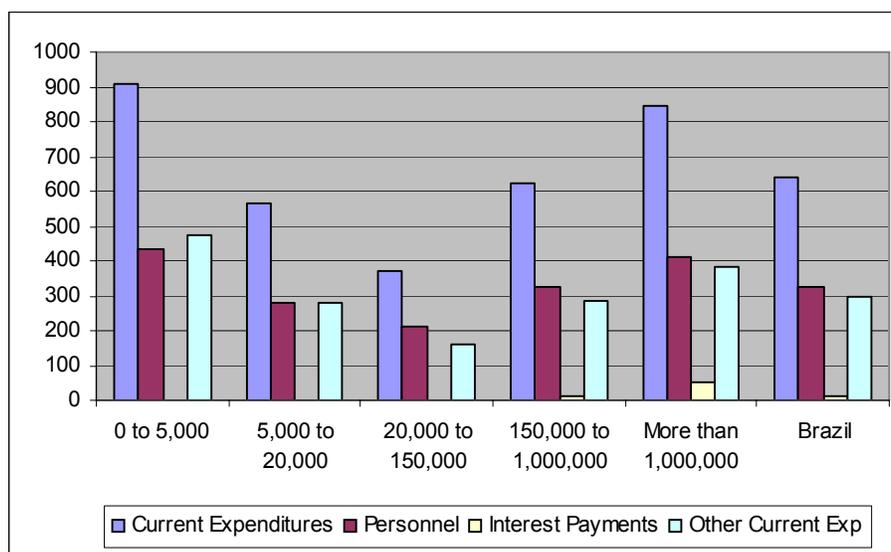
	0-5000	5000-20000	20000-150000	150000-1000000	More than 1000000	Brazil
Current Expenditures	13.37	15.15	23.78	14.00	19.32	18.29
Personnel	20.26	25.37	32.09	31.68	66.87	39.93
Interest Payments	-12.44	-28.37	10.68	10.29	50.27	37.77
Other Current Exp	7.80	6.56	15.90	-0.31	-10.20	0.87

Sample of 4,965 municipalities.

4.74 In per capita terms, again the smallest and largest municipalities have per capita current expenditures that are 50 percent higher than the Brazilian average. Figure 4.4 reveals that with the exception of interest payments, the same is observed for the different components of current expenditures. As mentioned above the absence of economies of scale on small jurisdictions justifies the high per capita personnel expenditures of the smallest municipalities. On the other side, the heavy weight of social security benefits to retired municipal employees justifies the high per capita personnel expenditures in the largest municipalities.

4.75 Other current expenditures are also much higher in the smallest and largest municipalities than national averages. Finally, Figure 4.4 shows that interest payments have relevance only for the largest municipalities.

Figure 4.4: Current Expenditure Per Capita by Municipal Size, 2003 (Reais of 2004)



4.76 On the capital account, debt amortizations and investment expenditures experienced a strong growth (54 percent and 29 percent, respectively), while other capital expenditures suffered a significant fall of 68 percent.

4.77 As mentioned above, the debt refinancing agreements signed by 180 municipalities with the National Treasury explains the increase of municipal governments’ amortization expenditures. Even with the favorable conditions of municipal debt rescheduling which set a ceiling for debt services, the agreements have forced municipalities to, differently from the previous period when municipalities had been rolling over their debts, to pay on time their debt amortizations to the National Treasury.

Investment expenditures followed a very volatile pattern.

4.78 Table 4.18 shows that investment suffered a strong fall in 2001 reaching their minimum level (R\$ 8.3 billion) during the period. In 2002, municipal investments substantially grew by 50 percent achieving their maximum level (R\$ 12 billion) in the last five years. In 2003, investment expenditures fell by 20 percent. Finally, in 2004, the strong improvement of revenues allowed the recovery of expenditures investments.

4.79 The volatility of investment expenditures, the fall of other capital expenditures and the containment of other current expenditures imply that these categories can be more easily adjusted by municipal governments as the other main categories, personnel expenditures, interest payments and amortizations are of mandatory nature, having their own dynamics being out the control of municipal authorities.

Table 4.18 Municipal Capital Expenditures, 2000-2004 (Billion of Reais of 2004)

	2000	2001	2002	2003	2004
Capital Expenditures	12.2	11.1	15.4	13.5	14.7
Investment	9.55	8.39	12.8	10.8	12.3
Amortization	1.34	1.72	1.96	1.94	2.06
Other	1.30	1.02	0.68	0.73	0.42

Sample of 3,028 municipalities.

4.80 The stratification by population size shows that investment expenditures experienced a larger increase in medium size municipalities. Given that medium size municipalities experienced a substantial increase of current revenues and generated large current account savings, they were able to increase investment expenditures. The lack of access to credit explains the stagnation of investments in small municipalities. On the contrary, the access

to credit operations (even if restricted) allowed largest municipalities to increase investment expenditures, even when current balances have deteriorated.

4.81 Debt amortizations increased in all municipalities but the increase was stronger in larger municipalities which confirm the enforcement of the contracts agreed between the National Treasury and 180 medium and large municipalities. Finally, cuts in other capital expenditures were applied in a similar magnitude independent of the size of municipalities.

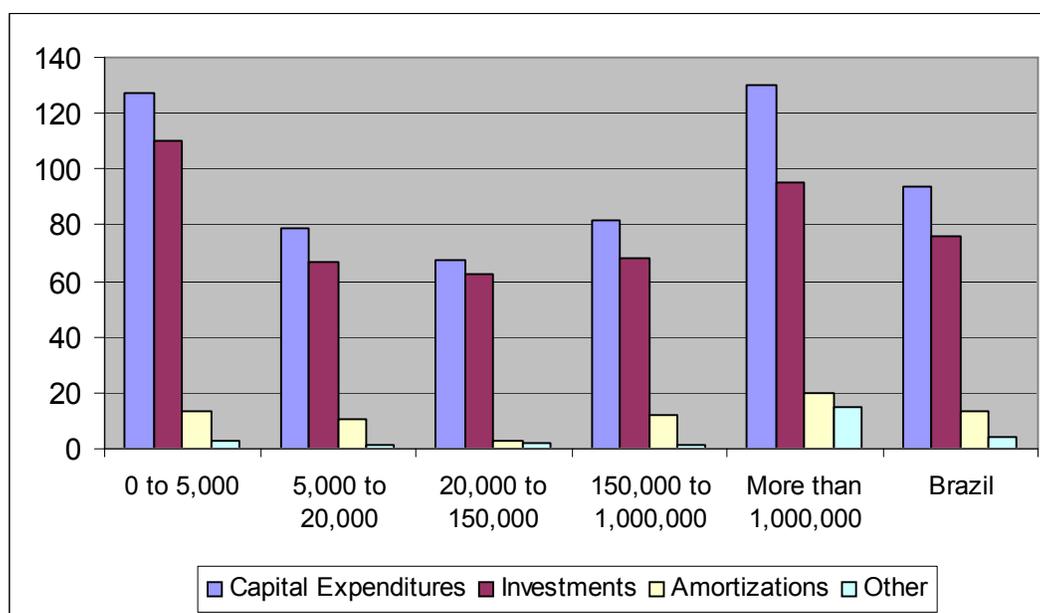
Table 4.19 Capital Expenditures Growth by Municipal Size, 2000-2004 (%)

	0-5,000	5,000-20,000	20,000-150,000	150,000-1,000,000	More than 1,000,000	Brazil
Capital Expenditures	-2.46	8.42	33.82	27.10	12.89	20.93
Investment	0.33	9.95	38.03	30.90	28.23	28.35
Amortization	0.38	25.05	56.53	44.67	72.90	53.33
Other	-63.74	-71.06	-74.75	-56.84	-67.91	-67.34

Sample of 4,965 municipalities.

4.82 Per capita capital expenditures present the same pattern observed in the revenue side and in the current expenditures. The smallest and the largest municipalities have total capital expenditures and investment expenditures that are about 50 percent higher than the national average figures. Differently, amortization payments and other capital expenditures are much higher in the largest municipalities.

Figure 4.5 Capital Expenditures Per Capita by Municipal Size, 2003 (R\$ of 2004)



4.83 The higher growth of personnel expenditures, interest payments and amortizations when compared with the growth of investments and the compression of other current and capital expenditures reflects the increasing rigidity of municipal expenditure composition. Figure 4.4 shows the increasing importance of personnel expenditures and the debt service obligations which make municipal expenditures more rigid. The share of these mandatory expenditure items increased from 40 percent in 2000 to 48 percent in 2004. Given that an increasing part of other current expenditures is becoming mandatory (for example the inclusion of some personnel expenditures, mentioned above), the expenditure rigidity would be more severe than at a first look.

4.84 On the opposite direction, the share of discretionary expenditures that includes investments and other capital expenditures as well as part of other current expenditures has been progressively reduced.

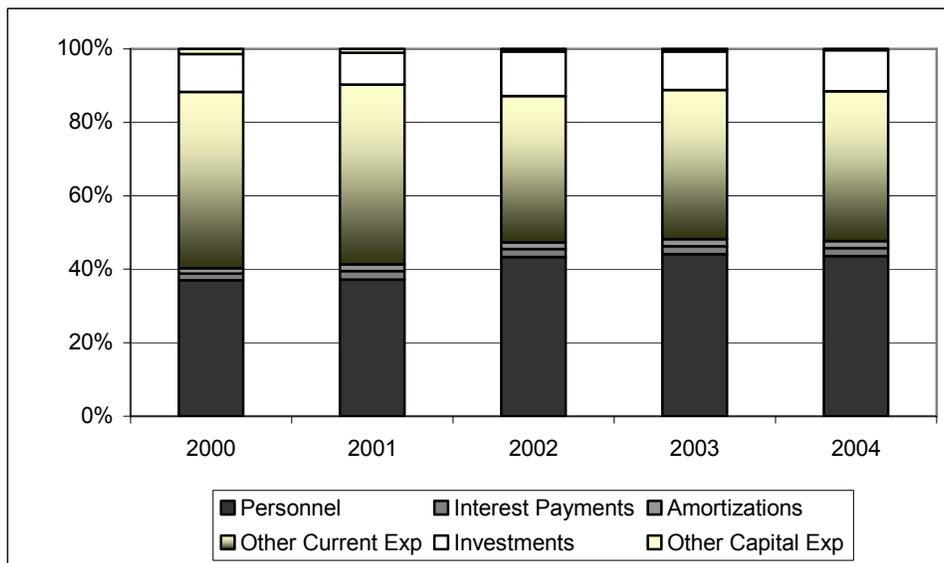
4.85 The increasing expenditure rigidity constitutes a real threat for the consolidation of the municipal fiscal adjustment and the continuity of municipal goods and service provision. As described above, the fiscal adjustment of municipalities was based on revenue increases and the control of expenditures categories that are more easily controlled by municipal authorities as investments and part of other current expenditures.

4.86 In summary, the sustainability of the fiscal adjustment of municipalities will depend on the ability to curb the increasing trend of mandatory expenditures. In particular, the containment of personnel expenditures will allow municipalities to enhance their ability to generate current account savings to finance investment expenditures.

4.87 Given the lack of access to credit operations and the fall of capital transfers from state and federal governments positive current account balances constitutes the only source to finance investment expenditures for small municipalities. Thus, on the expenditure side, the high level of personnel expenditures per capita suggests that small municipalities can control the expansion of this expenditure category without affecting municipal services delivery.

4.88 The heavy weight of the social security benefits to retired personnel and survivals and of debt services payments also reinforces the need for a strict control of personnel expenditures and for the rationalization of municipal goods and services purchases in large municipalities.

Figure 4.6 Municipal Expenditure Composition, 2000-2004



Box 4.4 Budget Rigidity

Budget rigidity arises from both sides of the budget. On the revenue side, constitutional or legal revenue earmarking mechanisms guarantee that certain type of government revenues should finance specific expenditures. As a result, it is forbidden the use of any resource legally earmarked to specific expenditures to other type of expenditure. Intergovernmental transfers and earmarking mechanisms to guarantee the financing of education and social security and assistance expenditures are the most relevant sources of revenue rigidity.

On the expenditure side, there are expenditures whose execution is considered mandatory and include legal (constitutional) obligations of the government such as interest payments personnel expenditures and entitlements such as social security and assistance benefits. Of course, there are some overlaps between the revenue rigidity and the expenditure rigidity which mean that there is a portion of mandatory expenditure that is financed with earmarked revenues.

The degree of budget rigidity is extremely high. In 2003, for example, 80% of the federal revenues were earmarked for specific purposes, whereas mandatory expenditures represented 89% of total non-financial expenditures by the federal government. Taking into account the overlapping mentioned above, the “fully free” portion of the executed budget in 2002 was just 4.5% of the non-financial revenues, or 8.1% of non-financial expenditures.

Municipalities also suffer a strong rigidity. On the revenue side, the constitutional norms establishing minimum levels of expenditure in specific sectors (15 percent of municipal revenues in health and 25 percent in education) are increasing the budget rigidity.

On the expenditure side, the increase of personnel payments observed in small and medium size municipalities also contributed to increase the expenditure rigidity at the municipal level. Additionally, the weight of debt services in highly indebtedness municipalities also contributes to increase municipal budget rigidity.

Whatever the way to measure the budget rigidity (portion of earmarked revenues on total revenues or portion of mandatory expenditures on total expenditures) and taking into account the overlap between both types of rigidities, it is clear that the portion of the budget that the government can allocate “freely” within an annual budget process is quite limited.

Municipal Expenditures by Function

4.89 Analyzing the evolution of municipal expenditures by economic functions for the period 2002-2004 it is possible that the municipal expenditure composition have not suffered significant changes. Over-head expenditures increased their participation on overall municipal expenditures from 28 percent to 29 percent of municipal expenditures while infrastructure functions reduced their share on municipal expenditures from 20.5 percent to 20 percent. Social expenditures preserved its participation at about 50% of municipal expenditures. The higher participation of overhead expenditures was the result of their higher expansion (6.5 percent) compared with the growth observed for total expenditures 4.2 percent). On the opposite direction the low growth of infrastructure expenditures (1.3 percent) justifies the fall in their share on municipal expenditure. As social expenditures grew at the same rate than total expenditures, they maintained their participation on municipal expenditures.

Table 4.20 Municipal Expenditures by Function, 2002-2004 (Billion of Reais of 2004)

Function	2002	% of total	2003	% of total	2004	% of total	% Growth 02/04
Over-Head	30.4	28.3%	29.9	28.4%	32.3	29%	6.5
Administration	19.6	18.3%	19.2	18.2%	20.2	18.2%	3.1
Social Security	5.5	5.1%	5.4	5.1%	6.6	5.9%	19.6
Interest Payments	5.2	4.9%	5.3	5.0%	5.5	5.0%	5.7
Social	52.4	48.9%	52.2	49.5%	24.6	48.9	4.2
Health	22.1	20.6%	22.3	21.2%	24.0	21.5%	8.6
Education	26.1	24.3%	25.8	24.5%	26.5	23.7%	1.5
Social Assistance	3.1	2.9%	3.2	3.0%	3.1	2.8%	1.3
Housing	1.1	1.1%	0.9	0.9%	1.0	0.9%	-13.3
Infrastructure	22	20.5%	20.8	19.7	22.3	19.9	1.3
Urbanism	12.8	11.9%	12.3	11.7%	13.5	12.1%	5.5
Sanitation	3.4	3.2%	3.0	2.9%	2.8	2.5%	-16.3
Other Infrastructure*	5.8	5.4%	5.5	5.2%	5.9	5.3%	2.2
Other**	2.5	2.3%	2.5	2.3%	2.5	2.2%	0
Total	107.2	100.0	105.3	100.0	111.7	100.0	4.2

*Other infrastructure aggregates expenditures on agriculture, environment, energy, industry and commerce, communications and transport.

** Other expenditures are public security, science and technology, citizenship rights and sport and leisure

Sample of 3198 municipalities.

4.90 Despite some stability on municipal expenditures composition among broad functions, strong changes can be observed for less aggregated categories. In particular, it is remarkable the high growth of social security benefits (almost 20 percent) which has led to the increase in the participation of this type of expenditure from 5 percent to 6 percent of municipal expenditures. On the social areas, health expenditures experienced a significant growth (9%) which increased their share on municipal expenditures while education expenditures' participation fell slightly. Also, the strong fall on housing expenditures has reduced the participation of this function on municipal expenditures. For the infrastructure side, it is worth to remark the strong fall on sanitation expenditures (-16%) which explains the decreasing importance of this function on municipal expenditures.

4.91 Analyzing the municipal expenditure composition according to the size of municipalities it is possible to observe substantial differences in the way in which municipalities allocate their resources among functions. Large municipalities allocate almost one third of their expenditures to overhead costs. Medium size municipalities allocate more than 50 percent of their expenditures to social areas and small municipalities proportionally dedicate more resources to infrastructure sectors.

Table 4.21 Municipal Expenditures Composition by Municipal Size (%)

Function	0 to 5,000	5,000 to 20,000	20,000 to 150,000	150,000 to 1,000,000	More than 1,000,000	Brazil
Over-Head	27.2%	25.4%	25.8%	28.1%	31.2%	27.8%
Administration	23.8%	21.7%	20.8%	20.3%	12.8%	18.7%
Social Security	1.8%	1.8%	2.4%	4.0%	9.3%	4.6%
Interest Payments	1.6%	1.9%	2.6%	3.8%	9.1%	4.5%
Social	49.7%	54.4%	53.0%	51.6%	45.2%	50.58%
Health	18.4%	19.4%	20.1%	24.7%	20.1%	21.1%
Education	26.5%	30.3%	29.0%	23.4%	21.3%	25.6%
Social Assistance	4.0%	4.1%	3.5%	2.7%	2.5%	3.1%
Housing	0.7%	0.7%	0.5%	0.8%	1.4%	0.8%
Infrastructure	21.6%	18.6%	19.1%	17.8%	21.3%	19.4%
Urbanism	7.0%	8.4%	11.2%	11.8%	13.6%	11.5%
Sanitation	1.6%	1.8%	3.0%	3.2%	2.9%	2.8%
Other Infrastructure	13.0%	8.4%	5.0%	2.8%	4.9%	5.2%
Other	1.6%	1.5%	2.1%	2.5%	2.4%	2.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Sample of 3198 municipalities.

4.92 Within each broad category significant differences can also be observed. Small municipalities allocate a significant share of their resources to administration expenditures while social security benefits and interest payments are very important in large municipalities. This finding confirms the pattern observed above which indicates that small municipalities has heavy active personnel expenditures while large municipalities have heavy retired personnel expenditures. Also, Table 4.21 confirms that debt burden is only important in large municipalities.

4.93 In social areas, it is possible to observe strong differences in the allocation to the education area. Municipalities with more than 5,000 to 150,000 inhabitants allocate 30 percent to education expenditures while the largest municipalities allocate only 21 percent to education. With the exception of medium to large municipalities (between 150 thousand to 1 million inhabitants), health expenditures represent about 20 percent of municipal expenditures. Housing expenditures are very low, but the largest municipalities allocate a substantially higher share to this type expenditure than the rest of municipal governments.

4.94 In the infrastructure sectors, it is important to note that the high share of infrastructure expenditures by the smallest municipalities is due to the heavier allocation (13 percent) of municipal resources to other infrastructure sectors (agriculture, environment, energy, etc). For urbanism and sanitation expenditures it is possible to observe a positive correlation between municipality size and the share dedicated to both infrastructure sectors.

4.95 In per capita terms, it is possible to observe the same pattern identified in the previous sections: in all the functions analyzed the smallest and largest municipalities have per capita expenditures that are much higher than

the Brazilian average. Table 4.22 reveals that the smallest and largest municipalities have overhead expenditures 50 percent higher than the observed in all Brazilian municipalities. In infrastructure sectors, this figure achieves 75%. As mentioned above the absence of economies of scale on small jurisdictions justifies the high per capita expenditures on overhead and infrastructure. Differences in municipal social expenditures per capita are less pronounced. Smallest and largest municipalities spend in per capita terms 25 percent more than the Brazilian municipalities' average.

4.96 More detailed analysis show that smallest municipalities have very high administration expenditures per capita while in large municipalities, the high levels of expenditure in social security and interest payments (3 times the national average in both cases) explain the high per capita expenditures in overhead functions.

4.97 The four sub sectors of social areas exhibit the same pattern mentioned above with the smallest and largest municipalities spending more resources in these areas. In the infrastructure sector, again it is noteworthy to mention that other infrastructure expenditures are responsible for the high expenditure per capita of the smallest municipalities. Differently, urbanism and sanitation expenditures per capita maintain the same positive correlation with the size of municipalities as the observed in absolute terms (see Table 4.20).

Table 4.22 Municipal Expenditures Per Capita by Municipal Size -2003 (R\$ of 2004)

Function	0 to 5,000	5,000 to 20,000	20,000 to 150,000	150,000 to 1,000,000	More than 1,000,000	Brazil
Over-Head	309	179	177	217	332	223
Administration	269	153	143	157	136	150
Social Security	21	12	16	31	99	36
Interest Payments	18	13	18	29	97	36
Social	561	383	364	398	482	405
Health	208	136	138	191	214	169
Education	301	213	199	180	227	205
Social Assistance	45	29	24	21	26	25
Housing	8	5	3	6	15	7
Infrastructure	244	131	131	137	227	155
Urbanism	80	59	77	91	144	92
Sanitation	17	12	20	25	31	22
Other Infrastructure	147	59	34	22	52	41
Other	18	11	15	19	25	18
Total	1,132	703	688	771	1,066	800

Sample of 3198 municipalities.

The evolution of municipal indebtedness and the restricted access to credit⁴³

4.98 As a result of the fiscal discipline, the enforcement of the Fiscal Responsibility Law and the hard credit access restrictions, Brazilian municipalities have maintained their indebtedness indicators at low levels. The Fiscal Responsibility Law indebtedness indicator, the net consolidated debt to net current revenue ratio increased slightly from 0.51 in 2000 to 0.54 in 2004. The good revenue performance expressed in a growth of 17 percent between 2000 and 2004 also contributed to keep this indebtedness ratio at a level well below the legal limit of 1.2⁴⁴.

4.99 In absolute terms, from 2000 to 2004 the municipal consolidated debt grew by 32 percent in real terms. However, it is important to mention that this growth was concentrated in 2002 when it increased 17 percent. The exchange rate shock of this year was the main responsible for the strong debt increase⁴⁵. In 2003, the municipal consolidated debt fell 5 percent as a result of the strong fiscal adjustment and the lack of access to credit operations. In 2004, the improvement of the economic situation and some relaxation of the restrictions to credit access allowed municipalities to contract credit operations that resulted in an increase of consolidated debt of 6 percent.

4.100 The most important component of municipal debt, the domestic contractual debt (share of 62 percent), has increased by 28 percent from 2000 to 2004. However, as mentioned above, this debt, which is basically debt with the federal government (National Treasury and Federal Banks), reached its highest level in 2002 due to the exchange rate devaluation (see previous footnote).

4.101 External debt is the smallest component of municipal debt (share of 5 percent) and it suffered a strong fall of 20 percent for the whole period that was accelerated after the devaluation of 2002 (from 2002 to 2004, it declined by 35 percent).

4.102 Table 4.23 shows that the social security contributions in arrears (share of 6 percent), other liabilities (share of 16 percent) and floating debt (share of 12 percent) have exhibited a strong volatility. In the case of social security contributions in arrears, the increasing coverage of municipal accounts (the progressive inclusion of indirect administration entities) resulted in the incorporation of debt with the National Institute of Social Security of these indirect entities by their respective municipalities. Currently, the federal government is negotiating with the Brazilian municipalities' association an overall term for the repayment of this debt. The specific terms of this negotiation should define the effect of the recognition of these liabilities on future debt service payments⁴⁶.

4.103 In the case of other liabilities which are basically debt with suppliers, the growth of this type of debt reflects its utilization as a finance mechanism given the difficult access to credit operations. Besides the normal budget execution problems that result in floating debt, the importance of this type of debt can be also explained by its increasing utilization as an informal way of financing.

4.104 In terms of net consolidated debt, as the financial assets held by municipalities strongly increased during 2000 to 2004, the growth of the net consolidated debt was 24 percent lower than the observed increase of consolidated debt. Municipalities have accumulated large financial assets which explain the fall of net consolidated debt. Positive financial results explain the accumulation of financial assets. Given the high interest rates paid by the federal government bonds, the financial revenues have become an important source of current revenues for subnational governments.

⁴³ Given the lack of detailed information on debt, the information presented in this section was produced by the WB staff using information of the Patrimonial Balances of municipalities.

⁴⁴ . Brazilian GDP accumulated growth from 2000 to 2004 was 9 percent, thus municipal revenues grew 90 percent above real GDP.

⁴⁵ . As mentioned in Box 4.1, debt stock of the most indebted municipalities (São Paulo, Rio among the most important) is very influenced by exchange rate. In 2002, São Paulo net consolidated debt rose by 20.2% in constant prices, mainly due to the exchange rate devaluation which promoted a big increase of the General Price Index (IGP) which is the index used to correct the municipal debt with STN.

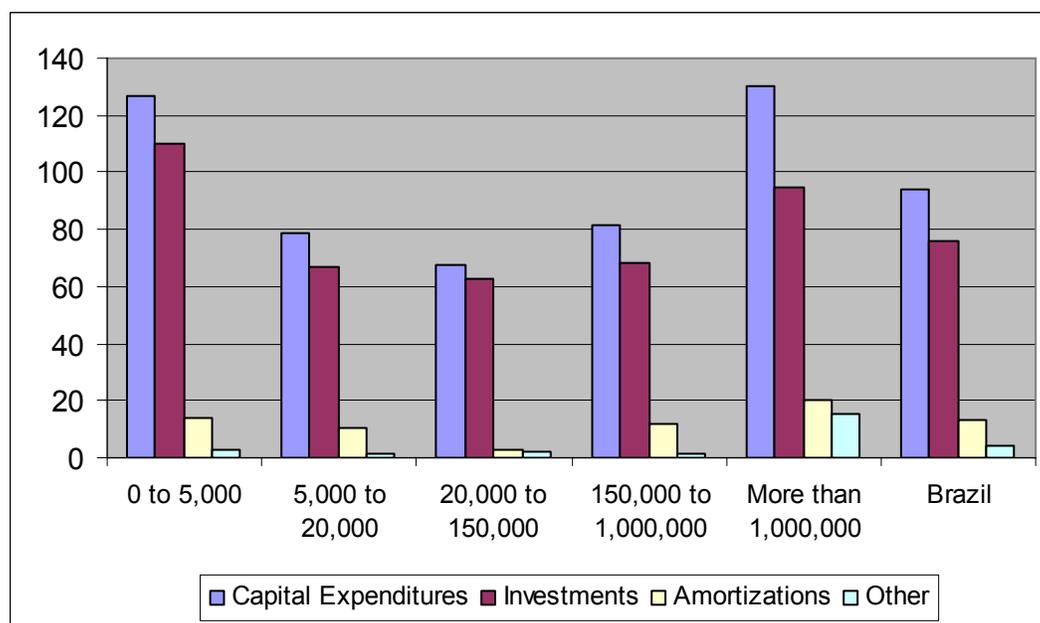
⁴⁶ . The contingent nature of this type of debt recommends some warning with the accuracy of the numbers.

Table 4.23 Municipal Consolidated 2000-2004 (Billion of R\$ of 2004)

	2000	2001	2002	2003	2004
Consolidated Debt	54,0	60,1	70,3	66,8	71,0
Contractual	37,8	38,7	50,0	44,7	47,1
Domestic	34,7	35,4	43,2	41,9	44,6
External	3,1	3,3	3,7	2,8	2,4
Social Security contributions in arrears	3,0	1,9	3,2	7,7	3,5
Other liabilities	4,2	10,9	12,7	6,9	13,6
Floating Debt	8,9	8,5	7,4	7,4	6,8
Deductions	7,4	13,6	15,0	13,6	13,2
Financial Assets	(7,33)	(13,6)	(15,0)	(13,6)	(13,2)
Loans	(0,02)	(0,02)	(0,03)	(0,02)	(0,02)
Net Consolidated Debt	46,6	46,4	55,3	53,2	57,8
Net Current Revenue	92,0	98,4	101,3	99,5	107,6
Consolidated Net Debt/Net Current Revenue	0,51	0,47	0,55	0,53	0,54

Sample 3,028 municipalities.

Figure 4.7 Municipal Deb Composition (% average 2000-04)



4.105 Analyzing the municipal debt by the size of municipalities, it is possible to confirm that indebtedness is highly concentrated in the largest municipalities which account for 66 percent of total municipal consolidated debt and 77 percent of total municipal net consolidated debt.

4.106 The high concentration of debt in large municipalities also is confirmed in per capita figures. The consolidated debt per capita of the largest municipalities is more than ten times the per capita debt of the smallest ones. The net consolidated debt per capita of the largest municipalities is 40 times the observed for the smallest one. Also, it is important to mention that differently from most of the revenue and expenditure per capita figures where largest and smallest municipalities had the highest levels, in the case of per capita debt there is a positive relationship between indebtedness per inhabitant and the size of municipalities.

4.107 In terms of debt composition, given the lack of access to credit, the smallest municipalities the main component of the debt of small municipalities are the floating debt and other liabilities. For this type of municipalities, domestic contractual debt is very low and they do not have external debt. Differently, the debt of medium to large municipalities rely is mainly domestic contractual debt. For the largest municipalities domestic contractual debt represents 74 percent in the largest municipalities and external debt accounts for 6 percent of the consolidated debt of the largest municipalities. The social security debt has a similar weight in all the groups, varying between 10 and 15 percent of municipal debt.

Table 4.24 Municipal Consolidated Debt by Municipal Size -2003 (R\$ of 2004)

	0 to 5,000	5,000 to 20,000	20,000 to 150,000	150,000 to 1,000,000	More than 1,000,000	<i>Brazil</i>
Consolidated Debt	0.536	3.210	8.520	12.1	48.0	72.4
Contractual	0.056	0.407	1.976	5.536	38.24	46.14
Domestic	0.055	0.402	1.880	5.410	35.6	43.3
External	0.001	0.005	0.076	0.126	2.64	2.84
Social Security contributions in arrears	0.074	0.552	1.090	0.138	5.50	8.54
Other liabilities	0.104	0.806	2.590	2.700	2.08	8.28
Floating Debt	0.302	1.440	2.940	2.520	2.24	9.44
Deductions	0.422	1.609	4.894	4.748	4.53	16.19
Financial Assets	(0.422)	(1.600)	(4.890)	(4.580)	(4.52)	(16.0)
Loans	(0.000)	(0.009)	(0.004)	(0.168)	(0.01)	(0.19)
Net Consolidated Debt	0.114	1.600	3.630	7.380	43.5	56.2
Net Current Revenue	3.943	16.21	33.95	29.42	29,68	113.2
Consolidated Net Debt/Net Current Revenue	0.03	0.1	0.1	0.25	1.47	0.50
Memo items:						
<i>Consolidated debt per capita</i>	<i>136.31</i>	<i>123.51</i>	<i>155.54</i>	<i>286.87</i>	<i>1,485.55</i>	<i>454.65</i>
<i>Net Consolidated debt per capita</i>	<i>28.98</i>	<i>61.60</i>	<i>66.18</i>	<i>174.59</i>	<i>1,345.59</i>	<i>352.97</i>

Sample of 4,965 municipalities.

4.108 The problem of excessive indebtedness, expressed in a net consolidated debt to net current revenue ratio higher than the FRL ceiling of 1.2, also affects a very few number of municipalities. In fact, in 2003 only 41 out of 4,965 municipalities or 0.8 percent had the indebtedness FRL indicator above the legal limit. From this sample, 4,894 municipalities or 98.5 percent of Brazilian municipalities have an indebtedness ratio lower than 1 and 4,548 municipalities or 92 percent have a FRL debt indicator of 0.5, well below the legal limit of 1.2.

Table 4.25 Number of Municipalities by Net Consolidated Debt to Net Current Revenue Ratio

DCL/RCL	0 to 5,000	5,000 to 20,000	20,000 to 150,000	150,000 to 1,000,000	More than 1,000,000	Brazil
0.00 – 0.25	1,024	1,888	885	76	5	3,878
0.25 – 0.50	111	316	214	27	2	670
0.50 – 0.75	22	129	80	11	2	244
0.75 – 1.00	8	54	34	5	1	102
1.00 – 1.20	3	15	5	6	1	30
More than 1.20	4	15	14	7	1	41
Total	1172	2417	1,232	132	12	4,965

4.109 Restricting to the group of municipalities with more than 150,000 inhabitants which are the relevant group for potential credit operations by the Bank, given the scale of the projects that can be financed, 132 out of the 144 municipalities or 94.5 percent of this group have a FRL debt indicator below the legal ceiling and able to contract credit operations. Thus, the problem of high indebtedness affects only a very restricted group of municipalities. As a result, it is possible to conclude that the Fiscal Responsibility Law ceiling on indebtedness is not a binding constraint for most of the Brazilian municipalities. (See Annex 2 with the complete list of municipalities with population higher than 150,000 inhabitants that are below the FRL limit).

4.110 However, there are other mechanism that effectively constraints the ability of municipalities to contract credit operations. The debt renegotiation agreements that the National Treasury and 180 municipalities agreed under the resolution MP2185 of 2001 condition the contract of credit operations by this set of municipalities. This legal instrument regulates the refinancing of the debt of 180 municipalities, and defines a debt chronogram which prohibits the issuance of municipal bonds during the time of the agreement.

4.111 New credit operations are also conditioned to a satisfactory accomplishment of the chronogram of debt service. In fact, the agreements establish the collateralization of resources to ensure debt service and the corresponding authorization to the federal government to withhold transfers mandated by the Constitution.

4.112 Even more important, in addition to the above controls on the demand for credit given by the FRL and the debt renegotiation agreements, the resolutions of the National Monetary Council (CMN) constitute the most important mechanism for the restraining of the credit supply to public sector entities. Basically, the first resolution, 2827 establishes the 45% exposure limit of domestic financial institutions to the borrowing of the public sector and a global limit of domestic credit to the public sector. Further resolutions altered the article 9 of the Resolution 2827 which defined the global limit and allowed some operations in specific sectors (sanitation and energy infrastructure projects).

4.113 Specifically, the first control channel was to limit the exposure of domestic financial institutions to the public sector borrowers. The exposure limit was set by Resolution 2827 (March 2001) to 45 percent of equity—a limitation that is particularly binding for the *Caixa Econômica Federal* (CEF) and *Banco Nacional de Desenvolvimento Econômico e Social* (BNDES) and other state government development banks which constitute the most important source of credit supply for subnational governments.

4.114 The second control channel was to establish a global limit of domestic credit to public entities. The article 9 of the 2827 CMN resolution set a global limit for domestic credit operations to public entities of R\$1 billion. Subsequently this limit was further reduced to R\$ 200 million by Resolution 2954 of 2002. Exceptions have been made for certain sectors, for example, Resolution 3153 of December 2003 exempted credit operations for sanitation projects from this limit and established a limit of domestic credit operations to public sector entities of R\$ 1.1 billion directed to finance sanitation projects.

4.115 The very low limits established by the CMN resolution practically eliminated the access to credit operations by municipalities. Demand for credit operations was estimated at about R\$ 10 billion, which implies that the infrastructure needs are many times higher than the global limits established by the CMN.

4.116 External borrowing also faces hard constraints. External credit operations need to be approved in a first step by the COFIEX (External Finance Commission) which is composed by the Planning and the Finance ministries who evaluates the adequacy of the projects to be financed. The second step is to obtain the sovereign guarantee by the National Treasury. Any external credit operation to public entities including subnational needs the guarantee of the Treasury. To give the sovereign guarantee, the National Treasury verifies the accomplishment of the targets defined in the debt renegotiation agreements and evaluates the indebtedness and repayment capacity of the borrower.

4.117 In summary, restrictions on the demand and supply side have exerted an efficient control that practically eliminated the access to credit operations by municipalities and were responsible for the slow growth of municipal indebtedness since 2000.

Conclusions and Policy Implications

4.118 Since 2000 municipal governments have adopted a sound fiscal performance that has been expressed in the generation of increasing fiscal balances. The improvement of fiscal balances has not been homogeneous among municipal government units. Small and medium size municipalities experienced a stronger improvement than the largest municipalities. In fact, fiscal balances of the municipalities with population superior to 1 million of inhabitants have been reduced.

4.119 The overall fiscal adjustment of the Brazilian public sector, the enactment of the Fiscal Responsibility Law in 2000 and the imposition of strong credit access restrictions have fostered the improvement of municipal fiscal balances.

4.120 Municipal governments have accompanied the adjustment efforts of the federal government to generate increasing primary surpluses, which in turn contributed to the overall improvement in Brazil's fiscal accounts.

4.121 The Fiscal Responsibility Law (FRL) has encouraged the fiscal adjustment of municipalities. The establishment of ceilings for indebtedness, for credit operations, for personnel for expenditures, debt service payments and the observance of the golden rule reinforced the adoption of prudent fiscal stances by municipalities. Besides the consolidation of fiscal responsibility, the Fiscal Responsibility Law promoted the strengthening of fiscal transparency and planning at the municipal level.

4.122 Finally, the imposition of hard domestic credit supply constraints has guaranteed the generation of municipal positive primary results.

4.123 As a result of its general sound fiscal performance and the hard credit access restrictions, the aggregated municipal level has complied with the fiscal limits established by the Fiscal Responsibility Law (FRL). The aggregate municipal FRL indicators are well below the legal ceilings and even more important, most of the FRL indicators did not exhibit a clear deteriorating trend during the last five years.

4.124 Net consolidated debt as a proportion of net current revenue, used for compliance of the Fiscal Responsibility Law, has fluctuated around 35 percent, far below the legal ceiling of 120 percent. Debt service as a proportion of the net current revenue has oscillated around 4 percent, well below the legally-imposed limit of 11.5 percent. The lack of access to credit operations, made the indicator credit operations to net current revenue to vary around the 1 percent level while the corresponding FRL limit is 16%. Differently, despite being below the ceiling of 60 percent, there was observed an increasing trend for personnel expenditures to net current revenue ratio which grew from 43 percent in 2000 to 47 percent in 2004. In fact, the most important risk for municipal finances is the difficulty to curb increasing trend of personnel expenditures. Additionally other financial indicators reveal that most of the Brazilian municipalities have a strong capacity to generate cash flows to face their debt service obligations and to finance a substantial part of their investment expenditures.

4.125 In general, small and medium size municipalities have better FRL and financial indicators than the largest municipalities. In particular:

- the high indebtedness is a problem only for the largest municipalities;
- the lack of access to credit operations by small municipalities makes them to finance with current account balances the totality of their investment expenditures;
- the largest municipalities has ability to pay their interest obligations on debt, however credit operations are needed to finance part of their investment needs;
- the growth of personnel expenditures is a common problem for all municipal governments; however,
- the source of the excess of personnel expenditures is different. Small municipalities have an excess of active personnel expenditures while the largest ones have excess of social security benefits to retired personnel.

4.126 The improvement in the municipal fiscal balances was based on the good performance of revenues, in particular on the increase of current revenues. The strong increase of municipal current revenues happened in a period of low economic growth which makes more remarkable this achievement. On the contrary, the declining performance of capital revenues reflects the hard credit restrictions imposed by the federal government on credit operations. At the same time, capital transfers from federal and state governments also suffered a strong reduction which resulted from the fiscal adjustment effort of both levels of government.

4.127 The good performance of municipal tax revenues indicates the enhancement of tax collection efficiency. In the last years, many municipal governments launched an aggressive program to enhance the efficiency of the municipal revenue services. Investments in software and the modernization of administrative processes were responsible for the improvement of tax collection effort.

4.128 Medium size municipalities experienced the higher growth of current revenues which resulted from a good tax revenue performance, a significant increase of intergovernmental transfers and an exceptional performance of other current revenues. Small and medium size municipalities have improved their tax collection performance more than the. On the opposite side the largest municipalities' current revenues had a disappointing performance that partially explains the worsening of their fiscal situation.

4.129 Despite the higher increase of tax revenues in small and medium size municipalities there remain striking differences in per capita terms. Tax revenue per capita of the largest municipalities is nine times the tax revenue of the smallest one. On the opposite direction, the redistributive nature of federal transfers and the distortions provoked by the rules of distribution that favored the creation of small municipalities explain the fact that federal transfers per capita in the smallest municipalities are five times the federal transfers per capita to the largest municipalities and three times the transfers per capita to the medium size municipalities.

4.130 As a consequence, the composition of municipal current revenue reveals strong differences. There is a severe dependence of small and medium size municipalities on intergovernmental transfers, with a weight of transfers varying between 91 and 74 percent of current revenues. The dependence on intergovernmental transfers in the municipalities with population higher than 150,000 is much lower varying between 62 and 45 percent of current revenues.

4.131 The high significance of intergovernmental transfers on municipal current revenues represents a major risk on the revenue side in the sense that reductions of tax revenues of the federal and state governments shared with municipalities would have a significant impact on the finances of these recipients units. The constitutional nature of most of the intergovernmental transfers received by municipalities alleviates in some extent the vulnerability of municipal finances derived from the extreme dependence on this revenue source. In any case, and independent of the size of the municipalities, the enhancement of the tax collection effort of the municipalities would increase the ability to generate current savings and expand municipal investments while would reduce the dependence on transfers from higher level of government.

4.132 Municipal capital revenues have not only stagnated but also have suffered a strong volatility. Credit operations are highly concentrated in the largest municipalities which responded for 70 percent of them. In fact, small municipalities do not have access to credit operations. However, small municipalities are financed by capital transfers from the federal and state governments.

4.133 The stagnation of capital revenues resulted from the domestic supply credit constraints imposed by the National Monetary Council (CMN) which practically blocked the access to credit operations by municipalities. In turn, the fiscal adjustment of the federal government and state governments limited and made more uncertain the capital transfers from these higher levels of governments to municipalities.

4.134 Municipal expenditures have experienced a lower increase of expenditures than of the observed in the revenue side. The increase of municipal expenditures was commanded by the increase of mandatory expenditures. Personnel expenditures, interest payments and amortizations experienced a strong increase. On the contrary, investment and other current expenditures have been reduced in the last years.

4.135 As a consequence, the evolution of the municipal expenditure composition shows an increasing rigidity on the expenditure side which is characterized by a rising share of mandatory expenditures that is reducing the space of maneuver of municipalities for sustaining their fiscal adjustment effort. In particular, the increasing trend of mandatory expenditures obligates municipalities to raise the tax burden or to cut investment expenditures as the available adjustment options.

4.136 Thus, the increasing expenditure rigidity constitutes a real threat for the consolidation of the municipal fiscal adjustment and the continuity of municipal goods and service provision which requires the expansion of the fiscal space for municipal investment expenditures.

4.137 The rationalization of government purchases through the improvement of procurement methods, the use of electronic tools and other management measures offer a potential way for the reduction of current expenditures opening space for investment expenditures in a context of hard fiscal constraints.

4.138 The stratification of municipalities by population size reveals a strong concentration of expenditures in the largest municipalities and high expenditures per capita in the smallest and largest municipalities. This finding is valid for all the expenditures categories.

4.139 It is natural that the much higher financial capacity justifies the concentration of municipal expenditures in large municipalities. The high per capita expenditures observed in the smallest municipalities results from the lack of economies of scale as municipal goods and services provision can not justify this high expenditure per capita. In particular, the existence of fixed costs explains the high per capita expenditures in the smallest municipalities which are mostly financed by intergovernmental transfers.

4.140 The prospects for municipal finances in the next years are positive. This expectation is based on two important assumptions: an economic growth higher than population growth and that the responsible fiscal stance will remain.

4.141 A higher economic growth is responsible for a higher rate of increase on revenues than on expenditures, which depends more on population growth. There is a strong consensus indicating a strong improvement of the economic scenario for Brazil in the next years. At the same time, the enhancement of tax revenue collection efficiency can reinforce the positive effect of economic growth on municipal revenues. Additionally, other current revenues as user charges or cost recovery need to be exploited in order to finance municipal investments.

4.142 On the expenditure side, as mentioned above the interruption of the increasing expenditure rigidity constitute the main challenge for the next years. In particular, the reduction of the weight of personnel expenditures on municipal finances and the rationalization of operating costs would expand the current narrow space for municipal investment expenditures.

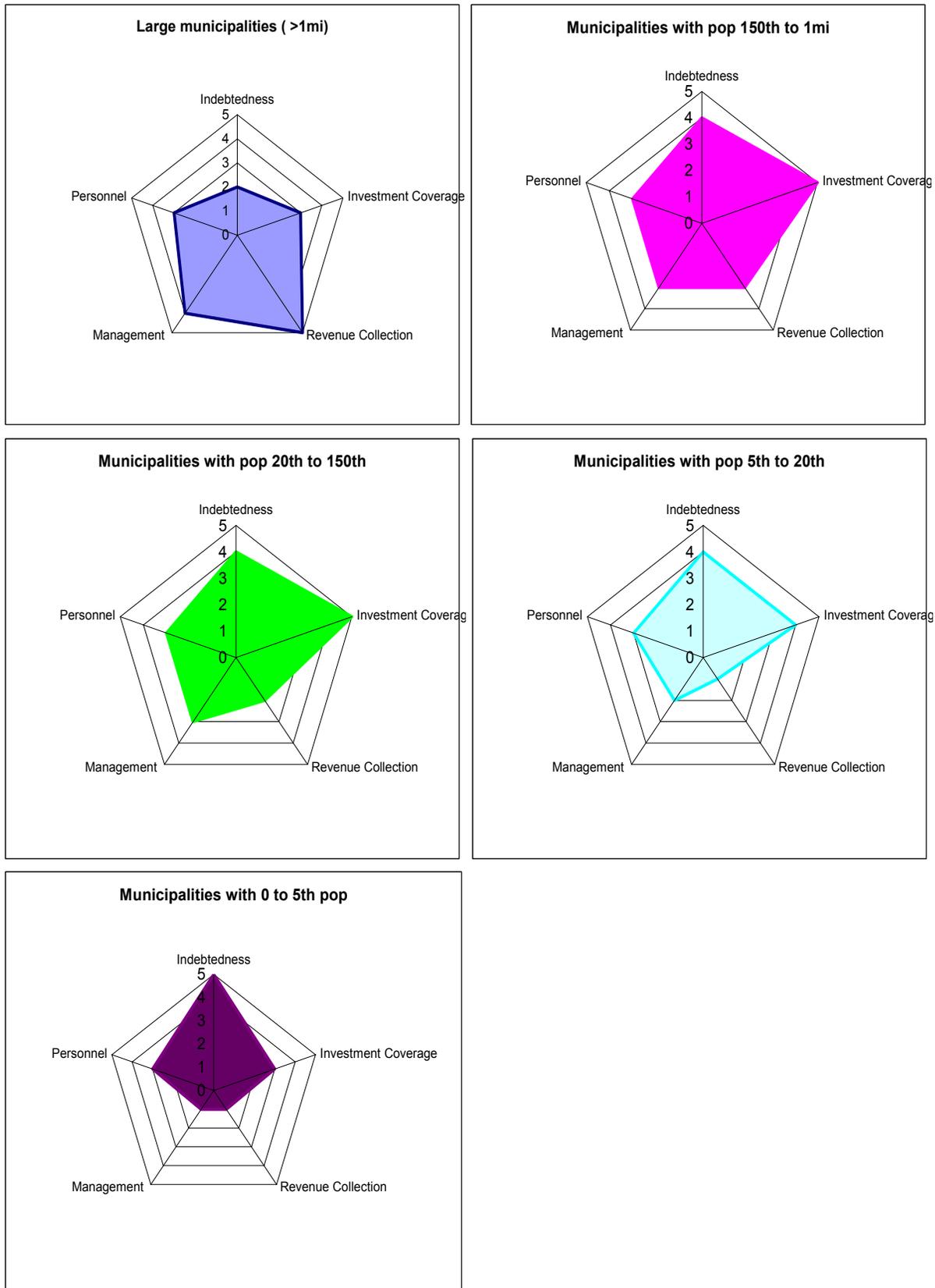
4.143 Even with the increase of the fiscal space for municipal investment, the large demand for the expansion of the municipal infrastructure and strengthening of service delivery indicates the need for developing instruments to finance municipal investments. The strong fiscal adjustment effort, the development of an institutional framework

for fiscal responsibility and the improvement of fiscal transparency and fiscal planning fostered by the Fiscal Responsibility Law would improve the creditworthiness of Brazilian municipal governments opening space for the development of a municipal lending market.

4.144 At this respect, given the strong heterogeneity among Brazilian municipalities a compound approach needs to be implemented. Figure 4.5 depicts the most relevant financial characteristics and constraints of the municipalities by population type that can orient the definition of a lending policy to municipal governments. The criteria used to classify municipalities are: indebtedness, investment coverage, the ability to collect tax revenues, municipal public sector management and the weight of personnel expenditures on municipal finances. Each indicator is measured in each one of the axis of the radar. The rating for each dimension varies from 0 (worst) to 5 (best). Thus, the municipalities that occupy a bigger area of the radar are in a better situation.

4.145 Overall, municipalities with a population size between 150 thousand to 1 million are in a better financial position as they exhibit a more balanced rating schedule. They have a low level of indebtedness, a large ability to generate cash flows to finance investments, an intermediate tax collection effort and management capacity and have the same problem with the excessive weight of personnel expenditures as the rest of Brazilian municipalities. As mentioned above, the largest municipalities have a high indebtedness problem that limits their access to credit operations. Small municipalities have a very low tax revenue collection effort and a poor management capacity.

Figure 6: Municipal Financial Typology by population size

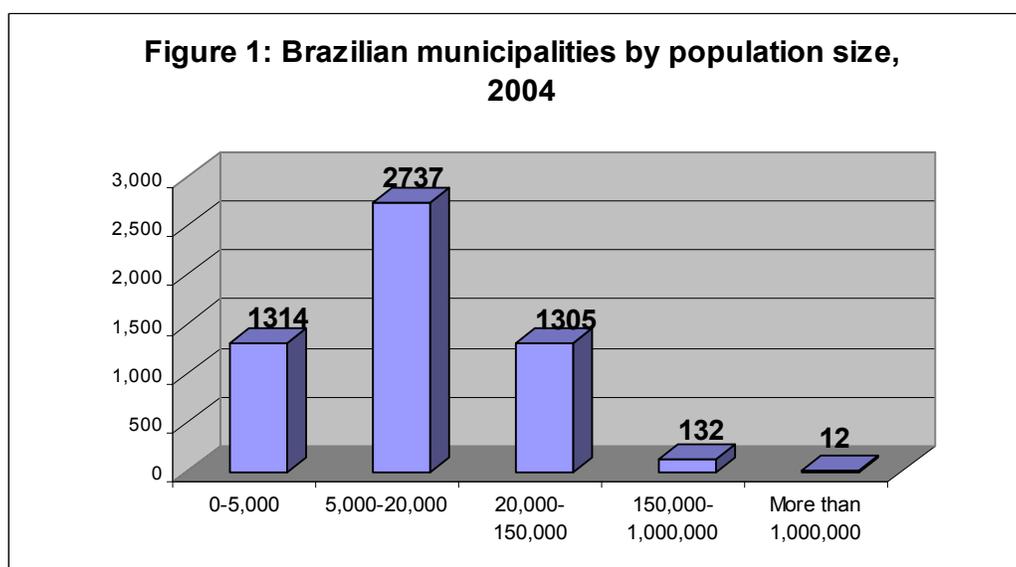


4.146 In summary, municipalities up to 1 million inhabitants have a large space for further indebtedness and they have ability to generate current account savings that guarantees a strong repayment capacity. Also, lending programs to finance investments in these municipalities would be accompanied by a public sector management component directed to the rationalization of expenditures and the enhancement of revenue collection effort.

Annex: Brazilian Municipalities Background Information (to be expanded)

4.147 Brazil is a federal system comprising the federal government, 26 state governments and 5,506 municipalities. Differently from other federal countries, since the Constitution of 1988, municipalities are autonomous entities having the same status enjoyed by state governments.

4.148 The municipal level is dominated by small government units. More than 4,000 municipalities have population below 20,000 inhabitants, 1,300 municipalities have population between 20,000 to 150,000 inhabitants, 132 municipalities have population between 150,000 to 1,000,000 and 12 municipalities have a population above 1,000,000 of inhabitants.



4.149 Table 4.26 shows strong disparities in terms of population and GDP. Small municipalities, which represent 75 percent of the municipal units, respond for 19 percent of the Brazilian population and for 14 percent of the national GDP. The municipalities with more than 150,000 inhabitants, which represent 3 percent of Brazilian municipalities, respond for almost 50 percent of population and 52 percent of Brazilian GDP.

Table 4.26 Population and GDP by Municipal Size

	Population in 2000 (million)	Share of Total Population	GDP – 2002 (Billion of R\$ of 2004)	Share of Total GDP
0-5,000	3.9	2.5	32.5	2.1
5,000-20,000	26.0	16.3	177.3	11.3
20,000-150,000	54.8	34.4	478.6	30.5
150,000-1,000,000	42.3	26.5	469.2	29.9
More than 1,000,000	32.3	20.3	409.1	26.1
Total	159.3	100.0	1,566.7	100.0

Source: IBGE.

4.150 For the analysis of the municipal finances two samples were used. For the analysis of the evolution of municipal finances during the period 2000-2004, given the data availability limitations, a sample of 3,208 municipalities were used to make consistent inter temporal comparisons. These 3,028 municipalities respond for 78 percent of the Brazilian population. For the cross comparisons by municipal population size, it was selected the

year of 2003 as it has the largest sample (4,967 municipalities) representing 95 percent of the Brazilian population.

Table 4.27 Municipalities with FRL Indebtedness Indicator Below 1.2

Municipality	Population	Net consolidated debt (NCD)	Net current revenue (NCR)	Primary Balance (PB)	NCD/NCR	Debt service / NCR
		R\$ Million			(FRL Ceiling= 1.2)	(FRL Ceiling=0.115)
RIO BRANCO/AC	253,059	57.2	149.0	4.7	0.38	0.01
ARAPIRACA/AL	186,466	18.0	95.7	1.3	0.19	0.01
MACEIO/AL	797,759	17.2	410.4	61.9	0.04	0.05
MANAUS/AM	1,405,835	31.0	816.0	83.0	0.04	0.03
MACAPA/AP	283,308	28.9	126.5	6.4	0.23	0.00
CAMACARI/BA	161,727	13.3	235.4	-10.7	0.06	0.06
FEIRA DE SANTANA/BA	480,949	63.8	150.3	7.6	0.42	0.02
ILHEUS/BA	222,127	45.7	90.0	8.2	0.51	0.03
ITABUNA/BA	196,675	111.1	106.1	10.6	1.05	0.05
VITORIA DA CONQUISTA/BA	262,494	57.9	116.3	4.7	0.50	0.03
CAUCAIA/CE	250,479	-12.2	99.0	10.0	(0.12)	0.01
FORTALEZA/CE	2,141,402	-76.8	1,357.1	-49.3	(0.06)	0.02
JUAZEIRO DO NORTE/CE	212,133	19.7	81.0	1.4	0.24	0.02
MARACANAU/CE	179,732	-15.4	131.1	14.8	(0.12)	0.01
SOBRAL/CE	155,276	13.1	122.3	0.7	0.11	0.01
CACHOEIRO DE ITAPEMIRIM/ES	174,879	32.6	87.3	6.4	0.37	0.04
CARIACICA/ES	324,285	37.2	96.1	-0.5	0.39	0.02
SERRA/ES	321,181	126.6	201.1	19.0	0.63	0.03
VILA VELHA/ES	345,965	60.8	162.0	-7.8	0.38	0.02
VITORIA/ES	292,304	68.1	422.6	26.7	0.16	0.03
ANAPOLIS/GO	288,085	50.9	150.0	14.3	0.34	0.04
APARECIDA DE GOIANIA/GO	336,392	0.2	117.4	12.7	0.00	0.01
GOIANIA/GO	1,093,007	492.6	915.1	42.1	0.54	0.02
IMPERATRIZ/MA	230,566	35.8	101.3	3.3	0.35	0.02
SAO LUIS/MA	870,028	108.8	544.7	12.2	0.20	0.02
BELO HORIZONTE/MG	2,238,526	884.6	2,057.4	26.1	0.43	0.04
BETIM/MG	306,675	65.7	385.5	16.3	0.17	0.03
DIVINOPOLIS/MG	183,962	39.4	115.9	2.6	0.34	0.03
GOVERNADOR VALADARES/MG	247,131	12.0	158.6	3.2	0.08	0.02
IPATINGA/MG	212,496	-6.2	195.2	20.7	(0.03)	0.05
JUIZ DE FORA/MG	456,796	51.2	337.1	28.2	0.15	0.02
MONTES CLAROS/MG	306,947	73.3	154.4	10.1	0.47	0.03
RIBEIRAO DAS NEVES/MG	246,846	7.9	60.6	-14.9	0.13	0.03
SANTA LUZIA/MG	184,903	26.9	76.4	-6.9	0.35	0.02
SETE LAGOAS/MG	184,871	47.8	105.4	7.8	0.45	0.05
UBERABA/MG	252,051	16.4	202.1	7.7	0.08	0.02
UBERLANDIA/MG	501,214	23.5	376.6	-9.2	0.06	0.02
CAMPO GRANDE/MS	663,621	46.4	561.6	25.4	0.08	0.02

Municipality	Population	Net consolidated debt (NCD)	Net current revenue (NCR)	Primary Balance (PB)	NCD/NCR	Debt service / NCR
DOURADOS/MS	164,949	98.7	117.6	6.7	0.84	0.03
CUIABA/MT	483,346	344.7	342.7	44.1	1.01	0.10
RONDONOPOLIS/MT	150,227	47.2	109.8	10.1	0.43	0.04
VARZEA GRANDE/MT	215,298	44.0	118.4	17.9	0.37	0.04
ANANINDEUA/PA	393,569	6.9	102.5	9.6	0.07	0.01
BELEM/PA	1,280,614	28.0	679.0	21.7	0.04	0.02
MARABA/PA	168,020	4.4	92.0	1.0	0.05	0.02
SANTAREM/PA	262,538	5.7	97.7	19.9	0.06	0.02
CAMPINA GRANDE/PB	355,331	-15.7	161.7	-55.0	(0.10)	0.04
JOAO PESSOA/PB	597,934	47.4	366.5	43.2	0.13	0.02
CABO DE SANTO AGOSTINHO/PE	152,977	5.8	102.4	10.4	0.06	0.01
CARUARU/PE	253,634	2.0	91.0	-1.2	0.02	0.01
JABOATAO_DOS GUARARAPES/PE	581,556	85.8	164.9	13.6	0.52	0.02
OLINDA/PE	367,902	64.2	101.4	3.3	0.63	0.03
PAULISTA/PE	262,237	-3.6	82.9	-2.7	(0.04)	0.04
PETROLINA/PE	218,538	81.6	93.0	3.3	0.88	0.08
RECIFE/PE	1,422,905	186.7	1,021.3	-8.6	0.18	0.02
TERESINA/PI	715,360	-38.4	391.5	16.9	(0.10)	0.03
CASCADEL/PR	245,369	23.3	138.4	-2.4	0.17	0.05
COLOMBO/PR	183,329	-26.4	91.2	5.0	(0.29)	0.05
CURITIBA/PR	1,587,315	488.7	1,977.5	134.4	0.25	0.04
FOZ DO IGUAQU/PR	258,543	69.2	232.8	16.2	0.30	0.07
GUARAPUAVA/PR	155,161	-5.9	88.1	-7.2	(0.07)	0.01
LONDRINA/PR	447,065	79.1	391.4	-26.9	0.20	0.02
MARINGA/PR	288,653	117.5	248.3	23.2	0.47	0.05
PONTA GROSSA/PR	273,616	97.0	159.5	-11.2	0.61	0.05
SAO JOSE DOS PINHAIS/PR	204,316	-14.6	193.2	4.7	(0.08)	0.04
BARRA MANSÁ/RJ	170,753	-1.6	121.8	11.7	(0.01)	0.04
BELFORD ROXO/RJ	434,474	3.0	127.4	11.5	0.02	0.01
DUQUE DE CAXIAS/RJ	775,456	-5.1	497.3	-0.9	(0.01)	0.00
ITABORAÍ/RJ	187,479	5.6	97.0	-4.6	0.06	0.00
MAGE/RJ	205,830	34.7	89.7	0.3	0.39	0.01
NILOPOLIS/RJ	153,712	21.9	54.4	0.9	0.40	0.04
NITERÓI/RJ	459,451	64.8	455.0	-6.0	0.14	0.02
NOVA FRIBURGO/RJ	173,418	53.1	127.3	-2.2	0.42	0.00
NOVA IGUAQU/RJ	920,599	-48.4	221.3	18.1	(0.22)	0.01
PETROPOLIS/RJ	286,537	44.8	264.6	7.5	0.17	0.01
RIO DE JANEIRO/RJ	5,857,904	5005.5	6,607.3	810.1	0.76	0.10
SAO GONCALO/RJ	891,119	0.1	245.2	18.4	0.00	0.01
SAO JOAO DE MERITI/RJ	449,476	-34.3	134.8	-0.6	(0.25)	0.01
VOLTA REDONDA/RJ	242,063	248.3	290.5	18.3	0.85	0.01
MOSSORÓ/RN	213,841	61.6	130.1	2.2	0.47	0.02
NATAL/RN	712,317	13.4	426.4	24.4	0.03	0.02

Municipality	Population	Net consolidated debt (NCD)	Net current revenue (NCR)	Primary Balance (PB)	NCD/NCR	Debt service / NCR
PORTO VELHO/RO	334,661	298.0	190.7	8.5	1.56	0.03
BOA VISTA/RR	200,568	16.5	156.4	3.4	0.11	0.03
ALVORADA/RS	183,968	-12.9	63.4	1.5	(0.20)	0.07
CANOAS/RS	306,093	-65.7	297.1	20.7	(0.22)	0.01
CAXIAS DO SUL/RS	360,419	-115.3	426.8	21.8	(0.27)	0.02
GRAVATAI/RS	232,629	137.2	118.3	-13.6	1.16	0.05
NOVO HAMBURGO/RS	236,193	39.1	179.2	10.8	0.22	0.07
PASSO FUNDO/RS	168,458	5.4	105.3	2.2	0.05	0.04
PELOTAS/RS	323,158	126.0	216.9	34.7	0.58	0.06
PORTO ALEGRE/RS	1,360,590	490.9	1,747.7	41.5	0.28	0.04
RIO GRANDE/RS	186,544	-8.4	119.8	3.3	(0.07)	0.01
SANTA MARIA/RS	243,611	-14.4	138.3	-5.9	(0.10)	0.03
SAO LEOPOLDO/RS	193,547	1.0	159.1	12.3	0.01	0.03
VIAMAO/RS	227,429	56.8	80.1	-1.6	0.71	0.05
BLUMENAU/SC	261,808	57.5	292.3	28.3	0.20	0.03
CRICIUMA/SC	170,420	-7.7	116.5	22.3	(0.07)	0.04
FLORIANOPOLIS/SC	342,315	107.5	322.2	45.2	0.33	0.03
JOINVILLE/SC	429,604	-67.8	438.3	62.3	(0.15)	0.02
LAGES/SC	157,682	4.5	106.6	4.2	0.04	0.00
ARACAJU/SE	461,534	63.2	336.3	71.6	0.19	0.02
AMERICANA/SP	182,593	122.7	170.0	-7.6	0.72	0.04
ARARAQUARA/SP	182,471	3.7	171.1	0.1	0.02	0.00
BARUERI/SP	208,281	-9.6	457.7	20.0	(0.02)	0.00
BAURU/SP	316,064	117.7	225.5	-7.8	0.52	0.02
CARAPICUIBA/SP	344,596	83.2	85.8	-6.5	0.97	0.01
DIADEMA/SP	357,064	322.4	283.1	19.8	1.14	0.05
EMBU/SP	207,663	-0.5	103.0	6.7	(0.00)	0.00
FRANCA/SP	287,737	85.5	169.8	-8.9	0.50	0.03
GUARUJA/SP	264,812	359.7	331.3	-4.7	1.09	0.02
GUARULHOS/SP	1,072,717	569.4	905.1	-6.4	0.63	0.02
ITAPEVI/SP	162,433	19.4	104.8	11.4	0.18	0.02
ITAQUAQUECETUBA/SP	272,942	37.3	115.1	-1.6	0.32	0.00
JACAREI/SP	191,291	20.1	157.7	20.7	0.13	0.03
JUNDIAI/SP	323,397	154.7	409.5	8.8	0.38	0.06
LIMEIRA/SP	249,046	44.3	205.0	14.6	0.22	0.03
MARILIA/SP	197,342	31.8	215.3	13.5	0.15	0.02
MAUA/SP	363,392	209.8	233.0	20.1	0.90	0.09
MOGI DAS CRUZES/SP	330,241	35.0	208.1	32.4	0.17	0.04
PIRACICABA/SP	329,158	76.7	296.7	3.2	0.26	0.02
PRAIA GRANDE/SP	193,582	-18.0	228.5	6.6	(0.08)	0.03
PRESIDENTE PRUDENTE/SP	189,186	51.9	164.2	24.4	0.32	0.03
RIBEIRAO PRETO/SP	504,923	-38.8	518.4	-149.4	(0.07)	0.01
RIO CLARO/SP	168,218	-5.8	140.4	11.1	(0.04)	0.04
SANTA BARBARA D'OESTE/SP	170,078	34.6	101.6	3.1	0.34	0.04
SANTO ANDRE/SP	649,331	475.6	456.3	27.3	1.04	0.00
SANTOS/SP	417,983	224.7	570.5	83.2	0.39	0.02

Municipality	Population	Net consolidated debt (NCD)	Net current revenue (NCR)	Primary Balance (PB)	NCD/NCR	Debt service / NCR
SAO BERNARDO DO CAMPO/SP	703,177	120.5	1,020.1	2.2	0.12	0.01
SAO CARLOS/SP	192,998	99.7	163.0	5.6	0.61	0.06
SAO JOSE DO RIO PRETO/SP	358,523	16.0	309.9	-22.9	0.05	0.02
SAO JOSE DOS CAMPOS/SP	539,313	-355.3	687.7	39.9	(0.52)	0.04
SAO VICENTE/SP	303,551	45.8	204.1	16.7	0.22	0.02
SOROCABA/SP	493,468	-35.1	475.5	4.3	(0.07)	0.03
SUMARE/SP	196,723	140.5	126.2	7.7	1.11	0.07
SUZANO/SP	228,690	4.9	161.2	5.7	0.03	0.03
TABOAO DA SERRA/SP	197,644	-9.6	158.8	2.9	(0.06)	0.01
TAUBATE/SP	244,165	5.7	214.5	9.7	0.03	0.01

5. Municipal Credit Markets

By
Benjamin Darche

Introduction

5.1 States and municipal governments in Brazil require a substantial amount of resources. The financing burden for municipalities to fund this investment is increasing as the Federal government continues to incrementally shift health, education, and other social expenditure assignments to state and local governments. To meet even a small portion of the urban infrastructure investment demand, local governments can accelerate their investment requirements by borrowing. But the Federal government has severely constrained the demand and supply of credit to local governments due to the current administration's tight fiscal and monetary policies that support long-term price stability. Can Brazil move to prudently expand borrowing for municipal investment without repeating the collapse of the municipal credit market experienced from 1989 through the late 90s? If so, what steps can it take now to develop a prudent future capital market for municipal finance?

5.2 This paper will briefly address these questions and expand on the findings of the World Bank's 2001 report, "Brazil: Financing Municipal Infrastructure; Issues and Options".

5.3 *The World Bank's 2001 report.* The Bank's report on Municipal Finance in Brazil presented the state of municipal credit market. The conditions of the municipal credit market present in the Bank's previous report are much the same today:

- Low outstanding municipal debt (12%) as a percentage of total public sector debt;
- High level of creditworthiness among medium and small municipalities;
- A well developed private banking system;
- Long history of municipal borrowing
- Expanding sub-national capital expenditure in education, health housing and other social services;
- Increasing investments in municipally owned water, sewer, solid waste companies as service areas grow, service demand increases, and companies defer annual maintenance to limit user fee increases;
- Continued reliance on subsidized Federal government bank loans to provide credit at below market rates for municipal loans;
- Restrictive legal and regulatory environment inhibiting municipal credit;
- Significant regulatory and administrative burdens for the federal government to monitor the municipal credit market;
- Limited investments in municipal infrastructure through public private partnerships primarily due to regulatory and user fee limitations. But rising federal and local government expectations that the new PPP law will encourage further private activity to help meet the growing infrastructure demand.

5.4 *Legal borrowing and lending restrictions created by the municipal debt crisis.* The mixed condition of the current municipal credit market described in the bullets above arose out of the local government debt crisis in the mid-1990s. The Bank's 2001 report showed that as of September, 1999, the outstanding stock of municipal debt reached \$R 28.7 billion. State capitals held 75.1% of this debt with the cities of Rio de Janeiro and Sao Paulo holding 63.6% of the total. In contrast, the remaining municipalities had a small debt burden, significant borrowing capacity and an excellent loan repayment record. However, the legislation restricting municipal borrowing does not distinguish between good and bad municipal borrowers. It has severely limited local governments from borrowing, regardless of risk, and most banks, except the federally owned banks CEF and BNDES, from lending to municipalities. Municipal governments continue to rely on Federal government banks and other "government to government" lending for investment capital.

5.5 *CEF and BNDES interest rate subsidies.* On going interest rate subsidies for municipal loans by federal banks reinforces the government's role in municipal lending and further delays development of a self-sustaining

municipal credit market. Although the federal banks include a risk factor in their calculation of interest rates municipalities pay on their loans, the high level of interest rate subsidies, absorbed by the FGTS and FAT social welfare funds, keeps municipal interest rates significantly below the Government of Brazil's (GOB) domestic borrowing rate. The combination of low rates in a restrictive borrowing environment has created "innovative" borrowing solutions and legal structures that distort the development of a risk-based private market for municipal debt. However, these same structures can also lead the prudent development of a municipal credit market, as we describe in the paper's second section.

5.6 *Report organization.* The report has two main sections. Section 1.0 presents the current status of the municipal credit market and the changes in the demand and supply of municipal credit since the Bank's 2001 report. Some of the demand side municipal credit issues include:

- A brief review of the legal and regulatory factors constraining borrowing and lending;
- Volatile capital expenditures by local government and bank lending for infrastructure investments since 2001;
- Burdensome government mandated municipal credit market disclosure;
- The creation of new types of local government financing institutions and organizations that can enhance the municipal market, but also act to delay adoption of market competitive rates supported by institutional investors.

Supply side municipal credit issues the report will discuss include:

- The impact of CMN and BACEN legal resolutions that limit financial institution municipal lending;
- Continued dominance of CEF and BNDES in the municipal loan market;
- The development of new instruments to fund municipal investments;
- The potential impact of the new Public Private Partnership (PPP) law on the municipal credit market.

5.7 Section 2.0 presents the current status of the capital markets and the elements of the current municipal capital market that inhibit or are conducive to the development of market based municipal credit. It describes some of the new CEF municipal credit structures and variations of these structures based on the rapid development of Asset Backed Securities (ABS) in the domestic bond market. It provides a discussion of:

- The status of Brazil's Capital Markets with an emphasis on the rising role of institutional investors and the potential to develop new municipal borrowing instruments;
- The role of credit ratings in development of a municipal credit market;
- How the GOB can shift some of the current disclosure and monitoring burden from STN to the private sector to encourage development of a prudent municipal credit market;
- Some of the transition steps the GOB may take to move toward a private, risk based municipal credit market.

Current Status of the Municipal Credit Market: Developments in the Demand and Supply of Municipal Credit

5.8 *Legal and regulatory supply and demand constraints.* The local government debt crisis in the mid-1990s initiated a flurry of legal activity in subsequent years to control the issuance of sub-national debt and reduce the fiscal impact to the GOB of profligate sub-sovereign government spenders. The crisis was triggered by the mountain of outstanding state debt that contributed to more than one third of Brazil's total outstanding consolidated public debt in 1997. The federal government negotiated agreements with the major state debtors to restructure their outstanding obligations, primarily state bonds, which amounted to 11.5% of Brazil's GDP at the time. The restructuring agreements, sanctioned by Law 9496 of 1997, required states to comply with fiscal and

debt indicators and other structural reforms to address the causes that lead to the federal bailout and restructuring. Senate Law 78, passed in 1999, applied these restrictions to all sub-national governments. The law included several targets such as debt service to current revenue ratios; personnel expenditures as a percent of current revenue; privatization of state enterprises and other reforms described in the Bank's previous report⁴⁷. It also prohibited states to issue bonds while their restructured debt to the federal government remains outstanding. Similar legislation passed in 2001 to restructure the debt of 180 municipalities also prohibits the issuance of bonds by municipal government until they retire their outstanding restructured debt. The state-federal agreements on fiscal adjustment and structural reform established the foundation for subsequent laws that limited sub-national borrowing.

5.9 *Fiscal Responsibility and other laws restricting the supply and demand of municipal credit.* To consolidate the various laws and restrictions on sub-national borrowing and to help buttress Brazil's progress to maintain fiscal discipline and price stability, the Senate passed the Fiscal Responsibility Law (FRL) in 2000. The FRL further strengthened the previous Senate laws and other resolutions controlling sub-national debt obligations. It established debt policies for sub-national borrowing including debt and fiscal indicators and other provisions that make borrowing more prudent and efficient⁴⁸. It also included other financial policies that attempt to control borrowing such as a prohibition of debt refinancing between different government levels and identifying financing sources for capital investment based on annual budget targets. However the FRL left the specific quantitative indicator controlling sub-national borrowing for future Senate Resolutions. Senate Resolutions 40 and 43 of 2001 established the fiscal and debt targets and prohibited specific types of borrowing. Some of the critical municipal credit indicators and borrowing restrictions are as follows:

For New Borrowing:

- Maximum debt service cannot exceed 11.5% of Net Current Revenues (NCR)⁴⁹;
- Total borrowing in the budget year cannot exceed 16% of NCR;
- Total outstanding stock of debt cannot be greater than twice NCR for states and 1.2 times for municipalities;
- General Sub-national Borrowing Restrictions:
 - State and municipal governments cannot issue bonds until 2010 except to refinance principal on existing outstanding debt;
 - They cannot borrow to refinance arrears on existing outstanding debt;
 - They cannot assume payment arrears from suppliers in the form of promissory notes or other forms of debt;
 - Higher level governments cannot lend to lower level governments.
- Other Indicators and Borrowing Restriction:
 - Personnel expenditures to NCR must be less than 60% for the federal and 60%.

These legal supply and demand restrictions to control municipal debt are some of the most stringent in Latin America⁵⁰.

Monitoring Sub-National Compliance with the Fiscal Responsibility Law

5.10 To help implement the FRL's sub-national borrowing restrictions, the CMN and BACEN have issued several regulations governing the supply of municipal credit offered by financial institutions to local governments. The CMN establishes lending policies and the BACEN and STN execute the policies through issuance of regulatory limits and loan approvals. While maintaining the spirit of fiscal control provided in the FRL, the plethora of CMN Resolutions issued since the FRL gives state and local government a certain amount of

⁴⁷ See Brazil, Municipal Finance, Issues and Options, Box 4.3, Controls on Sub-national borrowing, page 36.

⁴⁸ *ibid*, page 40.

⁴⁹ Net Current Revenues are very similar to RLR.

⁵⁰ See Freire, Huertas, Darche (1998) "Subnational Access to the Capital Markets: The Latin American Experience", page 12.

borrowing “wobble room” for specific investments. It has also led to the creative use of new “borrowing” instruments that have the potential to move municipal obligations toward the private capital markets, but may also support current expenditure rather than investment. We will return to this development in Section 2.0. For purposes of the current legal and regulatory review, one result of the myriad regulations governing sub-national borrowing is the lack of criteria to select priority sub-national government loan applications to allocate the global cap. It delays the distribution of municipal credit based primarily on credit risk and capital market discipline. *Supply Restrictions - CMN and BACEN Resolutions.* CMN’s 1999 Resolution 2827 set the initial financial institution lending limit to sub-national governments up to 45% of the institution’s total equity. It established a global limit of R\$ 1 billion lending to sub-national governments in 2001, reduced to R\$ 200 million by Resolution 2954 in 2002. However, CMN Resolution 3153 in 2003 raised the ceiling on previous CMN Resolution lending limits to R\$ 1.1 billion for sanitation projects which was increased to R\$ 2.2 billion by Resolution 3331 in 2005. The Ministry of Finance expects private banks to provide R\$ 200 million of this amount⁵¹.

5.11 In spite of the increases in lending limits, there is a significant waiting time for STN approval for municipal credits. The backlog of loan applications waiting for STN approval is substantial. Local governments pejoratively call it the “*filon*” (long queue). The borrowing restrictions combined with a burdensome application and approval process has led to stagnant municipal lending between 2001 and 2004.

5.12 *Burdensome municipal credit approval process.* The STN has a manual⁵² that explains the burdensome municipal credit approval process. It outlines the documentation required for AROs and internal and external municipal borrowing following FRL and Senate Resolution 40 and 43 requirements. It shows how the local governments should construct the various debt and fiscal indicators provided in the Senate Resolutions; evidence of the required Tribunal de Contas budget reviews; documentation of approvals by the authorizing body (such as the City Council in the case of municipal borrowing); and other procedures to comply with the legal morass that controls municipal borrowing. The reporting requirements include:

1. A bi-monthly report on its “financial and actuarial position” that shows:
 - a budget balance sheet;
 - revenues in the reporting period and an update of year-end forecasted revenues;
 - expenditures in the reporting period and an update of year-end forecasted expenditures;
 - revenues from credit operations and all debt service payments.

1. A trimester Financial Management Report that includes:
 - Compliance with legal debt service and other fiscal ratios;
 - Personnel expenditures segregated by active and inactive (pensioners) personnel;
 - Financial guarantees provided by the local government;
 - Progress on annual budget targets and the Net Worth of the local government.

2. An annual Budget and Financial Management Report that incorporates items 1 and 2 above.

5.13 *Required reports and their relationship to municipal credit analysis.* The reports provide good information for legal municipal debt compliance. STN data collection is a good instrument to insure standardization of local government reporting. However, the STN manual is not a toolkit to show local governments how to assess their creditworthiness using “best practice” credit criteria, such as international credit rating agency criteria that use additional factors such as the economic base, political and administrative setting to give a broader view of the willingness and ability of municipal governments to repay their debt. The borrower is only required to disclose information pertaining to the laws governing municipal credit. Lenders, such as CEF, rely on their own risk analysis to determine the general creditworthiness of municipal government. To move the

⁵¹ Valor Economico Nov 25, 2005.

⁵² Ministerio de Fazenda (2005), “OPERACÕES DE CRÉDITO DE ESTADOS E MUNICÍPIOS MANUAL DE INSTRUÇÃO DE PLEITOS” - MIP.-

municipal market toward self-monitoring in the future, the legal financial reporting requirements for municipal governments should be streamlined with many of the elements of the current reports and documentation shifted to a market regulating process. This will most likely only occur as the municipal credit market shifts from government bank lending to private creditors in a competitive interest rate environment.

5.14 *Subsidized interest rates.* Lack of risk criteria to determine interest rates for municipal loans is prevalent in the municipal credit market. The 2001 report illustrated that the majority of municipal credits have subsidized interest rate loans from the federal government banks CEF and BNDES. This is still the norm, albeit at a lower lending volume due to legal credit supply restrictions. There is a small component of the CEF and BNDES interest rate that is attributed to municipal credit risk in these loans, but this is offset by the substantial base rate subsidy. CEF and BNDES are able to provide this subsidy because their cost of funding for municipal loans, deposits in FGTS and other social welfare funds, earn below market interest rates. This creates a web of supply and demand subsidies that distorts the municipal credit market and further removes sub-national governments from competitive interest rates and market discipline.

Municipal Capital Revenues and Expenditures

5.15 Rigid controls on municipal credit operations contributed to stagnant growth in capital revenues by sub-national governments between 2000 and 2004 and were concentrated primarily in the largest municipalities. A recent Bank report⁵³ of a sample of 3,028 municipalities showed a small average annual decline in total capital revenues (credit operations, intergovernmental transfers, and asset sales) between 2000 and 2004 from \$R 4.02 to \$R 3.81 billion. Credit operations initially declined from \$R1.01 to \$R 0.56 billion between 2000 and 2001, but gradually increased to 1.25 billion by 2004. Over 30% of capital spending was concentrated in Brazil's municipalities with populations over 1,000,000. Credit operations showed a more pronounced concentration in these municipalities. They absorbed over 70% of municipal credit in the period and had per capita borrowing seven times the per capita amounts of the smaller municipalities⁵⁴.

5.16 *Capital investment expenditures.* Although capital revenues were relatively stagnant between 2000 and 2004, capital investment expenditures increased 28.7% in the period from \$R 9.55 to \$R12.3 billion, but showed significant year-to-year volatility, falling to \$R 8.39 billion in 2001 and rising over 50% to \$R 12.8 billion in 2002. Medium size municipalities showed a larger increase over the period, probably due to the significant rise in their net current balance as tax income increased at a more rapid pace than current expenditures and low debt service payment requirements. Small cities that lacked access to credit operations showed stagnant investment levels. The largest municipalities increased investment expenditure through credit operations in spite of borrowing restrictions⁵⁵ imposed by the FRL and their debt restructuring agreements with the federal government.

5.17 *Constraint on medium and small municipal credit.* The current restrictions on municipal borrowing apparently have limited borrowing by medium and small municipalities despite their substantial debt capacity. The top quartile of municipalities with 50,000 or more inhabitants (122 of 491) demonstrate considerable debt capacity; their Debt Service to Current Revenue ratio was only 2.1% using 2003 STN data, substantially below the 11.5% regulatory limit.⁵⁶ Political influence of the large municipalities for access to credit may crowd out small and medium size municipalities in the competition for scarce municipal credit. They get pushed to the back of the "filon".

⁵³ World Bank (2005) The evolution of Brazilian Municipal Finances, 2000-2004 First Draft/November 2004.

⁵⁴ *ibid*, pg. 19.

⁵⁵ *ibid*, pg 24.

⁵⁶ Vetter, David (2005) "The Role of Private Subnational Credit Markets in making Land Development More Affordable", pg. 16.

5.18 Although large municipalities continue to finance some of their capital investments with CAXIA and BNDES loans, they still need to raise capital for infrastructure investments. To gain access to additional funding, some larger municipalities have creatively developed new capital formation instruments and institutions.

New Borrowing Instruments and Lending Institutions to Assist Subnational Governments to Raise Capital

5.19 The rigid municipal credit controls have spawned creative measures by sub-national governments to raise capital. Two of the more original developments are the securitization of oil royalties and the transformation of state Municipal Development Funds into “Entidades Non-Dependentes” (non-dependent entities).

5.20 *Oil royalty FDIC.* The State of Rio de Janeiro sold future oil royalties via “Fondos de Investimentos dos Direitos Creditos” (FDIC) to raise capital. FDICs are a new financing vehicle that has deepened the domestic capital markets by providing companies with alternatives to bank credit⁵⁷. They were introduced by the BACEN in 2001 and are governed by the CVM, the Securities and Exchange Commission. FIDCs are structured as open or closed-end mutual funds, wherein investors purchase “shares” of assets owned by the FDIC in a “true sale”. Since an FDIC transaction is considered as a sale of assets, rather than a debt obligation, these instruments do not fall under municipal credit legal and regulatory restrictions. In addition to Rio de Janeiro, other state and municipalities with oil royalties are considering sales of their future oil royalty assets.

5.21 The advantage of the oil royalty FDIC is that it diversifies local government funding sources via a competitive capital market instrument, albeit at higher interest rates than CAXIA or BNDES subsidized rates. The fact that a state sold a FDICs at non-subsidized interest rates shows that they are willing to raise funds in the competitive capital market. It also probably indicates the difficulty they have to raise capital for their investment needs. A disadvantage is that the proceeds from the sale may not be used for investment purposes, but to support current budget deficits. If this is the case, the local government is selling future generation’s assets for current consumption - an unwise policy that will also hinder future economic growth by reducing infrastructure investment.

5.22 Another possible disadvantage of this instrument is that it circumvents the legal and regulatory controls on municipal borrowing and may exacerbate a local government’s fiscal condition by spending on current consumption rather than investment. However, oil royalty FIDCs may actually be a positive development that moves local governments toward market competitive market rates and market discipline. The market will price the political, economic and other risks associated with the sale of a future oil revenues. The FIDCs, as an asset backed security (ABS), can spawn other ABS instruments related to the municipal market, as more fully discussed in Section 2.0.

5.23 *Entidades Non-Dependentes.* The second variation in the municipal credit market that took place since the Bank’s 2001 Report is the transformation of municipal development funds to “Entidades Non-Dependents”. The passage of the legal and regulatory restrictions on municipal loans eliminated state Municipal Development Funds from lending to municipalities. To circumvent this obstacle, many states have restructured their MDFs into Entidades Non-Dependentes. These are non-bank organizations that are created with the remaining capital from liquidated MDFs. They are then eligible to provide capital to municipal governments for their infrastructure investments.

5.24 The advantage of the Entidades Non-Dependentes is that provide an much needed source of capital to creditworthy municipalities. The disadvantage is that they continue to reinforce the role of government in the municipal credit market, albeit in a similar fashion as the former MDFs. The danger is that these organizations become more like state development banks with potential political interference that may distort credit supply. As a “stop-gap” measure to help finance much need municipal infrastructure, these organizations are a good

⁵⁷ Moody’s Special Report, Structured Finance “Growth of FIDCs in Brazil: Current Outlook and Featured Structural Mechanisms” (October 27, 2004).

development. But there should be some mechanisms to shift these entities to the private credit markets as quickly as possible.

Public Private Partnerships and the Municipal Credit Market

5.25 The factors impeding the growth of private participation in infrastructure have not significantly changed since the Bank's 2001 report. It listed a number of legal, regulatory and financial issues that, for the most part, continue to hamper PPP progress, especially in the water and sanitation sectors:

- *Legal* – ownership of assets between many state and municipal water companies is still unclear with on-going court cases attempting to resolve asset ownership and other issues. Lack of a law that clearly defines water and sewerage asset ownership is a significant impediment to greater private participation.
- *Regulatory* - there is still no standardized national law for water and sewer concessions, no clear legislation on ownership of existing assets or tariff adjustment. Concession contracts have improved, but often contain clauses on tariff adjustment that are left unclear;
- *Financial* - Most municipal water companies remain in poor financial condition. Tariffs do not support operations and political interference in tariff adjustments has not substantially abated since 2001 report.

5.26 In spite of these obstacles, the government continues to encourage private participation in public services. The Congress passed Act 11.079 on December 30, 2004 (the “PPP Law”) that allows for more flexibility in the construction and operation of public infrastructure projects by the private sector. It expands upon the 1995 concession law (8987) and allows for direct government financial support of public projects in “administrative” (without user fees) and “sponsored” (with user fees) concessions. “Ordinary” non-recourse funded concessions that do not have any direct government financial support are not subject to the new law and remain regulated by the 1995 Act (8987).

5.27 *PPP law and the PFI Concept.* The PPP law is similar to the PFI concept that first emerged in the United Kingdom and that has spread to other countries in Europe, Australia, New Zealand and South Africa. Several other Emerging Market countries are in various development phases of creating PFI Units to expand traditional concession projects to include “administrative” as well as “sponsored” PPPs. This is a natural outcome of the process of private participation in infrastructure. Many traditional non-recourse infrastructure projects, especially in the water and sanitation sector, could not support private returns on equity with socially constrained tariffs. These projects required some type of government financial support to be commercially viable. In the UK, the government expanded the traditional user fee concession project concept to include private construction and maintenance projects for public facilities such as prisons, schools and health clinics, built and operated by the private sector, but financially supported with local government budget revenues. The use of direct government budget revenues has also led to new debt instruments in the UK capital markets to finance PPP projects⁵⁸. Likewise, it may be possible to create new debt obligation instruments for municipal PPP projects in Brazil's capital markets more fully discussed in Section 2.0.

5.28 *On-going PPP risks.* Like similar PFI laws around the world, Brazil's PPP federal legislation establishes the contract guidelines for federal, state, federal district and municipal PPPs. They provide for sharing legal, economic, and financial and other risks between the government and private contractor and present the general terms and conditions of government financial support for PPP projects.

5.29 The law is a good beginning and should result in further private participation in the construction, operation and maintenance of public service projects. But like existing concession projects in Brazil, the PPP law only provides contract guidelines. Individual PPP contract and concession agreements may be deficient and require substantial improvement to properly allocate risks between the public and private sectors.

⁵⁸ Standard & Poors (2005) “Public Private Partnerships Global Credit Survey 2005”.

5.30 Several issues listed above that currently plague concession contracts might similarly affect projects regulated by PPP Law 11.079. This is especially the case for “sponsored” concessions that have user fees that guarantee project debt and private contractor equity returns. For example, the law allows user fees to automatically adjust tariffs based on indices included in the contract. However, it also gives the local government the opportunity to approve the tariff increase if it publishes the reasons in the official press 15 days after presentation of the private contractor’s payment invoice⁵⁹. This introduces political risk for “sponsored” or user fee concessions such as a water supply project and will influence the extent to which private companies will invest in and creditors lend to PPP projects. Unless the GOB improves the current legal and regulatory framework for water and other user fee related projects, PPP Law sponsored concessions will most likely have the same tariff adjustment risks as current concession projects.

5.31 The expansion of government financial support in PPP Law project can mitigate tariff adjustment concerns to some degree through debt instruments that make government payments “water tight”. This will depend on the degree to which creditors can enforce the legal documents supporting the security structure for a PPP debt obligation that includes direct government financial support in addition to tariffs. The federal government may consider developing regulatory guidelines for the new PPP law so that state and municipal governments that introduce their own PPP laws use a standardized approach for the legal documents related to PPP debt obligations.

5.32 *Using the PPP Law to expand the municipal credit market.* The PPP law allows for further development of the municipal credit market in several ways. First, as a “private” company, the administrated or sponsored concession PPP is not subject to the regulatory limits restricting borrowing by local governments or bank lending limits to local governments. Second, local governments can provide budgetary financial from revenues or through a variety of other financing mechanisms from:

- A PPP Guarantee Fund;
- Other special funds established in law for PPPs;
- Private insurance company surety bonds;
- International financial institution guarantees;
- Other mechanisms permitted by law⁶⁰.

Section 2.0 will discuss some possible capital market options to finance PPP projects.

Development of Municipal Credit Markets in Brazil

Current Capital Market Conditions

5.33 The initial defaults in the sub-sovereign bond market in the late 1980s and associated bail out of state and municipal contracted indebtedness by the federal government in 1993 and 1997 effectively closed down the domestic sub-sovereign bond market. The market remains closed to general sub-sovereign debt as stipulated in the FRL legal and other regulatory impediments. However, it is open to debt obligations issued by private utility companies, PPP project debt financing, and refinancing of outstanding contracted debt by local government.

5.34 As discussed in Section I above, CEF and BNDES dominate bank lending to local governments for urban infrastructure improvements. CEF has several urban development programs funded by various federal government ministries, the World Bank and IDB. In 2004 the federal government, CEF and BNDES financed a total of \$R 7.7 billion of urban infrastructure of which \$R 5.9 billion was for water and sanitation programs⁶¹. CEF provided about \$R 4 billion since 2002 to fund these programs in large, medium and small municipal

⁵⁹ Law 11.079, 30/12/04, Chapter I, Article 4, item x.1.

⁶⁰ Law 11.079, 30/12/04, Chapter III, Article 8.

⁶¹ Interview with Rogerio Tavares, CEF.

governments. BNDES targets its lending primarily to the larger private utilities or other PPP projects on a limited or non-recourse basis. *Subsidized interest rates are an obstacle to commercial bank participation in the municipal credit market.* CEF and BNDES have programs to integrate private commercial banks into their urban infrastructure lending programs, but commercial bank lending remains modest. Most private banks are not willing to lend to municipalities for the limited spreads required in the BNDES and CEF subsidized programs when they can earn several times that amount in the private market and often at lower risk. The subsidized interest rates provided by CEF and BNDES through the FGTS and FAT funding are significant obstacles in attracting private banks to the municipal credit market. Until the federal government shifts the subsidy arrangements for essential public service investments, such as water and sanitation projects, bank lending for these projects will remain mostly with private banks, for the most part⁶².

5.35 *Domestic bond market.* Municipal borrowing in the domestic bond market is done almost exclusively by state and municipal electric and water utilities that are privately held. Municipal utilities from Sao Paulo, Minas Gerais, Parana, Ceara, and Brasilia have issued about \$R 2.4 billion of bonds⁶³. Due to the strict limitations on bond sales by state and local governments, there have been no sub-sovereign domestic bond issues in the past few years except for the state of Rio de Janeiro's oil royalty FDIC, discussed above, and the of Rio Grande do Sul's \$R 100 million structured financing backed by ICMS taxes sold last October. The inability of sub-sovereign governments to enter the domestic market with "plain vanilla" municipal bonds has led to the emergence of ABS type structures. The ABS market in Brazil has shown explosive growth in the past few years which now includes structured financings for sub-sovereign governments.

5.36 The domestic bond market in Brazil continues to expand and diversify with new structured financing instruments using a variety of trade receivable, credit card, and commercial consumer loans and, in the municipal market, oil royalties and ICMS taxes to back the bonds. These asset-backed instruments, developed in mature capital markets in the US, and have recently expanded into Emerging Market countries' domestic capital markets. Brazil's domestic capital market continues to broaden and deepen with these and other new instruments like those issued by the GOB, public utilities, and the FIDCs. A major driving force in this development is demand created by institutional investors.

5.37 *Institutional Investors*⁶⁴. In most domestic capital markets, the demand for high quality fixed income investments by institutional investors motivates the structural innovations of new financing mechanisms that take place in the market. As the pension systems in the Emerging Markets shift from "pay-as-you-go" government funding to public and private professional fund management, the demand for longer term, high quality investments will grow.

5.38 As shown in Table 5.1, pension funds and insurance companies have almost US\$86 billion invested in fixed income securities in Brazil⁶⁵:

⁶² MDFs are another source of funding for public services. Another paper will address developments in the MDF municipal credit market.

⁶³ Moodys (1 de Dezembro de 2005) "Lista De Ratings Da Moody's Para O Brasil" .

⁶⁴ For purposes of this report, we refer to institutional investors as the managers of Brazil's public and private pension funds and insurance companies.

⁶⁵ From Vetter (2005), "The Role of Private Subnational Credit Markets in Making Land Development More Affordable", pg.14.

Table 5.1 Total Investments of Institutional Investors on November 2003/January 2004

Institutional Investors	Total Investments (Billions of US\$)
Mutual Funds	186.4
Private Pension Funds	69.4
Insurance Companies	16.0

5.39 *Changing Composition of Institutional Investor Portfolios.* Given the relative immature state of Brazil's domestic market, most institutional investors rely on GOB securities institutional investors for their portfolio investments. GOB bonds comprise approximately 75% of pension funds fixed income portfolios⁶⁶. However, the proportion of GOB bonds to total portfolio investments is changing as the domestic market expands with new fixed income instruments such as FDICs and other structured finance products. Institutional managers seeking to prudently diversify their portfolios are significant investors in high quality FDICs and other structured finance bonds. These bonds are almost always rated above investment grade (BBB-) and often carry the same AAA national scale rating as GOB's securities. Institution investor portfolio managers are driving much of the current demand for the new structured finance instruments such as FDICs and other asset backed securities and are a potential source of demand for the structured finance and other instruments that can help develop a future municipal bond market. But direct investment in municipal credits by either institutional investors or banks will not be significant until the GOB restructures its policy of subsidized interest rate lending by CEF and BNDES to put municipal credits on a level playing field with other corporate and public fixed income instruments.

5.40 *Subsidized interest rates and development of new market instruments for municipal credit.* Demand for municipal assets from institutional investors and commercial banks will grow when subsidized rates for municipal credits converge with market rates and the municipal credit market adopts "best practice" credit analysis and disclosure procedures.

5.41 Reduction of subsidized lending will require substantial shifts in FGTS and FAT funding policies from subsidized funding to market funding for CEF and BNDES municipal loans. A myriad of complex inter-related financial institution, capital market, municipal service, regulatory and political issues will influence this event, which is unpredictable. Until it happens, an alternative approach is to incrementally integrate the private markets into the currently subsidized municipal credit markets. CEF and BNDES have begun to do this as the GOB continues its financial institution reforms to move government owned banks toward market competition. They have expanded their lending instruments to incorporate elements of private markets into their municipal credit operations. The next section discusses these developments and suggests further incremental steps CEF and BNDES may consider to accelerate private participation in municipal credit.

Municipal Credit Instruments

5.42 This section will present new municipal credit structures that CEF and BNDES have developed to incorporate private banks into their lending programs since the Bank's 2001 report. This is an encouraging step that shows a GOB commitment to cautiously re-integrate private credit into the municipal credit market⁶⁷. On the domestic capital market side, several new structures have emerged that may help diversify the municipal credit market. These include the FDIC and other asset backed structures mentioned above. The section will introduce

⁶⁶ IMF (2005) Chapter II, Global Financial Capital Market Developments.

⁶⁷ Private banks and the domestic bond market investors were very active in municipal credit until the GOB bailed out these investors during the local government debt crisis in the late 1980s and early 1990s. See "Brazil: Issues in Fiscal Federalism", op.cit., pages 6-10.

some additional capital market structures that may be appropriate at this time to support future municipal bond issues.

5.43 The small but encouraging developments in the municipal credit market must still overcome substantial difficulties for Brazil to attract private creditors to the municipal credit market. Critical judicial, bankruptcy and “moral hazard” issues persist, as indicated in the Bank’s 2002 report on fiscal federalism⁶⁸. There are also critical credit analysis, disclosure, and monitoring obstacles that may prevent private creditors from moving back to the municipal credit market. We present some suggestions for incorporating improvements to the current municipal credit market activities that will hopefully provide private creditors, especially institutional investors, with the confidence to become more active in the municipal credit market.

5.44 *CEF and BNDES Private Municipal Credit Structures.* CEF is exploring several new debt structures that shift its lending instruments toward the private markets and directly involve the FGTS fund⁶⁹. These structures directly link FGTS funding with municipal creditors. One structure is to integrate commercial banks into CEF’s municipal loan program. In this case, private financial institutions act as a “retail” bank that on-lends wholesale FGTS funds to municipalities with CEF acting as fiscal agent rather than in a traditional lending role.

5.45 Another CEF structure uses an SPE created for a PPP project, such as a water supply treatment facility. In this case the SPE borrows directly from FGTS or FAT to finance the investments. A variation of the latter mechanism is similar to a “sale-leaseback” structure common in the US municipal and European bond markets. In this case the SPE is a Trust that “buys” water concession assets from the water company. The water company builds the plant with the sale proceeds and leases it back from the Trust. It then receives periodic principal and interest installment payments from the company. In Brazil this structure can only be legally transacted through Certificados de Receívos Imobiliários⁷⁰ (CRIs) issued by the Trust.

5.46 *Credit enhancement.* The Dexia report describes variations of these structures using credit enhancement instruments such as Letters of Credit, full or partial credit guarantees from Brazilian or foreign financial institutions and monoline insurance companies. Credit enhancement shifts some or all of the municipal credit risk from private banks or institutional investors to the credit guarantor. This is a useful mechanism that has several potential benefits especially in the evolution of nascent municipal credit markets:

- Provides comfort to investors that are not familiar with municipal risk;
- Allows municipality’s that might otherwise not be able to enter the market to obtain credit at affordable rates;
- Provides support for new types of financing instruments such as “pooled” financing, securitization and other structures that might not otherwise be marketable.

5.47 In addition to lowering borrowing costs for municipalities, credit enhancement provided by international financial institutions can disseminate useful knowledge for domestic capital market participants (commercial banks and institutional bond investors) about municipal credit risk. Local investors can build their credit analysis capacity and become more comfortable with municipal credit risk by learning “best practice” municipal credit analysis techniques. Introduction of credit ratings by companies using international credit rating methodologies accepted by global investors should accelerate the local investor learning process for municipal risk.

⁶⁸ Op cit., page 20.

⁶⁹ Standard & Poors rated the debt a notch below the domestic currency BB rating because the bonds are at parity with other external debt and would be accelerated like other outstanding international bond issues in the event of a default. See Standard and Poors, “The Credit Implications of Local Currency Financing”, October 5, 2005.

⁷⁰ This is a fixed income instrument secured by real property.

The Use of Asset Backed Securities (ABS)⁷¹ to Further Develop the Municipal Credit Market

5.48 *Securitization of CEF/FGUTS and BNDES/FAT assets using Collateralized Debt Obligations (CDOs).* CEF and BNDES can expand their new municipal credit instruments discussed above by structuring an ABS for the domestic capital market. Basic options include:

- Securitization of CEF's direct loan portfolio;
- Securitization of SPE/Trust CRIs that finance PPP projects;
- Securitization using Credit Enhancement

5.49 These new instruments use the same concepts as Rio de Janeiro and Rio Grande do Sul's oil royalty and ICMS tax revenue securitizations recently issued in the domestic capital market. In a new collateralized debt obligation (CDO⁷²) structure, CEF/FGTS and BNDES/FAT sell a portfolio of their direct municipal loans to an FDIC in the domestic capital market. This will release capacity for the banks to continue lending to local governments under the 45% regulatory limit.

5.50 The sale of a CEF or BNDES CDO is indirect funding of municipal credits by the domestic bond market. It introduces a diverse portfolio of municipal credits to investors and expands the use of credit ratings into the municipal credit market⁷³.

5.51 *CDO familiarize the market with small and medium municipal credit risk.* The credit rating of a municipal CDO will require a "shadow" or underlying rating of each of the municipalities in the total loan portfolio. This will allow CEF and BNDES staff to compare the results of their risk analysis methods with international credit rating methodologies when structuring a CDO. The CDO also shifts CEF municipal risk for seasoned loans to institutional investors. Credit enhancement, partial or full, can also play a role in this structure depending on market conditions and the underlying municipal credits.

5.52 CEF will most likely not be able to use a CDO structure to sell its loan portfolio until the gap between subsidized loans and market rates shrinks. It could only sell its municipal loan portfolio in today's market at a loss because it would have to over-collateralize its offering with additional cash flow from the underlying loan debt service payments to compensate for the gap between current market rates and its municipal portfolio rates. However, it may be possible to overcome this obstacle through issuance of a Real denominated international security.

5.53 A Real denominated CEF CDO issued in the global and domestic market may mitigate this problem and attract global and domestic investors at yields that do not require over collateralization, in the same way the 12.75% GOB global issued last October attracted domestic buyers. The Real global bond was over-subscribed even though domestic 8 year GOB bonds were selling at a yield of about 15.5% yield at the time (see Box 5.1). It may be possible to structure a CEF CDO with credit enhancement features that raises the credit quality of the pool

⁷¹ An Asset Backed Security is comprised of a portfolio of individual assets such as trade, credit card, consumer loans, commercial loans, other debt obligations (generically referred to as Collateralized Debt Obligations – CDOs) that are bundled together and sold to investors. The cash flows from the underlying assets are passed through to bondholders who own an interest in the assets.

⁷² A CDO is a generic name of a package of loans and/or bonds that are sold as a single fixed income security. The cash flow from the underlying loans provides the interest and principal payments for the fixed income security. Often a CDO will have senior and subordinated tranches of debt obligations within the same security that reflect their priority position to receive the underlying cash flow payments.

⁷³ International credit rating agencies have issued sub-sovereign credit ratings in Brazil primarily for electric utilities and or future flow deals such as the State of Rio de Janeiro and Rio Grande do Sul's structured financings. Fitch rated Rio de Janeiro's oil royalty FIDC AAA(bra) and Moody's an A3.br rating for Rio Grande do Sul's securitization of ICMS tax revenues. They do not have general municipal credit ratings due to the lack of general municipal credits in the domestic market.

of municipal loans to provide greater comfort to institutional investors while matching the yield requirements for this type of ABS.

Box 5.1 Government of Brazil Real Denominated Global Bond

The Government of Brazil issued a 10 year, 3.4 billion Real denominated bond in October with a yield of 12.75%. This extended the GOB's domestic bond yield curve from 8 to 10 years and gave the GOB an average maturity of 21 months for its debt. The 12.75% coupon for this ground breaking issue significantly lowers the government's borrowing cost. Foreign investors seeking higher fixed income yields in a relatively low interest rate market had understandably stronger demand for the issue than domestic investors who could purchase 30 day GOB bonds at a rate of about 18% throughout 2005. Nevertheless, the GOB was able to reduce its domestic currency cost of capital and deepen the domestic capital market with this Real denominated issue.⁷⁴

5.54 *Securitization of CRIs.* It may also be possible for CEF to sell its CRIs in the market by bundling these securities and selling shares in an FIDC mutual fund. A critical question is whether CEF has a sufficient volume of CRIs to package and sell as a FIDC or other asset backed instrument to institutional investors. There are several other legal and market questions that this type of instrument would have to address. Nevertheless, it may be possible to introduce institutional investors to the credit characteristics of PPP projects and municipal utility risk by bundling the CRIs of smaller municipalities into a pool of securities. Again, credit enhancement may play a role in this structure.

Monitoring the Municipal Credit Market

5.55 Progress toward broader, deeper self-sustaining municipal credit market based on competitive interest rates will depend, to a large degree, on the pace of the reforms that shift the supply of municipal credit from government controlled banks to private financial institutions and institutional investors in the bond market. In the previous section we discussed some of the incremental changes in CEF and BNDES municipal lending programs that incorporate private banks. We also presented some of the new ABS instruments that can support progress in the municipal bond market. These incremental steps are a good beginning, but additional financial institution, capital market and regulatory reforms are required to accelerate the shift to a self-sustaining municipal credit market. What are some of the regulatory reforms the GOB may consider? In this section we present suggestions for reforms in municipal credit risk analysis, disclosure and reporting, and surveillance. The objective is to move toward a self-regulating municipal credit market governed by prudential regulatory guidelines that maintain a sound municipal credit system with competitive interest rates. The elements of this system should be in place and further encourage the government in order to shift the supply of municipal credit from subsidized CEF and BNDES lending to competitive market rates.

5.56 A good example of the confluence of reforms and development of a self-sustaining municipal credit market is Mexico, as shown in Box 5.2.

⁷⁴ Standard & Poors (October, 2005), "The Credit Implications of Local Currency Financing" ..

Box 5.2 Mexico's Municipal Credit Market

Much like Brazil, government banks in Mexico provided a substantial portion of municipal credit in the past. Local governments were not considered creditworthy; there was no secure source of debt repayment and very little lending by commercial banks to municipalities. The bond market for municipal debt did not exist. As Mexico's economy stabilized, and banking, financial markets, securities regulation, pension, fiscal and decentralization reforms proceeded, the nature of the municipal credit market changed. It shifted from the predominately government development bank supply of credit to a private supply of credit. Municipal creditworthiness improved through fiscal and decentralization reforms that allowed for the transparent transfer of federal government shared tax revenues to the states. Capital market regulation allowed sub-sovereign governments to issue bonds, but only if they received a credit rating from 2 international credit rating agencies, among other regulatory controls. Banking regulations required all banks to use Basel II principles to assess portfolio credit risk to determine capital reserve requirements, including loans to municipalities. Private pension funds established through pension reforms created a new supply of capital. Capital market prudential regulations allowed pension funds to purchase municipal securities. The confluence of these reforms with Mexico's stable macroeconomic growth exploded the municipal credit market. Since the on-set of these reforms, local governments have raised US\$10 billion from the domestic bond market for infrastructure investments.⁷⁵

5.57 One of the key elements of a shift toward private municipal credit markets is to move monitoring municipal financial health by the government to the private market.

5.58 Since the sub-sovereign debt crisis, monitoring municipal credit has shifted almost entirely to the government. Prior to the crisis there were almost no controls on municipal borrowing. Banks and the bond market relied on government as the lender of last resort. Their instincts were correct. When local governments threatened debt defaults, the federal government stepped in and converted the private municipal debt into federal municipal debt. This caused a major pendulum swing in "monitoring" (which was non-existent for the most part) municipal credit back the other direction to significant government intervention in limiting municipal borrowing and lending. The laws limiting the supply and demand of municipal credit also required the federal government to monitor municipal credit. STN became the executing agency for these controls as discussed in the first Section. Is it time for the pendulum to begin its move back to a self-regulatory municipal credit market?

5.59 In the ideal regulatory situation, the government's role is to provide the prudential legal and regulatory rules that govern market interactions between the suppliers of municipal credit and municipal borrowers. The suppliers of credit are responsible for evaluating the municipal credit risks associated with the sale of loans and purchase of bonds. Municipalities follow government's regulatory procedures, but it is incumbent on investors to confirm that local government complies with the rules governing their sale of securities and purchase of loans. This is the current regulatory situation in the mature municipal capital markets in the OECD countries, including Mexico. How can Brazil move toward less government intervention in municipal credit market regulation?

5.60 Below we present recommendations for changes in three critical elements of municipal credit market regulation:

- Credit risk analysis and credit ratings;
- Disclosure documents, financial accounting and auditing;
- Municipal credit monitoring.

5.61 *Bank Credit analysis.* The BACEN should establish regulatory requirements for municipal credit suppliers in the banking system that supports a healthy municipal credit market. This includes detailed regulations for commercial and government banks to develop an acceptable methodology that measures municipal credit risk and the amount of capital reserves banks need to set aside to cover this risk. This methodology should

⁷⁵ Billand, C (2005) "Municipal Finance: Increasing Local Government Resources To Fund Multi-Sectoral Facilities", page 4.

not only be consistent with Basel II accords, as is CEF's current municipal credit risk methodology, but be more broadly defined and use the criteria developed by international credit rating agencies that assess municipal credit risk. This type of regulatory guideline is very different from the credit evaluation of secured and unsecured corporate, real estate and other commercial loans that follow Basel II accords. Governments have issued regulatory guidelines to implement the Basel II principles that assess portfolio credit risk, including Brazil, but many countries do not have specific guidelines for municipal credit risk. These regulatory guidelines should use "best practice" credit risk evaluation criteria established by the three primary international credit rating agencies that are active in the domestic sub-sovereign capital markets throughout the world. These companies have developed a national scale credit rating for Brazil's capital market in addition to their standard global rating scale. The national scale ratings have a direct relationship to global scale ratings that give investors information to compare the unique characteristic of Brazil's municipal credit system to the credit risks associated with municipalities around the world.

5.62 *Credit ratings for municipal bonds.* Like Securities and Exchange Commissions in other Latin American countries, the CVM requires credit ratings by **qualified** credit rating agencies for debt instruments registered on the stock exchange. But there are no specific regulations governing the qualifications of credit rating companies that evaluate municipal credit risk. To accelerate the shift toward a self-sustaining prudent municipal credit market, the CVM may consider modifying its current credit rating requirements to a more specific rating requirement for municipal obligations, as in the case of Mexico.

5.63 Another way to more broadly introduce a range of municipal credit ratings into the current bond market is through the offering of a CEF CDO, as described above. International credit rating agencies would undertake the CDO rating. These rating agencies use a complex rating methodology for an ABS security. They prepare a cash flow model that tests the ability of the portfolio's combined debt service loan payments to meet the ABS debt service payment. They assign an underlying rating to each of the municipalities to assess the probability of default of each loan in the ABS portfolio and, consequently, the probability that the CDO will default.

5.64 The primary advantages of the CEF CDO, from a credit rating perspective, are:

- To familiarize the capital markets with a range of individual municipal credit risks that will facilitate municipal market development;
- To provide CEF with a credit rating benchmark to compare its credit evaluation methodology with the international credit rating agency approach.

5.65 Like other aspects of regulatory control, the principles guiding the credit rating, its methodology and the quality of the firm producing the ratings are critical to maintaining a healthy capital market. The CVM may consider promulgation of regulatory guidelines to approve credit rating companies that perform a municipal credit rating analysis. These guidelines should follow international "best practices" approach for credit evaluation as discussed in the previous paragraph.

5.66 *Data quality and audits.* An important element of municipal credit ratings is the data required to produce debt and other financial operations indicators, key criteria of a general municipal credit rating. The reliability of the quantitative data that comprises the indicators, usually obtained from local government financial reports, is critical. Municipalities in Brazil are required to produce a substantial amount of timely financial data for STN to construct the indicators that measure municipal compliance with FRL and other laws, as discussed in Section 1.0. This data is not audited by an independent external company, but by a government agency, the Tribunal de Contas.

5.67 The Tribunal de Contas, by law, audits local government financial statements and budgets. It does not have sufficient trained staff in municipal accounting to provide detailed quality audits for Brazil's 5,500 municipalities. The GOB may consider shifting some of the municipal auditing burden from the Tribunal de Contas to private accounting and auditing firms. The Tribunal de Contas can either out-source the audits to private firms, or municipalities can substitute the Tribunal de Contas audits with government approved private accounting firms. This activity should be coordinated with the CVM to insure that any changes it makes in

disclosure, accounting and auditing requirements for municipal obligations registered on the stock exchange is consistent with the out-sourcing of this activity by the Tribunal de Contas.

5.68 External audits by private accounting firms can start on a pilot basis and slowly expand as the municipal credit market shifts from CEF and BNDES lending to private market lending. The cost of the audit is borne by the municipality seeking a loan or listing a bond on the stock exchange.

5.69 *Disclosure documents.* Quality disclosure documents are critical for the development of a prudent private municipal credit market. Clearly, quality disclosure documentation did not exist prior to the sub-sovereign debt crisis. The CVM has regulations regarding disclosure for debt obligations listed on the stock market. But, like quality municipal credit ratings, these are general guidelines for fixed income obligations registered with the CVM. CVM may consider preparation of disclosure document guidelines that insure that the critical risks associated with a municipal debt offering are provided to investors. This is an important to build the institutional investor base for a future municipal bond market.

5.70 In addition to the quality and content of the disclosure, the guidelines may also consider regulations to update the disclosure document with any information that creates a material change in the financial condition of the municipality. This will help support a secondary market for trading municipal obligations. Of course a secondary market cannot develop without a robust primary market, which does not currently exist. Nevertheless, if the CVM considers changes in regulations governing municipal disclosure, it should also include requirements that support secondary market trading. Again, this process should be coordinated with the STN, the government agency responsible for the monitoring the municipal credit market. As STN shifts its role from primary monitor to supervisor of the monitoring process, as recommended below, it can supervise the implementation of the primary and secondary market regulations prepared by the CVM. As the municipal credit market evolves, self-regulating mechanisms, such as those that have evolved in the US and Europe capital markets, would replace the STN.

5.71 *Monitoring municipal credit.* The STN has established a country-wide municipal reporting system and website that collects data and evaluates municipal compliance with financial and debt indicators required by law. This is a costly operation to build and maintain. In addition, it further entrenches a government bureaucracy in the administrative activities to monitor municipal credit. It may also inhibit the shift toward the market's self-regulation. We suggest that the STN consider out-sourcing this activity to private firms as an initial step to shift municipal credit regulation from the government to a self-regulating activity. The firm would also move the municipal financial data from the STN website to a non-government site for public disclosure. This site can be expanded to act as a repository for municipal disclosure, including any disclosure documents required by CVM for municipal bonds, as discussed above. STN would remain the government regulator of bank compliance with municipal credit law. However, it would use the non-government web site and its access to bank portfolio data to assess bank compliance with GOB's banking laws that pertain to municipal loans, in addition to Basel II requirements.

5.72 To implement this recommendation, STN issues a Request for Proposals (RFP) from private firms to collect municipal financial data and maintain the municipal credit website. The firm provides the STN with the periodic municipal financial reports required by law and identifies any municipality that may be approaching non-compliance with the legal indicators. This is the initial step in the shift of STN as the primary municipal credit regulator to a self-regulating mechanism. When municipalities return to the domestic bond market, the CVM would already have an existing mechanism to supervises municipal credits and may further allow incremental changes toward a self-regulating industry commonly found in mature capital markets in other countries.

6. Efficiency of Brazilian Municipalities

by
Suhas Parandekar*

Abstract

6.1 This paper attempts to provide a methodological contribution regarding the study and improvement of municipal efficiency in Brazil. Drawing on the previous literature regarding municipal efficiency, and the particular problems surrounding its measurement, the paper looks to a simple graphical presentation of data regarding municipal efficiency. Instead of drawing a regression line through the scatter cloud of variables, the frontier estimation methodology drops an envelope over the cloud and measures the distance of municipalities on the interior of the cloud from the outer surface, taken to be the efficiency frontier. The main thrust of the paper is that efficiency measures are delicate, but they can be explained in intuitively appealing ways to policy makers in the municipalities. With efficient municipalities being benchmarked under the method, the idea would be for discussion amongst the local actors to derive lessons regarding the institutional structure and other mechanisms that enable some highly efficient municipalities to achieve superior results while using the same or lower amount of resources as compared to municipalities whose efficiency can be improved to reach the frontier.

Introduction

6.2 This paper is motivated by the aim to provide a straightforward measure of municipal performance in Brazil, concentrating on the efficiency with which that performance is obtained. Data collection and availability have advanced rapidly in the past few years, and detailed data about Brazilian municipalities is now available on the internet and through other media. A natural question associated with the ready availability of the data concerns its use. Data is of course used by researchers to undertake all manner of complex research, which is a good thing, but an even better thing would be to contribute to the actual improvement in municipal efficiency, through an active involvement of mayors and others who are responsible for implementing policy on the ground. This paper provides one example of how municipal level data can be put to use to encourage policy discussion regarding the efficiency of municipal performance, as a step towards enhancing that efficiency.

Why Discuss Municipal Efficiency?

6.3 A process of improvement in accountability at all levels of government has been steadily taking place in Brazil, even as the news has been dominated somewhat by recent political scandals. Under the institution of fiscal federalism, municipal accountability works in two directions - towards the higher level of governments that provide transfers to the municipalities, as well as to the voting citizens who elect the local government. It is in the interest of both higher levels of government and the voters that municipal resources be used as efficiently as possible. Elected representatives and appointed officials in the local government (*prefeitura*) from the mayor (*prefeito*) on downwards, are themselves interested in improving performance, but how to achieve that improvement in performance is not a simple question to answer. In the vast tropical heartland of Brazil, good

*Thanks are due to Marize Santos and Alfonso Trevigniani for their help in data collection, and to Cassia Miranda for her help in putting together the references. Thanks to Paul W. Wilson and the Free Software Foundation's GNU Project for making freely available the software to run frontier estimation models. This document was prepared using another free software. LaTeX2e, initially developed by Leslie Lamport.

governance practices that enable more effective or efficient provision of local public services often remain confined to the municipality that has put such practices into use, though they could potentially also be adapted and adopted by other municipalities.

6.4 It is unlikely that practices of local government that lead to improved efficiency would be known, let alone emulated by others, unless first there is an identification of such practices. The process of benchmarking and systematizing the diffusion of good practices is first dependent on the identification of possible municipalities where such practices might be found. Once reasonably robust indices of municipal efficiency are developed by researchers, a discussion of the efficiency of municipal performance, involving not only researchers, but also policy practitioners and civil society at large would be required to uncover the practices that lie behind the efficient outcomes. Other levels of government and associations of municipalities can then play an instrumental role in disseminating information about municipal performance and good practices, as well as providing a mechanism for vetting of that information.

6.5 The involvement of practitioners on the ground is important because it is easy to make mistakes in efficiency analysis. In particular, the identification of certain municipalities as more efficient than others cannot be taken lightly because of the deep political implications of this analysis. This has a very important methodological implication that drives the approach chosen by this paper. This implication concerns the need for the construction of the efficiency index to be as simple and transparent as possible. Thus, if there is a mistake either in the data or in the researcher's programming, this should be easily identifiable. It is perhaps not a coincidence that in most published research on the kind of efficiency analysis that is relevant to this paper, the authors also provide the raw data that they have used together with the paper itself.

Problems in the Measurement of Efficiency

6.6 Measurement of municipal efficiency as a concept is easier to talk about than it is to implement. Efficiency means getting the most output for a given input, or getting to a given level of output with a minimum use of inputs. This much is simple, but then but how does one go about defining the outputs and inputs? Should we consider the general welfare of the municipality as an output, or should one restrict oneself to public services? If we are interested in helping to identify municipalities where it is good to live, to work and to run businesses, clearly we should be interested in the overall level of welfare. If we are interested in a particular aspect of public policy, say whether chartered public hospitals do better than private hospitals, or whether more educated teachers are conducive to better learning, we should probably look at performance regarding only those services.

6.7 If we do decide to examine the provision of multiple services, we would need a plausible story regarding the weighting scheme between the services, and define how exactly the service is to be measured. Of course, even though data availability has improved greatly in the recent past, we are restricted by the availability of data, as in any other empirical endeavour. Then there is the problem of deciding between looking at a static picture, where one considers municipal production as a sort of maintenance of a given flow at a point of time; the analysis would be a "freeze frame" photograph of that flow. Alternatively, one could look at a more realistic dynamic concept of stocks and flows, where efficiency is concerned with progress through time.

6.8 A similar concern about definition and data holds for the input side. Public expenditures (whether financed through local taxes, transfers or user charges) are only a part of what can be considered as inputs on the production of locally provided public services. Thus, a mayor may reasonably claim that the apparently poor performance of his municipality is a result of a complex interplay of historical and social forces that have resulted in a municipality where poverty, unemployment and crime is rampant, in spite of the best efforts of the government at all levels. In fact, this kind of argument is often heard as a reason for poor performance across many levels, ranging from the growth performance of a nation, to the poor reading performance of children in a school located in a poor neighborhood. Of course, at some stage the outcome is endogenous to a particular public policy, but it is very difficult in practice to determine where policy responsibility ends and bad luck begins.

6.9 Excuses are of course not the exclusive domain of the public sector. The reason of environmental factors as an explanation for poor results is put forth with equal enthusiasm by a salesman who fails to meet his quarterly sales target, or the chief executive of a giant corporation defending her lack of performance. There is a huge economic literature on information asymmetry, with the associated policy lessons from the literature on mechanism design. In the case of the salesman, the solution is to provide a minimum assured salary, but link the bulk of his remuneration to a commission on sales. Similarly, a portion of CEO compensation is generally linked to company performance through stock options. The literature on mechanism design has the potential to provide insights to the area of municipal performance⁷⁶. Any decent measure of municipal efficiency needs to address the issue of environmental factors, and even more so if the objective is forward-looking, to understand how efficiency might be improved.

6.10 Another relevant issue regarding the identification of inputs for efficiency measurement is the fact that counting public expenditures is only one way of accounting for inputs. Thus, we should also be looking at the use of physical or real inputs - hospital beds, nurses, educational establishments and so on that are used to produce health and education services. Indeed, differences in efficiency depending on whether the input chosen is expenditure or physical inputs would be revealing regarding the remuneration or price of the inputs. However, measuring physical inputs brings its own attendant problems of the measurement of quality of those inputs.

6.11 Even if we arrive at a tentative understanding regarding the inputs and outputs, a vexing issue that would remain concerns the universe of the municipalities whose efficiency is to be analyzed. Again, most people would agree that sensible efficiency comparisons can only be made between more or less homogenous units that face similar questions of allocations, institutional mechanisms and incentives for public workers and beneficiaries. However, the answer to what constitutes a reasonably homogeneous set of municipalities is not so easy to establish.

6.12 Assuming that reasonable compromises are possible regarding the variables to be used to perform the efficiency measurement, the next question is to determine the methodology to be used. In this regard, we are fortunately on safer ground, thanks again to the exponential increase in computing power over the past few decades that enables one to crank through computationally intensive empirical techniques through brute force rather than mathematical artifice.

Empirical Frontier Estimation of Efficiency

6.13 Earlier approaches to efficiency analysis were typically based on the parametric statistical estimation of a production function such as the ubiquitous Cobb-Douglas production function or the more general Constant Elasticity of Substitution (CES) production function. Most typically applied to production process in firms, this kind of analysis sought to arrive at estimates of regression coefficients that would reveal insights about returns to scale, and efficiency analysis could be performed as a derived product of the regression equations. A more recent literature - the so called empirical estimation frontier takes a more direct and intuitively simple approach.

6.14 Rather than make assumptions about the possible theoretical shape and location of the production function, this literature does not assign any restrictions on the nature of the underlying technology of the production function. The method side-steps the question of whether a particular unit is located on or off a theoretically defined production function by focusing attention exclusively on the empirical evidence.

6.15 The approach is particularly attractive when, as in the case of Brazilian municipalities, the definition of inputs and outputs is tentative at best. It would be extremely difficult to come up with a plausible assumption regarding a smooth and well-behaved concave production surface with these alleged inputs and outputs. Indeed, a look at the production surface of municipal performance would probably reveal a picture not of Euclidean smoothness, but of considerable ruggedness, like a mountain range. Indeed because of the multiple influences from measured and unmeasured inputs on the output, with a complex of local forces in addition to global ones, it would be most likely that as in the case of most real mountains, the production surface would have a fractal

⁷⁶ An excellent example can be obtained from Gasparini and Ramos, 2004.

dimension. We explore this notion later in this paper. For now, it should just be noted that empirical frontier estimation in its basic form avoids the need for making any sample-based statistical inference.

6.16 The methodology of empirical frontier estimation is best understood with some very elemental graphs (see the next section of this paper). Essentially, instead of estimating a conditional expectation function relating the output to an input through the scatter plot, as in a statistical regression, the empirical frontier estimation seeks to find out the envelope of the entire data cloud. We are not seeking to establish a possible statistical general relation between the input and the output; we are merely interested in identifying who it is that lies on the empirical efficiency frontier, and how far within that envelope are the other municipalities. It is possible that the theoretical efficiency frontier lies even further out, but we are not interested in its location. We are only interested in showing what a real life municipality has actually achieved, and we seek to generate a healthy discussion about how other municipalities can possibly seek to repeat the performance of some of their peers.

6.17 The most basic technique is called the Free Disposable Hull (or FDH); adding the assumption of convexity of inputs would invoke the technique of Data Envelopment Analysis (DEA). Formulations of the DEA method can alternatively impose the restriction of constant, decreasing or increasing returns to scale. Even the FDH method is not completely assumption free, which does constitute a weakness that should be known when using the method to measure municipal performance. This method assumes that inputs are freely disposable, meaning that if a unit is using an excessive amount of one or more inputs, it can get rid of these inputs without incurring any cost. In the Operational Research language of linear programming, the slack has not a price associated with it. In terms of implementing the method, FDH is nothing else but the combination of multiple linear programs, one for each of the units in the analysis. The production frontier is constructed piece-wise out of the output of the various linear programs, which is what makes it computationally intensive.

Organization of this Paper

6.18 This paper has four remaining sections. In Section⁷⁷, we present a brief literature review. Section 3 presents some graphs. The graphs build up successively to the argument that we should examine efficiency more closely within a reasonably homogeneous group defined by groups of municipality defined by size, within a particular state. In Section 4, we present an FDH analysis of some representative groups of municipalities, with alternative specifications. Finally, in Section 5 we examine the influence of environmental or contextual variables on municipal efficiency and perform a tentative investigation of the on efficiency of the specific institutional arrangement of sectoral municipal consortia across neighboring municipalities and of consultative councils within a municipality. Through all the presentation that follows, it bears reiteration that the objective of this paper is not to provide a definitive or final conclusion about municipal efficiency in Brazil; rather, the aim is to stimulate discussion amongst policy makers in municipalities and the policy thinkers who help them.

Literature on Frontier Estimation of Municipal Efficiency

6.19 The empirical literature using frontier estimation techniques has literally exploded in the past few years, and there are hundreds, if not thousands of papers available on the subject. In terms of a mathematical introduction to the topic, a useful source is Fried, Lovell and Schmidt (Eds.), 1993 [2]. Other useful textbook length treatments include Charnes, Cooper, Lewin and Seiford (Eds.), 1995 [3] and Zhu, 2002 [4], the last one in the form of a tutorial for practitioners, distributed with an easy to use software that adds on to Microsoft Excel. A periodically updated list of books on frontier estimation is available online at the website DEA Zone. The same website is also linked to a very large list of papers. For the purpose of this paper, the next sub-section of this introductory section focuses attention briefly on the available papers that have used frontier estimation to compare municipal efficiency.

⁷⁷ However, this need not be a fatal assumption. We can still explore options regarding improving efficiency that do not involve reducing inputs, which is generally politically infeasible at least in the short and medium term for municipalities when human resource inputs are considered.

6.20 The following brief review of the literature is by no means comprehensive. The papers reviewed are roughly divided into three groups for purpose of classification, this grouping being only one of other possible forms of organization. In the first group are papers that present efficiency as a general concept, taking into consideration all municipal expenditures. The second group consists of papers that examine specific services, such as solid waste collection or education. Finally, a list of papers is discussed that have looked at efficiency in Brazilian municipalities.

General Municipal Efficiency

6.21 Borger and Kerstens, 1996 [5] is an early paper examining efficiency in Belgian local governments. The authors analyze total current expenditures as the input for a set of five outputs for a single cross-section of 589 Belgian municipalities for the year 1985. The five outputs considered are (i) the number of beneficiaries of minimal subsistence grants; (ii) the number of students enrolled in local primary schools; (iii) the surface of public recreational facilities; (iv) total population; and (v) the fraction of the population older than 65. The authors note that the overall population is not an 'output' in the traditional sense, but is a proxy for administrative tasks undertaken by the municipality, such as maintaining the register of births and deaths, etc., and because direct quantitative data on the magnitude of such tasks was not available. Similarly, the population of older residents serves as a proxy for the supply of social services to the elderly. This kind of pragmatic treatment of inputs and outputs is fairly common in the literature.

6.22 As the title of their paper suggests, the authors wish to compare the findings of efficiency measures calculated by 5 alternative methodologies - two of which, DEA (with variable returns to scale) and FDH are of our special interest. The two principal findings of this paper are worthy of note. First, they find that the assessment of efficiency, generally presented as scores from 0 to 1 varied widely depending on the method used. The estimated mean efficiencies for the 589 municipalities considered as a group, ranged from 0.57 to 0.94, surely a striking difference. The authors also run a second stage regression that seeks to relate each of the five efficiency scores to a mix of variables such as the per capita personal income of the municipality, the population density, and variables intended to capture the political context. Their second main finding is that the coefficients in those regressions are close to one another, even though the efficiency scores vary widely from one another.

6.23 Worthington (2000[6] examines 177 local governments in the State of New South Wales, Australia, again for a single cross-section (1993). The author uses a detailed specification of inputs and outputs, with an attempt at separating the effects of physical inputs and input prices (including average municipal salaries). The noteworthy outcome of this paper for our purpose is the author's comment about how the mathematical programming method is the method of choice when the objective of the exercise is to "benchmark local governments and peer groups for comparison." The author also notes the special circumstances regarding measurement of efficiency for local government - "Thus, in cases where the usual axioms of production activity breakdown (i.e. profit maximization) then the programming approach may offer useful insights into the efficiency of these types of industries. This is especially the case with local public sector activities."

6.24 In a related paper, Worthington and Dollery (2002)[7] examine the impact of contextual information, or the so-called 'non-discretionary' inputs on the efficiency of the same universe of NSW local governments. The two basic approaches are (i) to include the non-discretionary inputs as if they were regular inputs; and (ii) to use the efficiency scores from a first-stage DEA or FDH analysis using only the discretionary inputs, and use a second stage regression analysis with the efficiency score as the dependent variable and the non-discretionary inputs as independent variables. This solution seems somewhat arbitrary, though the choice depends on whether the objective of the analysis is to benchmark specific units and generate discussion about their performance, or whether it is to establish general patterns regarding the relationship between the various inputs and outputs.

6.25 A number of papers in fact use the two-stage approach. Most papers present the second stage regression as a tobit, given that the efficiency score is truncated at the upper bound of 1. In an innovative variation, Balaguer-Coll, Prior and Tortosa-Ausina, 2003 [8] use nonparametric kernel regression at the second stage in their analysis of Valencia (Spain) municipalities. Their paper includes representations of the three dimensional

graphs of joint densities that are most revealing about the underlying relationships. Conceptually, their approach is also more consistent, since they are not really interested in arriving at an inference about a single measure of a regression coefficient. The powerful visual presentation of the output in this paper deserves to be replicated in other contexts. Three more papers round up the first group of papers considering municipal efficiency in general - Michailov, Tomova and Nenkova, 2003[8]; Afonso and Fernandes, 2003 [10]; Loikkanen and Susiluoto, 2004 [11]. These papers look at municipal performance, respectively in Bulgaria, in the Vale do Tejo region of Portugal, and in Finland. The notable aspect of the paper looking at the Finnish municipalities is that it is the only paper considered of the lot so far that repeats the analysis for multiple years between 1994 and 2002. However, rather than presenting an analysis of dynamics, the authors look at average scores for each municipality across each of the years, perhaps in an attempt to enhance the robustness of the results.

Municipal Efficiency for Specific Services

6.26 We look at four papers in this group, though it bears repetition that the list of papers is not comprehensive. Two of these papers look at efficiency in the municipal function of collection of solid waste. An example from Australia is discussed in Worthington and Dollery 2000 [12]] and one from Spain in Bosch, Pedraja and Suárez-Pandiello, 2001 [13]. An investigation of efficiency regarding municipal water services can be obtained from Woodbury and Dollery, 2003 [14]. An interesting variation from the study of rubbish is an excellent analysis regarding Norwegian Local Secondary Schools, obtained from Borge and Naper, 2005 [15]. This paper has important features that can be copied for other contexts of efficiency analysis.

6.27 The choice between including contextual variables (per capita income and so on) as inputs in the frontier estimation or as explanatory variables in a second stage tobit regression is arbitrary and does not have a sound conceptual basis. Borge and Naper neatly address the issue by doing the regression first. They are measuring performance in terms of test scores in municipality managed schools. The authors first run a regression of the scores on the socio-economic characteristics of the students (the contextual variable), together with dummy variables for each municipality. They do not run into the Neyman Pearson incidental parameters problem because they use data on more than 50,000 students across 426 municipalities. The authors then use the coefficients on the municipal dummies as the output variable for municipal efficiency, this variable representing municipal performance purged of the influence of the quality of residents. In a similar manner, Grosskopf, Hayes, Taylor and Weber, 2000 [16] studied efficiency in school districts in Texas. They use the residuals from test-score regressions as the output, with various institutional and administrative variables as the inputs.

Municipal Efficiency in Brazil

6.28 Three sets of papers are available that have used frontier estimation to analyze aspects of municipal efficiency in Brazil. Two of these papers study specific services. Seroa da Motta and Moreira, 2004 [17] study efficiency in the sanitation sector to understand how aspects such as jurisdiction and the nature of management affect efficiency. Marinho, 2003 [18] study municipal efficiency for the health sector for 74 of the 91 municipalities in the State of Rio de Janeiro. The outputs are hospitalizations and consultations per capita, and the hospital mortality rate. Inputs are beds, hospitals and health clinics per capita and the duration of hospital stay and consultations. The author also run a second stage regression on efficiency scores with population and GDP as the dependent variables. The paper's findings relate to the importance of neighborhood spillovers and of municipal consortia to derive economies of scale and capture some of the externalities in an optimal way. The interesting feature of the analysis is that the second stage regressions are run separately for the two groups of efficient and inefficient municipalities. It appears that OLS regressions are used, and it is not clear why the author does not use a Chow test to test for structural differences in the regression coefficients. The presentation of results includes a useful table depicting the relative contribution of each input/output to the efficiency score.

6.29 A set of three related papers examines general efficiency of municipalities for all Brazil. Sampaio de Sousa and Ramos, 2001 [19] study all Brazilian municipalities but in the presently referenced work report findings only for the 1,429 Northeast and 1,334 Southeast municipalities for which data was available. The input

variable is municipal current spending for the year 1992, in 1992 cruzeiros, as obtained from the secretariate of the national treasury (STN). Five variables, for the year 1991, are used as outputs, "carefully selected" in the authors' words: (i) total resident population; (ii) domiciles with access to safe water; (iii) domiciles served by garbage collection; (iv) illiterate population; and (v) enrollment in primary and secondary municipal schools. Three methodologies are used, DEA with constant and variable returns to scale, and FDH. The authors then analyze the distribution of the efficiency scores by various groupings of municipalities, and examine the issue of returns to scale, finding that increasing returns to scale are prevalent for municipalities of size smaller than 30,000 inhabitants. An important conclusion of the authors for the present paper regards their finding comparing the DEA and FDH methodology: "Moreover, the convexity of the data set that characterizes the DEA methods is, clearly, in our case, an unjustified assumption when analyzing the efficiency of the Brazilian municipalities". They further add about FDH: "Furthermore, instead of calculating an abstract frontier by referring to a fictitious combination of municipalities, as DEA methods do, this procedure builds up its cost-efficiency frontier by contrasting actually observed municipalities."

6.30 Two other papers (not a comprehensive list) use Brazilian municipal data to make excellent methodological contributions to the general literature. The related papers, Stosic and Sampaio de Sousa 2003 [20] and Sampaio de Sousa and Stosic 2003 [21] examine the issue of leverage of outlier municipalities on the distribution of efficiency scores for other municipalities. The idea is that if a very small number of municipalities outperform all the others, that performance is probably due to a special reason, and it should generally not be expected that other municipalities would be able to emulate such a performance. The method is conceptually quite powerful, it basically consists of taking each municipality out of the dataset in turn and running the DEA (in the case of these papers) again on the new set of municipalities, now reduced by 1, and compare the change in efficiency scores for other municipalities. This method is termed as 'jackknifing'. With more than 5,000 municipalities in Brazil, the process is so computationally intensive that it would take (as of 2003), according to the authors' calculations, roughly 7 months on a regular desktop computer (a 1Ghz Pentium III), though figures for other kinds of computers are not mentioned. The authors suggest a bootstrapped random re-sampling approach of 10% of the dataset, and provide findings in support of using such a methodology combining the jackknife and the bootstrap.

6.31 An interesting aspect of the discussion is the evidence the authors present of the need to look at the dataset closely, especially at the fringes of the distribution of the input and output variables (these are fairly standard ones such as current spending for the municipality as an input; student enrollment as an output, to mention two examples). They discuss how the data included municipalities, with the specific names, that reported spending per capita of R\$6.00 and R\$0.32 and so on, while the dataset mean was R\$45.21, all figures in current 2001 Reales. They also note the example of how one municipality, the city of Iperó of about 18,000 habitants had an enrollment per school of 2165 students, roughly 12 times the national average⁷⁸. A similar discussion relates to the authors' investigation of 20 of the 50 most "inefficient" municipalities in all of Brazil as identified by the DEA model. It turns out that half of those 20 municipalities receive substantial royalties on oil and water. The authors note that their per capita spending levels are very high (3 to 8 times the national average), but those increased costs are not reflected in the services considered. Which begs the question, and then what does that extra earning get for the residents? In any event, this kind of qualitative discussion is definitely needed to extract the maximum value from the preceding quantitative analysis of efficiency scores.

Human Development in Brazilian Municipalities

There are two parts in this section. We present the reasons for using the two main variables that we look at to analyze efficiency, and we then present some graphical results from the data.

⁷⁸ The authors do no report of any attempt o communicate with the municipal authorities or with the federal Ministry of Education that provided the data to corroborate the information about the schools in Iperó.

Human Development Index: IDH-M and Current Spending per Capita

6.32 We choose to look at the Human Development Index for Brazilian municipalities as the output variable of interest for three reasons. First, we hold the belief that the idea of measuring municipal performance needs to be holistic if it is meant to be a contribution to the overall task of economic development in Brazil. Suppose there were a very high level of technical efficiency of service provision in a particular municipality, but the overall standard of living were miserable? What good would that be? Municipal authorities could not use that data to go to say, a group of business investors, and argue in favour of investment in their municipality. On the other hand, it is difficult to imagine how a municipality would have superior indicators on overall welfare, and do very poorly on public services. It does remain a possibility, and by all means, further research can investigate a more delimited aspect of performance. In fact, it is hoped that the findings of this paper would generate a discussion not just in the research community, but amongst practitioners in municipalities, about what parameter would they like to be measured on, and one can speculate that there would be a distribution of preferences. Thus, this paper looks at only one of many possible perspectives on municipal performance.

6.33 A second reason is the pragmatic one on data availability. Thanks to the efforts of the UNDP and other organizations, a fairly high quality dataset on the Human Development Index (IDH-M as the Portuguese acronym) is readily available at the following website: Atlas do Desenvolvimento Humano. Data is available for all municipalities for the two years of 1991 and 2000, a long enough span to permit comparison and analysis. In fact, many other researchers have used the same data set, so this paper would be a useful complement to those efforts. The overall municipal index, IDH-M, (M for Municipality) is a 0-1 normalized index. It is comprised of the simple, unweighted average of three 0-1 normalized indices - IDH-L, or longevity index that measures normalized life expectancy at birth as an indicator of health and wellness; IDH-E (E for Education) that combines the gross enrollment rate for habitants aged 7-22, and the literacy rate, the two combined with respective weights of 1 and 2 and normalized; and finally, IDH-R (R for Renda per capita, or Per Capita Income), again normalized. As with any such index, various criticisms can be made about the choices made, but we are not aware of all the factors considered by the researchers who constructed that index, and take the construction of the index as a given. The same UNDP website also provides the data of the various sub-indices, and future research can very well consider alternative considerations of an index from the sub-indices or from other basic parameters.

6.34 A third reason for choosing the IDH-M as our output variable of choice is methodological. The FDH method can of course handle multiple outputs and inputs. However, when one moves beyond a one-output one-input measurement of efficiency, it loses some of its direct intuitive appeal. As a beginning at least, it is safer to stick to such a simple conceptualization. One of the reasons for the complications when considering multiple outputs or multiple inputs is the issue of weighting between different outputs or inputs. The structure of the weights under a DEA or FDH model depends on the underlying structure of the data, rather than being explicitly assigned by the researcher and the weights are not uniform across the municipalities. Without delving into a mathematical explanation, essentially the outcome is that if a particular municipality does relatively much better (i.e., higher for an output, or lower for an input) on any one indicator, that indicator is assigned a higher weight for that municipality. This system is fair, because the methodology of course does not choose between municipalities, and being 'rewarded' on one dimension may be balanced by being 'penalized' on another dimension. However, the upshot is that it makes the efficiency scores unstable. It is not clear at all that all variables on the output dimension should be treated so equally, but then if one begins to make discretionary choices about the weighting scheme, the method becomes subject to further criticism. In a methodology that is rather sensitive to such specification issues, we decided to stick with a simple formulation.

6.35 As the single input, we consider municipal current spending per capita. It is the variable most often used in the literature that has been cited, and we do not have any particular reason to deviate, even though it is a far from perfect measure on the input side. The single most damaging criticism of our choice in the case of this paper is that it is contemporaneous. In this section we look at the year 2000 for the IDH-M and the current expenditure per capita. It is clear that current municipal spending does not immediately produce better human development; one should rather look at a combined series of lagged current and capital expenditures, together with adequate

controls for the contextual variables that are given to a municipal administration. However, we leave that task for future research. In defense of the pragmatic choice made here, we can only say the following things. First, that even if current expenditures do not fit neatly into a production model, they do reflect an aspect of maintenance of the given level of human development in terms of municipal effort, be it in the areas of health and education services, or more generally for economic development. Second, current expenditures per capita do not usually exhibit wild swings from one year to another, so even if we considered a combined lagged aggregate, it is probable that the cross-sectional variation would not be drastically altered. Finally, later in this paper, we do explore a similar analysis for the year 1991, thus providing at least a partial dynamic aspect of efficiency.

Graphical Presentation of the Data

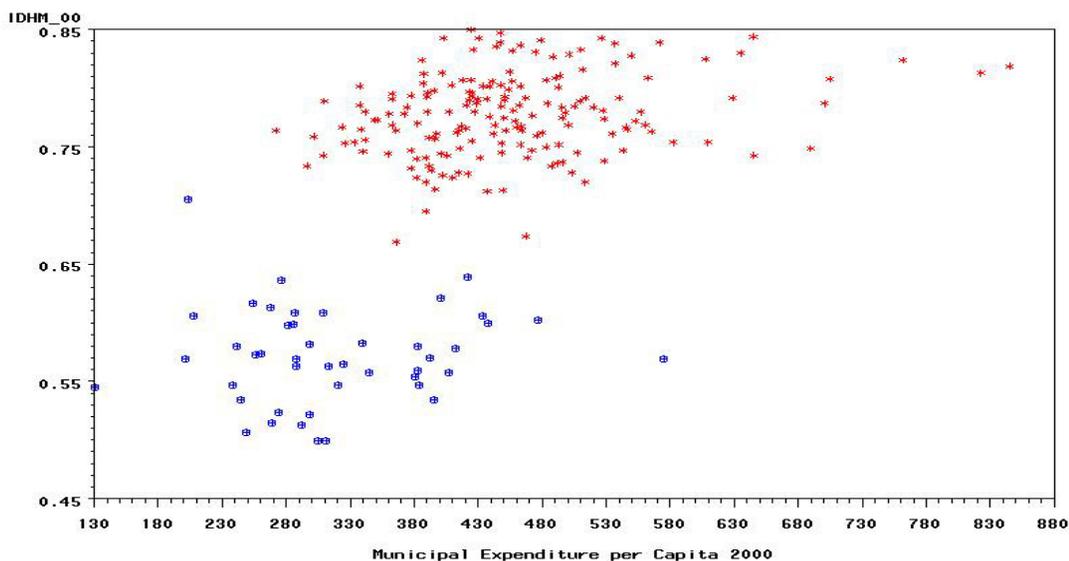
6.36 There are a little over 5,500 municipalities in Brazil, but the STN dataset on current public spending for the year 2000 is available for only 4,617 of those municipalities. The mean municipal current spending of that subset is R\$451 (in current reales), the minimum was R\$0.25 and the maximum of R\$2,817. As referred to earlier, the frontier estimation methods are extremely sensitive to outliers, and some of the very low numbers on spending may indicate data inaccuracies or other issues not related to efficiency. We would like to eliminate these kinds of extreme low-spending municipalities from the sample, as their behavior is clearly not going to be replicable in any general sense.

6.37 The problem is to determine the point of cut-off below which the expenditure information would not be relevant. Rather than pick an absolute number, we decided that it would be less arbitrary to pick the first percentile as the cutoff and drop the bottom 1% of municipalities. In the case of the dataset being considered, the bottom 1% consisted of municipalities reporting current spending of less than R\$111.2 per capita. For the sake of symmetry, we also eliminate the top 1% of the sample, with the 99th percentile cutoff being at R\$1288.92. It should be noted that for DEA and FDH methods, where we are not making statistical inferences, unlike for regression approaches, this kind of purposive elimination is perfectly valid. We are not interested in determining the value of a regression coefficient, for which it would not be correct to reduce the sample in this way. Figure 6.1 shows a plot of the IDH-M against the spending per capita for all the 4,525 municipalities now in the sample.

6.38 Our objective is not to draw a regression line through this scatter cloud (with or without control variables in orthogonal dimensions) to derive a single value of a B coefficient linking the y-variable to the x-variable,

Figure 6.1 Basic IDH-M 2000 Graph for all municipalities

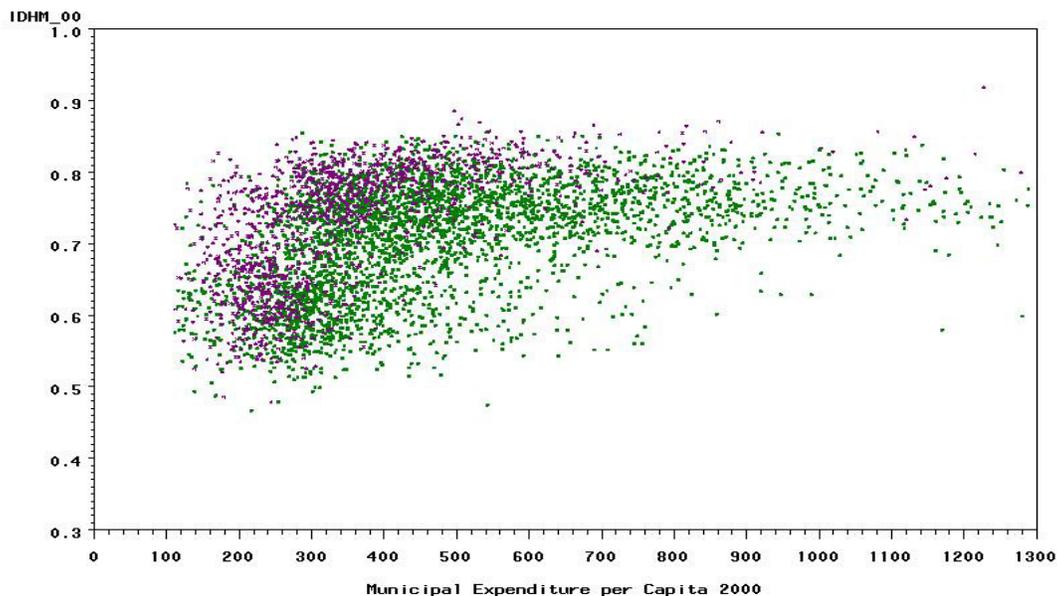
IDHM_00 against MUNEXPER 2000 — Small Alagoas Blue Cross and RGS Red Star



but to draw an envelope over the scatter cloud, and measure the distance of individual points relative to the axes and the envelope. But we are not yet ready for that step. Figure 6.2 and Figure 6.3 shows the same scatter plot, but with a third dimension added through the use of color (would probably have to be changed in the eventual report version of this paper to pattern). Figure 6.2 shows the plot with the added information about the size of the municipalities, with green dots representing small municipalities (those below size of 20,000 habitants) and the purple dots representing not small municipalities (above 20,000 habitants). Figure 6.3 shows the plot with the added information about the region of the municipalities, with blue dots representing municipalities in the North-East(NE) of Brazil and red representing all the other regions combined.

Figure 6.2 Graph Showing Small and Very Small (below 20,000 Population) Municipalities in Green

IDHM_00 against MUNEXPER 2000 All Brazil — Small(Green) vs Not Small

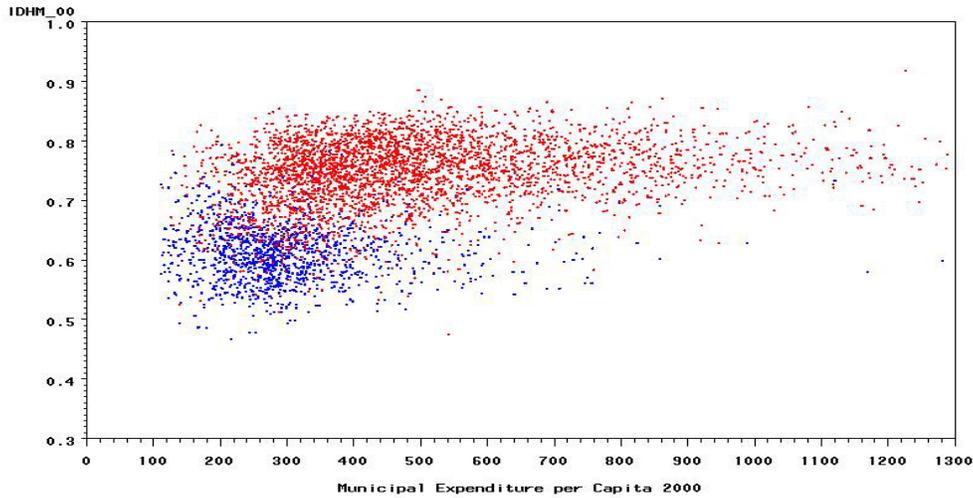


6.39 It can be noted from the graphs that in the case of size, the smear appears to be from left to right, with the small municipalities tending to have higher expenditures per capita, but there is a lot of overlap, especially on the vertical dimension. The graph by region on the other hand is quite astounding (at least for the uninitiated) in the extent to which it shows the clear demarcation between the North-East and other regions of Brazil. There is some overlap, but the smear clearly runs from top to bottom, with most NE municipalities occupying a position of low expenditures and low IDH-M.

6.40 In terms of efficiency analysis, where we seek to identify the empirical efficiency frontier, marked by those municipalities that get the most output for a given level of input, or least input for a given level of output, the figures provide an important insight. If the purpose of the efficiency analysis is to move towards helping the inefficient municipalities become more efficient, it would be very important to do so within reasonably homogeneous groups. We next turn to an examination of the scatter plot at a slightly more disaggregated level. We want to compare a section of the small municipalities (those between 5,000 and 20,000 habitants) in two arbitrarily selected States from the South and North-East - Rio Grande do Sul and Alagoas.

Figure 6.3 Graph Showing NE Municipalities in Blue, Others Red

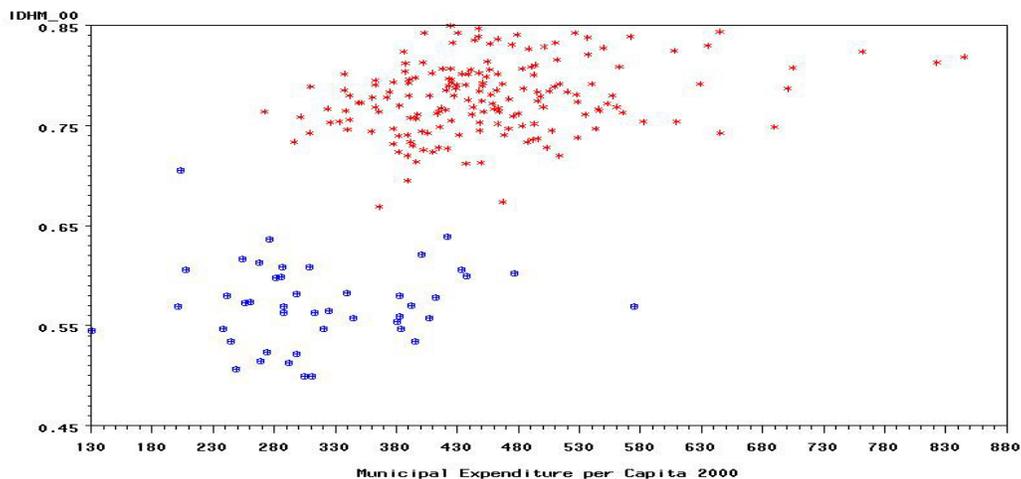
IDHM_00 against MUNEXPER 2000 All Brazil — NE vs. Others



6.41 The remarkable aspect of Figure 6.4 is how the municipalities of the two states separate out so neatly, as if there were very little to compare between them. The figure serves to show that it would not be fair to classify Alagoan municipalities as inefficient in comparison to those from Rio Grande do Sul, due to the intervention of a host of historical and other factors, not accounted for in this simple two-dimensional analysis. Specifically, this paper makes the case that if Alagoan municipalities are exhorted to be more efficient, this should be done in a fair comparison to the municipalities in the same state.⁷⁹ We next turn to look in Figure 6.5 at two contiguous municipal sizes, the small municipalities between 5,000 and 20,000 habitants; and medium municipalities between 20,000 and 150,000 habitants.

Figure 6.4 Small Alagoas Municipalities with Blue Cross, Small Rio Grande do Sul

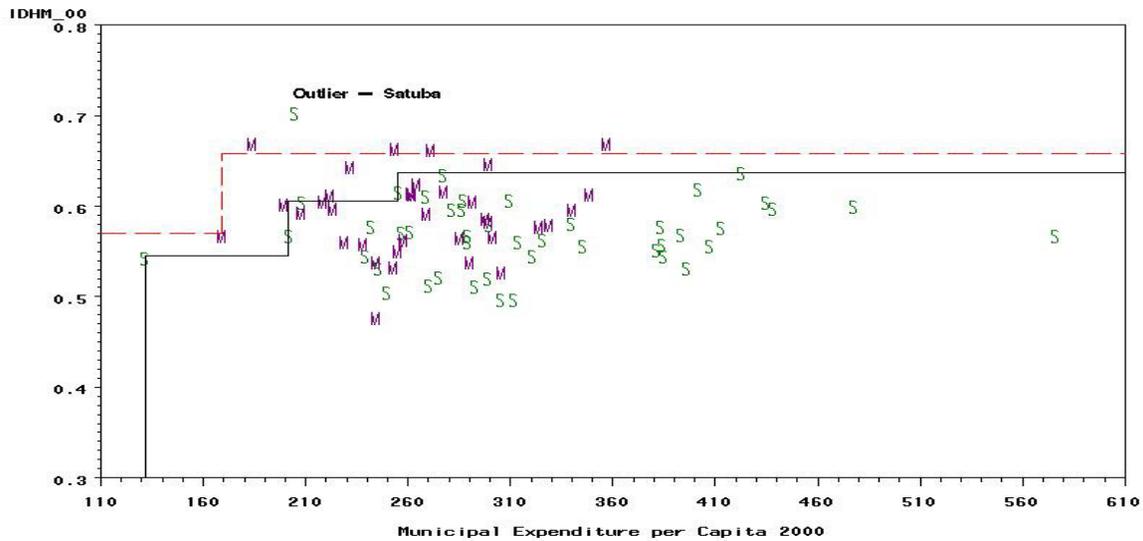
IDHM_00 against MUNEXPER 2000 — Small Alagoas Blue Cross and RGS Red Star



⁷⁹ It may also be meaningful to compare within regions, given the inequities in Brazil are driven so much by region. Even though municipalities in the Brazilian federation are not subservient hierarchically to the State government, the State does provide a range of contextual variables that would be important to efficiency. This is the reason we prefer to make municipal efficiency comparisons within a State.

6.42 Lines are added to Figure 6.5 to depict the envelope of the two groups of small and medium municipalities, in a manner that attempts to illustrate the intricacies of the FDH method and the manner that it can be applied for the purpose of encouraging discussion amongst the policy makers of the municipalities in the State of Alagoas. The first thing to note is that there is an outlier small municipality of Satuba (Population 12,555, IDH-M of 0.705, Municipal Expenditure per capita of R\$ 204.37) that far outperforms the rest of the small municipalities. This fact is noted, and the envelope for small municipalities (black line) is constructed without Satuba. The envelope for medium municipalities (red, dashed line) is constructed on the basis of the entire available sample for medium municipalities, as no such particular outlier is observed in their case. The efficiency frontier for medium municipalities lies outside the one for small municipalities. Figure 6.5 shows qualitative evidence in support of size groupings within a State, if sufficient numbers are present.

Figure 6.5 Alagoas Small Municipalities with a Green ‘S’, Medium Municipalities with a Purple ‘M’
 IDHM_00 against MUNEXPER 2000 — Small Alagoas S and Medium M



6.43 The FDH efficiency scores in the output dimension measure the relative position of a municipality vertically from the envelope, and the efficiency score on the input dimension measure the scores horizontally from the envelope. For the purpose of this paper, we focus on the output efficiency, under the assumption that it would be very difficult for municipalities to achieve efficiency by reducing the use of inputs, due to various institutional and political factors, but that it would be feasible, and indeed desirable that municipalities could strive to achieve a better output for the same level of input. To conclude this section of the paper, as an illustrative table to complement the mainly graphical presentation in this section, Table 6.1 depicts the efficiency scores for the most and the least efficient of the small municipalities in the State of Alagoas.

Table 6.1 FDH Scores of Output Efficiency for Small Municipalities in Alagoas

Municipality	Expenditure	IDH-M 2000	Efficiency Score
Efficient Municipalities			
Satuba	204.37	0.705	1.00
Barra de São Miguel (AL)	422.87	0.639	1.00
Coité do N'óia (AL)	201.48	0.569	1.00
Estrela de Alagoas (AL)	131.61	0.545	1.00
Maribondo (AL)	276.81	0.636	1.00
Olho d'Água das Flores (AL)	208.02	0.606	1.00
Paripueira (AL)	254.94	0.617	1.00
5 Least Efficient Municipalities			
Inhapi (AL)	269.66	0.515	0.83
Roteiro (AL)	299.05	0.522	0.82
Branquinha (AL)	292.09	0.513	0.81
Poço das Trincheiras (AL)	311.54	0.499	0.78
Porto de Pedras (AL)	304.89	0.499	0.78
MEAN FOR 44 municipalities	321.88	0.569	0.91

6.44 The average level of efficiency is 91%, but at the same time, the average IDH-M on 2000 for Alagoas was only 0.57, as compared to a Brazil average of 0.70 and a Southern region average of 0.77. This appears to suggest that while efficiency could be improved in small municipalities in Alagoas, the potential improvement in efficiency would still leave Alagoas behind in terms of human development. While this might seem to be an obvious conclusion that did not require so much of data analysis, it is also the case that discussion about small Brazilian municipalities is often dominated by discussion of their poor institutional capacity. The data examined in this section shows that the story of poor capacity may not be universal. However, deeper analysis would be required as definitive conclusions cannot be drawn from a single illustrative example.

Results from FDH Analysis of Efficiency

6.45 In this section we look at some illustrative examples regarding the application of the FDH methodology to study municipal efficiency in Brazil.

Comparing North and South on IDH-M 2000

6.46 We look closely at municipal efficiency within two regions, the North and South. Frontier estimation requires a certain minimum number of municipalities, if there are too few in any group, there may be a chance that they may be declared "efficient by default", meaning that it may not be so much that they are efficient as the fact that there are no comparator municipalities. To avoid the problem, we only look at those State and municipal size groupings which reach beyond a handful. Of the 7 States in the North and the 3 States in the South, we cover a total of 352 municipalities in the North, and 1,135 municipalities in the South. In each case, we carry out the efficiency analysis to determine the distance of each municipality from the frontier, without any convexity assumption, i.e., the envelope would be similar to the one in Figure 6.5. However, in this section we do not look at the individual municipalities for outliers to provide a correction as we did for the case of small municipalities in Alagoas. We do present the key results in a set of tables in Appendix 1, and the entire results are available in electronic form by requesting to the author. As was stated in the introductory section, the purpose of this exercise is not so much to provide a definitive word on municipal efficiency as it is to engender a discussion amongst the practitioners. Size Groupings are Very Small (below 5,000); Small (5,000 to 20,000); Medium (20,000 to 150,000); Large (150,000 to 1,000,000) and Very Large (1,000,000).

6.47 Table 6.2 provides a summary of the analysis carried out. The table shows the disparities between the North and South in terms of the output variable being considered here, IDH-M for 2000. However, expenditures in the South tend to be higher as well. The point to note from the table is that within the defined comparator groups, inefficiency is not widespread amongst the municipalities. The municipalities in the States in the North are only slightly less efficient than the ones in the South, though overall outcomes are distinct. Also, it should be noted that within the same State, very small and small municipalities represent much higher expenditures as compared to larger ones, without showing a commensurate improvement in the IDH-M indicator. However, within their individual groupings the average inefficiency is not larger for the smaller municipalities. This could be considered to be an interesting finding. The process of the generation of smaller municipalities in Brazil has stopped, but it seems difficult that it would be politically feasible to consolidate municipalities in Brazil. However, smaller municipalities can get together in consortia with other smaller municipalities or larger municipalities. If smaller municipalities are not inefficient in a deep structural way, and these results seem to indicate that efficiency is not so poor, the mechanism such as consortia may prove to be very helpful.

Table 6.2 Means from IDH-M 2000 Efficiency Analysis for North and South

State	Group	Number	IDH-M	Expenditure	Efficiency
RONDONIA	All	44	0.709	310.92	0.93
ACRE	All	15	0.622	326.12	0.87
AMAZONAS	All	27	0.637	320.41	0.88
RORAIMA	All	13	0.677	244.73	0.93
PARA	All	31	0.668	269.30	0.89
AMAPA	All	5	0.731	246.36	NA
TOCANTINS	V Small	44	0.662	537.89	0.94
TOCANTINS	Small & Med	38	0.693	308.87	0.88
PARANA	V Small	91	0.730	643.27	0.91
PARANA	Small	217	0.734	428.38	0.92
PARANA	Med & larger	79	0.770	370.44	0.94
SANTA CATARINA	V Small	104	0.778	648.43	0.94
SANTA CATARINA	Small	136	0.789	397.66	0.93
SANTA CATARINA	Med & larger	48	0.820	393.91	0.96
R G DO SUL	V Small	193	0.779	704.04	0.92
R G DO SUL	Small	177	0.778	459.23	0.93
R G DO SUL	Med & larger	90	0.805	384.14	0.96

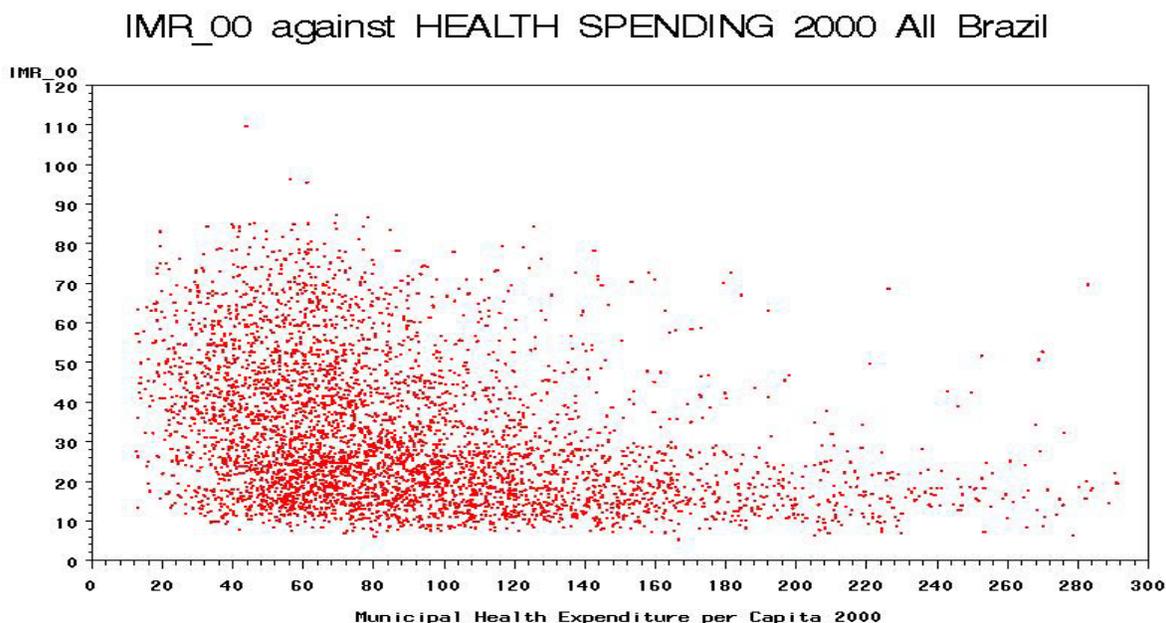
3.1 Comparing Maranhão and São Paulo on IMR 2000

6.48 We turn to a similar analysis now as in Table 6.2, to examine the Infant Mortality Rate (IMR) and Health expenditures. Figure 6.6 depicts the graph for all 4517 Brazilian municipalities in the sample, the data source is the same UNDP database for IMR and STN for health expenditures. As before we eliminate the bottom and top 1% of the sample on health expenditure per capita, the cutoffs being R\$ 12.64 and R\$ 291.17, in current 2000 reals. Mean municipal health expenditures (classified in the database as health and sanitation) being R\$88.70 and mean IMR being 31.44, with a minimum IMR of 5.38 and maximum IMR of 109.67. For the purpose of efficiency analysis, we take the reciprocal of the IMR as the 'output', multiplied by 1000 to retain the notion that more of the output is better. The IMR is of course defined as the number of deaths below 1 year of 1000 live births for the concerned municipality, and is a standard indicator of health status. In this example, we do not present further graphics after Figure 6.6, but delve straight into the efficiency analysis. We look at a comparison between two states, Maranhão in the North-East and São Paulo in the South-East.

6.49 In the case of Maranhão, we look at two groups, comprised of very small and small municipalities in one group (68 municipalities), and medium and large in the other (47 municipalities). In the case of São Paulo, we look at four groups. The first three groups are constituted respectively of very small (170 municipalities), small

(221 municipalities) and medium municipalities (186 in number). The last group consists of 37 large and very large municipalities, including São Paulo and Guarulhos, though it might well be argues that very large municipalities belong to a class of their own and should not be compared in the same group as large municipalities. Table 3 presents the mean results and tables in Appendix 2 present selected municipal level results.

Figure 6.6 IMR 2000 Graph for all Municipalities



6.50 The notable fact from Table 6.3 is the low level of efficiency as compared to the earlier results for IDH-M. There are multiple possible results for this finding, which should be considered with care. First, the STN data on municipal expenditures by area may of less accuracy than the data on overall expenditures. There are accounting issues of earmarked transfers from the federal government and programs such as the family health program that has

Table 6.3 Means from IMR00 Efficiency Analysis for Maranhao and Sao Paulo

State	Group	Number	IMR	Expenditure	Efficiency
MARANHAO	V. Small & Small	68	60.97	58.77	0.68
MARANHAO	Medium & Large	47	58.00	63.39	0.67
SAO PAULO	V. Small	170	15.91	163.26	0.54
SAO PAULO	Small	221	15.61	117.69	0.54
SAO PAULO	Medium	186	14.85	114.13	0.52
SAO PAULO	Large & V. Large	37	16.13	157.25	0.78

been accredited with a large positive impact on the reduction of infant mortality⁸⁰. The private expenditures on health are also not recorded here. Second, a number of municipalities have low health expenditures but have high health performance as they are the so called 'dormitory municipalities', close to a larger metropolitan city that provides needed health services in the area. On the flip side, municipalities with high expenditure per habitant may, in fact, be serving a bigger population. Finally, it is a characteristic of frontier estimation techniques that the

⁸⁰ See Macinko, Guanais and Marihho de Souza 2006, [22]. The authors report that after controlling for a set of other variables, a 10% increase in the coverage of the Family Health Program led to a decline of 4.6% in the IMR.

variation in efficiency scores closely follows the variation in the input and output variables. As an output variable, even a glance at the mean IMR shows a much greater variation than was the case for IDH-M.

Efficiency for IMR 2000 with Physical Input Variables

6.51 To test the hypotheses regarding the ostensibly low efficiency of health performance (as measured by the IMR), we examine an alternative specification of inputs. Information is available from the IBGE of a number of physical inputs that go into health services. We choose the following, that includes both public and private resources in the municipality - number of health centres (of all kinds), number of doctors, number of nurses, and number of hospital beds. We also use IBGE data about contemporaneous (year 2000) percentage of households with access to safe drinking water and the percentage of households benefiting from garbage collection services. The municipal level tables are presented in Appendix 2, and a summary of the means is presented in Table 6.4.

Table 6.4 Means from IMR00 Efficiency for Maranhao and Sao Paulo

State	Sample	Centre	Doctor	Nurse	Bed	Agua	Lixo	IMR	EFF
Maranhão 1	37	5	9	3	33	16%	22%	62.73	0.86
Maranhão 2	45	20	100	26	208	29%	44%	57.45	0.88
São Paulo 1	14	2	10	2	32	97%	99%	14.79	0.93
São Paulo 2	119	4	24	4	44	97%	99%	15.73	0.88
São Paulo 3	175	17	141	20	194	97%	98%	14.73	0.78
São Paulo 4	37	128	2,365	437	1,433	98%	99%	16.13	0.91

6.52 As expected, the efficiency scores for health performance go up when compared to using recorded public municipal health and sanitation expenditures. However, the magnitude of the increase is considerable, with the least efficient group, very small municipalities in the State of Maranhão indicating a mean efficiency level of 0.88. The remarkable change in efficiency scores indicates an important methodological point. It has been stated before that a useful purpose of efficiency analysis is to publicize and foment public discussion of efficiency scores as a precursor to the identification of high performing municipalities that set benchmarks for other municipalities to emulate. If the benchmark municipalities are obtaining higher performance with the same level of resources, it is probable that such performance is due to better institutional features and behavioural incentives.

6.53 In some cases, analytical quantitative research may be able to diagnose the drivers of such performance. However, it is likely that the complexity of local conditions account for the variation in the performance, and the true reasons for superior performance can only be encountered through interaction with the local actors - the so called positive deviance' methodology, as described by Pascale and Sternin, 2005 [23]. Even if one were to restrict attention to available quantitative data, and not go to the next stage of policy discussion with practitioners, it remains the case that efficiency scores need to be reasonably robust. The illustrative example considered here for health performance underscores the critical importance of the specification of inputs and outputs, as efficiency scores may alter radically from one specification to the next. In policy terms, the results from the IMR analysis appears to reconfirm the finding that enhancing municipal efficiency would only go so far in terms of improving human development in Brazilian municipalities.

Comparison between 1991 and 2000

6.54 So far the presentation has been of a static nature, examining the efficient frontier, as it existed in 2000. However, a most interesting discussion is the manner in which the shape and location of the frontier shifts over the years. Since the empirical frontier estimation method is not based on a theoretical production function, it is intriguing why such an attempt to trace out the movements of municipalities has not been presented before in the literature. In this sub-section we undertake a graphical examination of the movement of the efficiency frontier

considering the IDH-M between 1991 and 2000, tracked against per capita municipal current expenditures in constant 2000 reais to enable comparison.

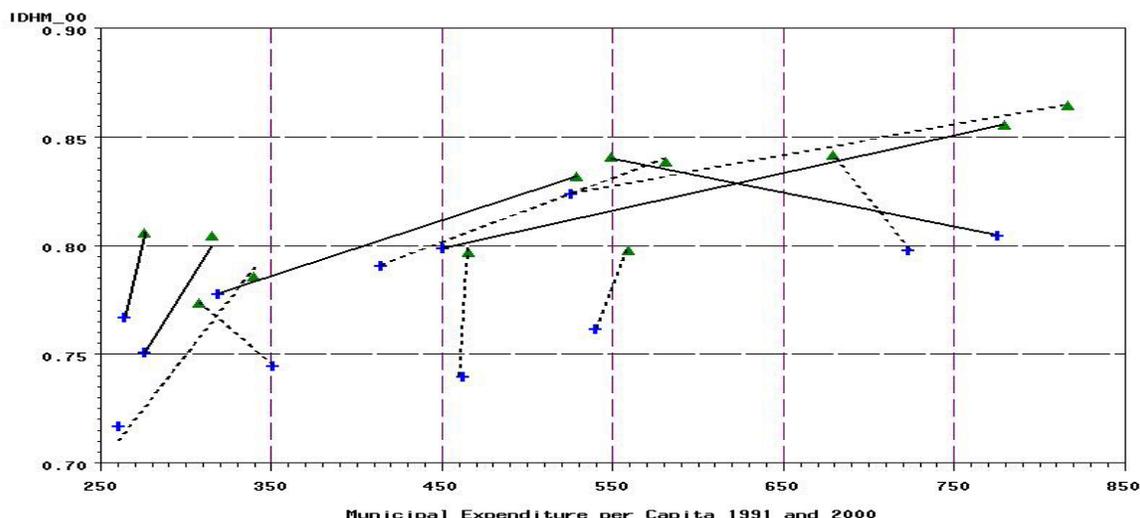
Table 6.5 Comparing IDH-M and Expenditures between 1991 and 2000

Obs	MUNICIPIO	EXPER91	IDHM 91	EXPER00	IDHM 00
1	Bel'em (PA)	264.160	0.767	275.723	0.806
2	Manaus (AM)	351.246	0.745	308.257	0.774
3	Salvador (BA)	275.517	0.751	315.851	0.805
4	Fortaleza (CE)	260.732	0.717	340.005	0.786
5	Recife (PE)	462.506	0.740	465.784	0.797
6	Goi'ania (GO)	318.530	0.778	528.879	0.832
7	S'ao Paulo (SP)	775.973	0.805	549.181	0.841
8	Guarulhos (SP)	540.284	0.762	559.520	0.798
9	Belo Horizonte (MG)	413.931	0.791	581.166	0.839
10	Rio de Janeiro (RJ)	723.605	0.798	679.026	0.842
11	Curitiba (PR)	450.747	0.799	779.434	0.856
12	Porto Alegre (RS)	525.328	0.824	816.746	0.865

6.55 A better depiction of the data above can be obtained by looking at the figure showing the same data. In Figure 6.7, the points of origin of 1991 are denoted by a + sign and the point of destination of 2000 denoted by a Δ sign. Of course, we do not know the precise trajectory between 1991 and 2000; the path may well have been wavy or looped or jagged. To facilitate the reading of the graph, the cross is in blue color and the triangle in green. Appendix 2 provides detailed graphs with labels indicating each municipality. The lines that go up vertically pertain to the North and North-East municipalities. The lines for the two South municipalities slope to the right, while Rio de Janeiro and São Paulo show leftward slopes, marked in the case of São Paulo. On the whole, Table 6.5 and Figure 6.7 show an overall positive picture regarding efficiency, or at least one that is not declining. A more rigorous quantitative investigation would surely provide some interesting conclusions.

Figure 6.7 Basic IMR 2000 Graph for all Municipalities

IDHM_00 and IDHM_91 against MUNEXPER 2000



FDH after Correction for Contextual Variables: Understanding Drivers of Efficiency

Outcome Variable of Interest

6.56 In this section, we examine the evolution of a particular outcome variable of interest. The variable is chosen from the education sector, but the methodology would be applicable to other output variables, such as the ones considered in the previous section, namely the IDH and the IMR. The literature regarding municipal performance insofar as education is concerned generally looks at enrollment, i.e. the number of students enrolled. However, the use of enrollment as an output variable when coverage is nearly universal seems to be an unnecessary compromise. Coverage in Brazil is nearly universal for Primary Education in Brazil, which is the level of education where Municipalities predominate in the provision of educational services. Variation in the number of children enrolled is therefore only indirectly an effect of municipal performance, through possible Tiebout effects and stochastic demographic variations related to performance in the long run. In view of the policy focus of this paper, which seeks to generate and inform the debate about municipal performance, an education outcome variable is required that is more directly related to actions that are undertaken or neglected by municipal administrations.

6.57 It is generally regarded that value added standardized test scores of students are the best possible measure of the quality of education services, though there is some dissension amongst scholars about this point of view. Thus one measures student achievement at the beginning of an educational course, and then measures the achievement of the same students in a valid, reliable and accurate way after the completion of the course. Without getting into the merits or otherwise of this 'ideal' measure of educational quality, the fact of the matter is that this kind of data is simply not available for Brazilian municipalities. Also, even though coverage of Primary Education in Brazil is universal, primary completion is not universal. Typically, because of a combination of disadvantaged family contexts including low income, and poor quality of service provision, students begin to lag behind in their studies, end up having to repeat the same grade rather than moving to the next one at the end of the year, and after a few repeated episodes of repetition, drop out of school altogether. Even the children who may repeat grades but not drop out are victims of low self-esteem and motivation. The probability for further education is hampered by grade repetition, and an individual's productivity and labor market prospects are also damaged. Grade repetition as a phenomenon is one that is eminently treatable by policy action on the part of the municipal administration running municipal schools. The effects of municipal action would clearly be stronger for municipal schools, because more policy variables are under municipal control. However, in collaboration with State governments in Brazil, municipalities can and do play a role even in the grade repetition in State run schools, and arguably also in private schools, because of the flows of students from one system to another, and the overall context of educational service provision in a municipality.

6.58 Students repeat grades because they do not learn the material in the curriculum designed for them within the year. There may be multiple factors that affect grade repetition, or educational service provision more generally. These factors can be classified into roughly three groups: First, the education of a child is a joint outcome of a child's experience at school and at home; after all, a child spends 5 or 6 times more of his or her time at home or away from school rather than in the school, and there is only so much individualized attention that can feasibly be provided at school. Second, a lot depends on the physical availability and quality of educational inputs at the school - simple things such as the physical layout of the school building in terms of sound protection and light availability, furniture, sports fields and equipment, trees and gardens and recreational areas in general, textbooks, other didactic material, the presence of teachers and so on. Third, there are a number of educational policy variables that specifically affect grade repetition, in addition to policy effects through the provision of inputs - the entire system of training and pedagogical and administrative support provided by the municipal administration to schools, the human resource policies in place for the municipality, the presence of remedial programs for children from disadvantaged backgrounds, policies to engender community participation and collaboration, cooperation with other levels of government, with neighbouring municipalities, and so on.

6.59 In this last section of the paper, we provide a preliminary examination of a particular way to measure grade repetition, the Age Grade Distortion Rate. The data is readily available from the same source, the Atlas of Human Development for Brazil, prepared by the UNDP with other collaborating organizations. The variable in question is the Age Grade Distortion Rate of 1 year or more. It captures the cumulative effect of grade repetitions, because in fact it is this cumulative effect that is most damaging to children, rather than a possibility isolated case of repetition in one year. It also provides a unique combination of quantitative and qualitative factors regarding service provision. The indicator used here measures the percentage or proportion of students who have repeated at least one grade. It takes as the denominator all the children enrolled in a certain age group; here the age group of 7 to 14 years old. As the numerator, which is a subset of the denominator group of children, it uses the number of children who are behind their cohort, by 1 or more years, due primarily to repetition. It is an indicator that does not pose problems of aggregation across schools within a municipality and does not require assumptions regarding the population for reference, as is the case, for instance, with enrollment rates. A municipality that provides better educational services (quantitatively and qualitatively) would have a lower Age Grade distortion rate, and poor service provision would likely show up in a higher Age Grade distortion rate, though two such municipalities of the same size and in the same State might have identical enrollment.

6.60 Since the level of the Age-Grade distortion rate (henceforth ADR) itself may be a manifestation of a long past trajectory, from a policy variable, it would be useful to examine the change or evolution in the Age-Grade distortion rate, over a sufficiently long but not too long period of time. We use the change in the Age-Grade distortion rate, between the two years of 1991 and 2000, for the municipality as whole, that is not restricting attention to municipal schools, which would account for an average roughly between one-half and two-thirds of the enrollment for that age group for the period under consideration. In fact, there was an accelerated process of municipalization of education in that time period, which provides further reason to consider all schools in the municipality rather than just municipal schools. World Bank, 2002 [24] provides a detailed analysis of the context and consequences of this process of municipalization.

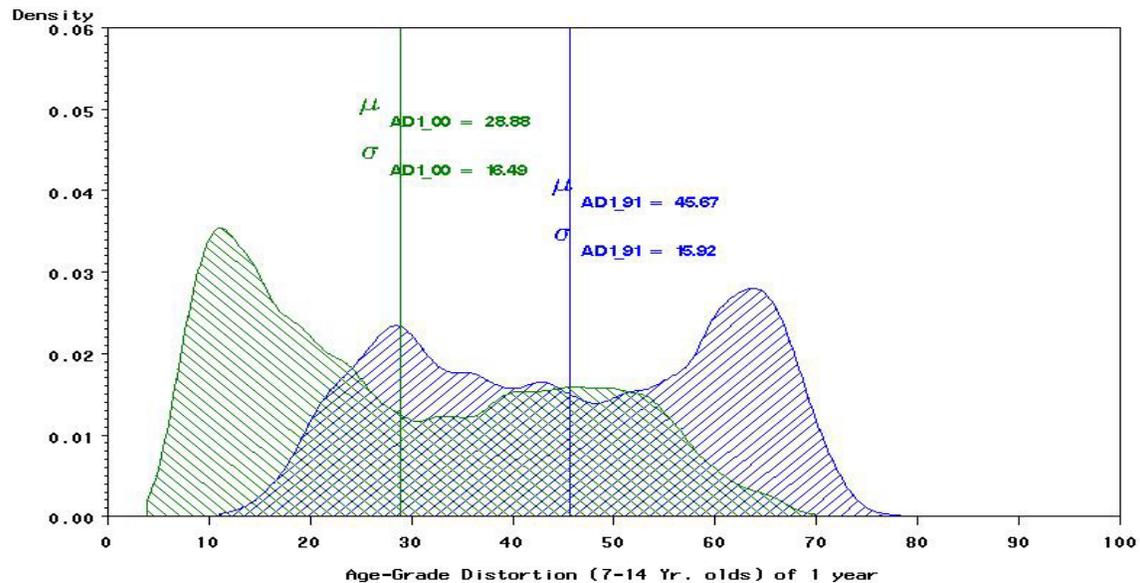
Evolution of Age-Grade Distortion Rate (ADR) between 1991 and 2000

6.61 Considering the 5508 municipalities for which data is available, the ADR for Brazil was 45.67 in 1991, and it declined to 28.88 in 2000, still considerably high, but representing a dramatic improvement. The remarkable fact is that the reduction of the ADR took place for all of Brazil; of the more than five thousand municipalities in Brazil, only two reported an increase in the ADR over the period 1991-2000. A look at the evolution of the municipal distribution between 1991 and 2000 provides an interesting picture, as seen in Figure 6.8

6.62 The municipal distribution for 1991, shown in blue with right slanting lines filling the kernel density function has two distinctive peaks; it is interesting to note that with the leftward shift in 2000, the peak on the right (showing much higher age-grade distortion) has flattened considerably. The graph for All Brazil is actually a combination of two groups of unimodal distributions. Two representative groups are shown as Figure 6.9 and Figure 6.10, pertaining respectively to the municipalities in the North-East and South, respectively.

Figure 6.8 Evolution of Age-Grade Distortion (ADR) All Brazil: 1991 - 2000

Kernel Density Estimator Age-Grade Distortion Bandwidth of 1.0 — All Brazil

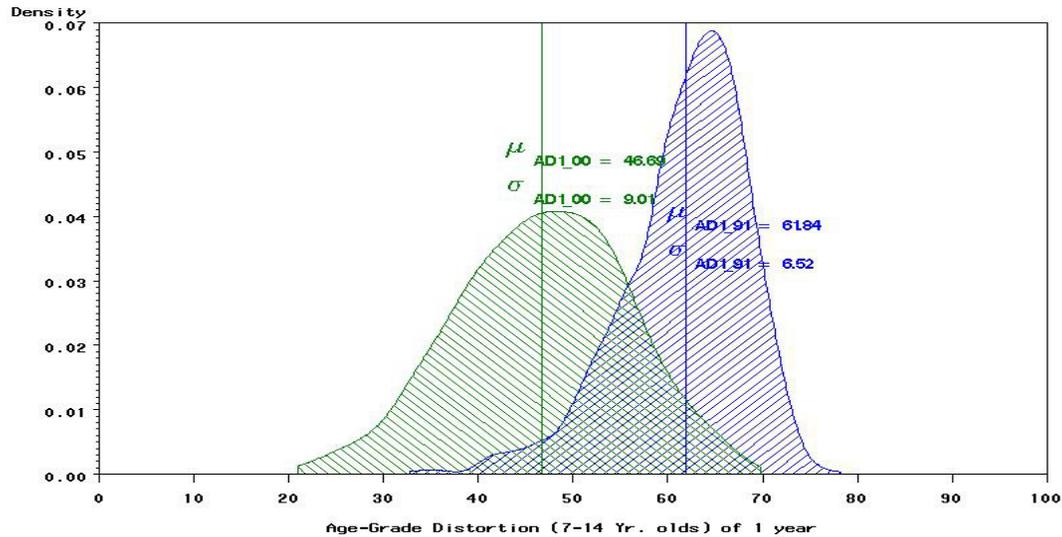


6.63 It should be noted that compared to a Brazil average of 45.67 for the ADR in 1991, the mean for the North-East was 61.94, as the distribution moved to the left, the variance increased, and the mean of 46.69 for 2000, still higher than what it was for Brazil in 1991. At the other extreme one finds (Figure 6.10) that the mean ADR for South Brazil declined from 28.03 to 13.91. The graph also shows how the variance was reduced, even though there is a tendency for a fat right tail to remain.

6.64 In terms of analysis of municipal efficiency, the interesting question to answer concerns the relation between reductions in the ADR to the expenditure for educational services incurred by municipalities. If it were possible to identify municipalities that were able to achieve higher levels of reduction in the ADR for given level of expenditures, the institutional arrangements and policies of those efficient municipalities would serve as benchmarks or guideposts for other municipalities. As has been stated before, the ADR is a good bellwether of educational services, and through educational inputs and policies, it is possible to improve the provision of educational services.

Figure 6.9 Evolution of Age-Grade Distortion (ADR) North-East: 1991 - 2000

Kernel Density Estimator Age-Grade Distortion Bandwidth of 1.0 — North-East

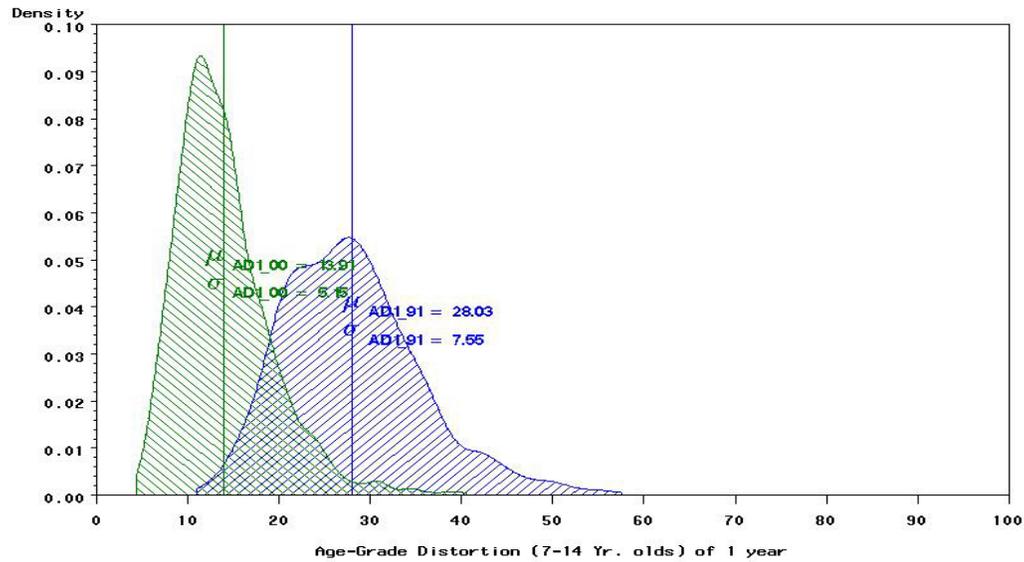


The Effect of Contextual Variables

6.65 In the literature review section of this paper, we mentioned the problem faced by researchers attempting empirical production frontier analysis. Contextual variables affect the output variable, but it is conceptually difficult to integrate such contextual variables as 'inputs'. Second stage regressions of efficiency scores on the contextual variables have their own problem, because of truncation problems and lack of clarity about the meaning of the efficiency score that excludes contextual variables. We adopt a pragmatic approach, that is closest to Grosskopf, Hayes, Taylor and Weber (2000) [16]. We choose a set of readily available contextual variables that would affect the output independently of our chosen policy variable of municipal education expenditures as an input. We run an OLS regression of the reduction in ADR, the variable called DEL_AD714, as the dependent variable on a set of regressors that serve as our contextual variables (detailed below). We then take the residuals from that regression, and add on the residuals to the mean level of DEL_AD714, a step that follows Grosskopf, et. al and that is required because we need an output variable that is above zero for all cases. This adjusted ADR or ADJ_ADL serves as the output variable that in a sense has been purged of the influence of the contextual variables. This would become clearer after a presentation of our regression results.

Figure 6.10 Evolution of Age-Grade Distortion (ADR) South: 1991 - 2000

Kernel Density Estimator Age-Grade Distortion Bandwidth of 1.0 — South



6.66 First of all, even though municipalities are autonomous of the State government, and also because we choose the reduction in ADR for all schools as the output of choice, we include dummy variables for each State, to take account of the fixed effect of the State. Using São Paulo as the excluded dummy, we have a set of 25 dummies for the 26 States in Brazil, for our database of 4605 municipalities for which education expenditure data is available. We use five other contextual variables - RPC91, the per capita income of the municipality in 1991, as an indicator of the general economic development of the municipality; PERQMW91, the percentage of the individuals in the municipality who in 1991 lived in households where the income per person was less than a quarter of the existing minimum wage - this serves as an indicator of income inequality; AN_INST that depicts the year of formation of the municipality, to capture the effect of the splintering of municipalities and the consequent institutional dismembering; DIST_CAPITAL that measures the geographical distance of the municipal centre from the State Capital; and TOTPOP_91, the total population of the municipality in 1991. Table 6.6 presents the means and standard deviations the variables used in the regression.

Table 6.6 Description of Variables Used in Regression

VARIABLE	DESCRIPTION	MEAN	STANDARD DEVIATION
D11	Dummy (RONDONIA)	0.0095548	0.0972913
D12	Dummy (ACRE)	0.0032573	0.0569862
D13	Dummy (AMAZONAS)	0.0058632	0.0763550
D14	Dummy (RORAIMA)	0.0028230	0.0530628
D15	Dummy (PARA)	0.0065147	0.0804588
D16	Dummy (AMAPA)	0.0010858	0.0329368
D17	Dummy (TOCANTINS)	0.0184582	0.1346159
D21	Dummy (MARANHAO)	0.0254072	0.1573754
D22	Dummy (PIAUI)	0.0249729	0.1560593
D23	Dummy (CEARA)	0.0280130	0.1650279
D24	Dummy (RIO GRANDE DO NORTE)	0.0269273	0.1618884
D25	Dummy (PARAIBA)	0.0390879	0.1938253
D26	Dummy (PERNAMBUCO)	0.0295331	0.1693137
D27	Dummy (ALAGOAS)	0.0191097	0.1369254
D28	Dummy (SERGIPE)	0.0117264	0.1076633
D29	Dummy (BAHIA)	0.0699240	0.2550466
D31	Dummy (MINAS GERAIS)	0.1730727	0.3783512
D32	Dummy (ESPIRITO SANTO)	0.0162866	0.1265894
D33	Dummy (RIO DE JANEIRO)	0.0193268	0.1376859
D41	Dummy (PARANA)	0.0849077	0.2787746
D42	Dummy (SANTA CATARINA)	0.0631922	0.2433347
D43	Dummy (RIO GRANDE DO SUL)	0.1001086	0.3001773
D50	Dummy (MATO GROSSO DO SUL)	0.0156352	0.1240728
D51	Dummy (MATO GROSSO)	0.0212812	0.1443359
D52	Dummy (GOIAS)	0.0464712	0.2105262
RPC91	Income per Capita 1991	131.9422085	74.1038848
PERQMW91	% Individuals <quarter min wage	29.7911857	20.1272631
AN INST	Year of Formation	60.9200869	21.0842534
DIST CAPITAL	Distance from State Capital	249.9506418	154.1934412
TOTPOP 91	Total Population 1991	28499.98	182830.82

N=4605 for all variables

6.67 The regression equation is used just to generate the residuals; it is not an object of analysis. However, it is of interest in Table 6.7 to look at the results of the regression analysis to examine the sign of the variables and to note a reasonable explained variation (R-squared) of 0.47. The coefficients on the State dummy variables are not presented, except to note that nearly all (22 out of 25) are statistically significantly different from zero. Compared to São Paulo, the excluded State, it is interesting to note that even as two of the three coefficients on the dummies for the statistically insignificant variables are positive, of the 22 statistically significant dummies, all but three have negative signs. The States that have dummy coefficients in the positive direction from São Paulo, are Ceará, Minas Gerais, and Goiás. Amongst the other explanatory variables, the Income per Capita has a statistically significant negative effect, and the population of the municipality has a positive effect. The effects of the year of formation of the municipality, the poverty measure, and the distance from the State capital are statistically insignificant. Future research can look into alternative specifications of the regression equation and test the sensitivity of the eventual conclusions regarding municipal efficiency to those specifications.

Table 6.7 Results of Regression of DEL-AD714

VARIABLE	DESCRIPTION	COEFFICIENT	STD. ERR.	t	VALUE
RPC91	Income per Capita 1991	-0.02549	0.00191		-13.35
PERQMW91	% Individuals <quarter min wage	-0.00687	0.00782		-0.88
AN INST	Year of Formation	0.02571	0.00361		7.12
DIST	Distance from State	0.00071123	0.00047972		1.48
CAPITAL	Capital				
TOTPOP 91	Total Population 1991	7.810555E-7	3.840315E-7		2.03

N=4510; 22 out of 25 dummies with t higher than 2

6.68 The purpose of the regression analysis is to extract residuals to adjust the output variable to be used in the efficiency analysis. An example using a pair of municipalities would explain the adjustment. The municipality of Santana do Maranhão, a predominantly rural municipality with a 2000 population of about 11,000 habitants in the State of Maranhão, has an actual value of DEL_AD714 of 1.36, meaning that the Age-Grade distortion rate declined by only 1.36 percentage points in the period between 1991 and 2000, that can be seen to be a small decline as compared to the overall decline for the North-East as seen from the shifting pattern of distribution depicted in Figure 9. That difference is not explained because of the development level, poverty, distance from the capital, the Maranhão dummy and so on. Given the values for those 'independent' variables, the regression equation predicts a value of 13.36 for the DEL_AD714 for Santana do Maranhão. Thus the residual value for the municipality would be a negative -12.00. Of course, we add the mean value of the overall reduction in the ADR (17.01) in order to get only positive values on the output variable in the subsequent efficiency analysis. Another case from the same State is that of Tasso Fragoso, with a population of around 6000, roughly half of it urban. The value of the DEL_AD714 variable for Tasso Fragoso was 24.88, with the regression predicting 12.75 (close to the 13.36 for Santana, meaning the values for the independent variables used in the regression were not strikingly different across the two municipalities), and thus a positive residual of 12.13. Over the more than 4,500 municipalities used in the sample, the residuals were generated with the express purpose of purging out the effects of the chosen regressors. Thus, in the FDH analysis, the adjusted output value for Santana would be 4.99 and for Tasso Fragoso it would be 29.13. The hypothesis is that with this adjustment, the output variable can more plausibly be used together with the input of educational expenditures to perform empirical efficiency analysis.

Efficiency Analysis with and without Contextual Variables

6.69 We perform FDH efficiency analysis, as in the previous sections. We run two kinds of efficiency analysis, the first one with the adjusted reduction in ADR as the output variable, and the other one with the output as the unadjusted reduction in ADR. The input variable is the same in both cases, namely the municipal education expenditures per capita. The analysis has been performed for groups formed by the population size groups and regions. We perform the analysis for the North-East and South regions. It would have been consistent to perform the analysis within population grouping by State, but as State dummies were included in the regression used for adjusting the output variable, we have chosen to look at efficiency within the region. Analysis by State would be a useful avenue for further research. Table 6.8 presents the results from the efficiency analysis.

Table 6.8 Comparing Mean FDH Efficiency Scores with and without contextual variables

North East Region						
Group	N	Eff. With	Eff. Without	DEL_AD712	DEL-ADJ	Edu exp per cap
V. Small	166	0.62	0.53	15.13	17.13	190.19
Small	665	0.57	0.51	15.56	16.82	132.81
Medium	384	0.53	0.45	15.71	17.30	108.36
Large & V. Large	25	0.62	0.60	17.22	20.27	88.52
South Region						
Group	N	Eff. With	Ef without	DEL-AD712	DEL-ADJ	Edu exp per cap
V. Small	390	0.59	0.49	14.87	17.36	231.54
Small	529	0.55	0.49	14.77	17.33	149.56
Medium	190	0.66	0.43	11.52	16.10	135.79
Large & V. Large	27	0.83	0.70	9.59	16.65	127.49

6.70 The table shows some interesting patterns. Note that the mean efficiency scores with contextual variables is consistently higher than the mean efficiency scores without the contextual variables for all groups, though this relationship does not necessarily hold for each municipality. The interpretation of this finding could be that there is a preponderance of municipalities that show relatively low unadjusted efficiency scores because the low output is not only the result of poor efficiency, but also because there are contextual variables that constrain the municipal results. When the contextual variables are taken into consideration, the efficiency score may not be as bad. This phenomenon is stronger for some groups of municipalities. Table 6.8 shows that the contextual variables do not make for a large difference in the case of Large and Very Large municipalities in the North-East, but do so for the South. Again, it should be stressed that these are average results, with individual municipalities possibly showing differing sign in the tendencies. Indeed, we look in Table 6.9 at the case of some selected municipalities. We choose the 166 Very Small municipalities in the North East and the Large and Very Large municipalities in the South, choosing the 10 most efficient municipalities in each case.

Table 6.9 Efficient municipalities With and Without Contextual Variables

North East Region -Very Small Municipalities		
Municipality (State)	With Contextual	Without Contextual
Geminiano (PI)	1.00000	0.21281
São Gonalo do Piauí (PI)	1.00000	0.23591
Varzea Grande (PI)	1.00000	0.23358
São Francisco do Oeste (RN)	1.00000	0.10393
Miguel Leão (PI)	0.49194	1.00000
Vera Mendes (PI)	0.18262	1.00000
Parari (PB)	0.69622	1.00000
Quixaba (PB)	0.81537	1.00000
São José do Brejo do Cruz (PB)	0.52664	1.00000
South Region -Large & Very Large Municipalities		
Municipality (State)	With Contextual	Without Contextual
Alvorada (RS)	1.00000	0.41085
Caxias do Sul (RS)	1.00000	0.63906
Novo Hamburgo (RS)	1.00000	0.84628
Santa Maria (RS)	1.00000	0.63773
São Leopoldo (RS)	1.00000	0.51506
Guarapuava (PR)	1.00000	0.32738
Blumenau (SC)	0.83823	1.00000
Criciúma (SC)	0.64157	1.00000
Florianópolis (SC)	0.88222	1.00000
Gravataí (RS)	0.65120	1.00000

6.71 It can be seen from the upper panel in Table 6.9 that the four efficient municipalities in the group of North East municipalities that are at the efficient frontier in the specification with contextual variables (i.e., using the adjusted change in ADR as the dependent variable), the scores without contextual variables are very low, indeed the same municipalities would be at the bottom of the distribution as can be seen from the right hand side of the panel. A similar effect is seen for the Southern municipalities, though the difference in scores is not as striking; the municipality of Novo Hamburgo (RS) has a relatively respectable without adjustment efficiency score of 0.85. The group of municipalities that are efficient with adjustment and inefficient without adjustment are municipalities that would typically be adversely affected by the contextual variables, and would be useful benchmarks for other municipalities that seek to overcome their own handicaps regarding the contextual variables. It is interesting to note that the efficient municipalities as depicted by the right hand side of the panel are not efficient when context is considered. That is to say, these municipalities appear to have other things going for them other than efficiency that enables them to achieve superior results. This paper has a primarily methodological motivation. However, future research should examine such variation in efficiency scores for groupings of municipalities within each State. The efficiency scores can then be used as tools to engender policy discussion about the drivers of efficiency. For the purpose of this paper, we perform a preliminary investigation of one possible part of the explanation regarding efficiency, though such investigation needs to be carried on to a deeper level, and policy practitioners need to be involved in the research exercise because the complexity of the local context is difficult to capture in an aggregate database of the kind that we are using.

Municipal Efficiency: Possible Effects of Consortia and Municipal Councils

6.72 IBGE has a series of municipal databases that provide a wealth of data for further investigations on aspects of efficiency. We use the Survey of Basic Municipal Information (PIBM in Portuguese) for 1999. As part of this survey that has universal coverage of municipal, two sets of questions were asked that relate to the

presence of consortia with other municipalities and the presence of municipal councils. This paper is written under the hypothesis that a complex underplay of factors affect efficiency such that aggregate analysis would probably not yield discernible patterns. Even though this hypothesis is difficult to test without an exhaustive analysis of available aggregate data, a preliminary analysis can be performed by way of initial experimentation, to be developed through further research.

6.73 We use two possibly relevant variables regarding municipal consortia. The first relates to the presence or existence (in 1999) of a municipal consortium regarding education with other neighbouring municipalities - the dichotomous variable is called CRE99. The second is regarding the existence of a consortium regarding any sector - the question was asked regarding consortia for health, housing, purchase of equipment or machinery, water, sanitation, and solid waste management. The dichotomous variable CRG99 records the existence or otherwise of The information regarding municipal education councils is somewhat more detailed. We use questions regarding the existence or otherwise of a municipal education council (CHE99a); whether or not the council is functioning (CHE99b); whether or not the council has equal representation from the municipal administration and civil society (CHE99c); whether or not the council has any decision-making influence (CHE99d) and whether or not the council administers municipal funds for the education sector (CHE99e). In all the cases, a value of 1 indicates an affirmative response and a value of 0 indicates the absence of an affirmative response.

Table 6.10 Existence of Municipal Consortia and Education Councils

Group	N	North East Region						
		CRE99	CRG99	CHE99a	CHE99b	CHE99c	CHE99d	CHE99e
Very Small	166	3.01%	16.19%	93.37%	82.53%	80.12%	71.68%	36.14%
Small	665	4.66%	19.24%	91.87%	82.85%	77.44%	71.27%	39.69%
Medium	384	4.16%	13.80%	92.18%	84.89%	81.77%	76.04%	39.58%
Large & Very Large	25	4.00%	12.00%	96.00%	96.00%	92.00%	84.00%	24.00%
South Region								
Group	N	CRE99	CRG99	CHE99a	CHE99b	CHE99c	CHE99d	CHE99e
Very Small	390	4.61%	66.41%	91.53%	83.07%	73.33%	70.51%	30.00%
Small	529	5.86%	65.21%	93.00%	85.25%	74.48%	72.02%	38.75%
Medium	190	3.68%	48.94%	93.15%	84.21%	68.42%	68.42%	36.84%
Large & Very Large	27	0.00%	40.74%	81.48%	70.37%	51.85%	62.96%	48.14%

6.74 Table 6.10 indicates the very low incidence of consortia for education, the general existence of consortia is higher, especially in the South, most of these consortia pertain to the health sector. This is data for 1999; it is likely that the existence of consortia has expanded since then. There is nearly universal existence of municipal education councils, and in most cases the councils are functioning and have representation from civil society. In terms of efficiency analysis, we need to have some underlying variation in the data in order to explore possible correlations with efficiency. Variables indicating universal absence or universal presence are not very helpful in this regard. Accordingly, we use the variable CHE99e, whether the municipal educational council administers municipal education funds, as an empirical evidence of the importance attributed to the municipal education council. The analysis did not indicate any discernible pattern regarding the impact of this variable on municipal efficiency. In most region and size groupings, the mean efficiency scores are similar between the two sets of municipalities, with or without council administration of funds. The mean score in the North East for Large and Very Large municipalities is higher for those with a council administering funds (0.71 vs. 0.60) when the adjusted output is considered, but the reverse is the case with unadjusted output (mean efficiency of 0.45 vs. 0.66). For the same size group of municipalities in the South, the situation was the obverse, with municipalities that possess a council administering funds doing better when the unadjusted output is considered (0.75 vs. 0.60). This evidence is inconclusive about the futility of seeking answers about the question regarding the drivers of efficiency from aggregate analysis. It does indicate the need for further detailed research, examining such policy variables at the

same time as the need to involve municipal actors in the research regarding the factors that enable some municipalities to be so much more efficient than the others.

Figure 6.11 Basic IDH-M 2000 Graph for all Municipalities

IDHM_00 and IDHM_91 against MUNEXPER 2000 — NORTH

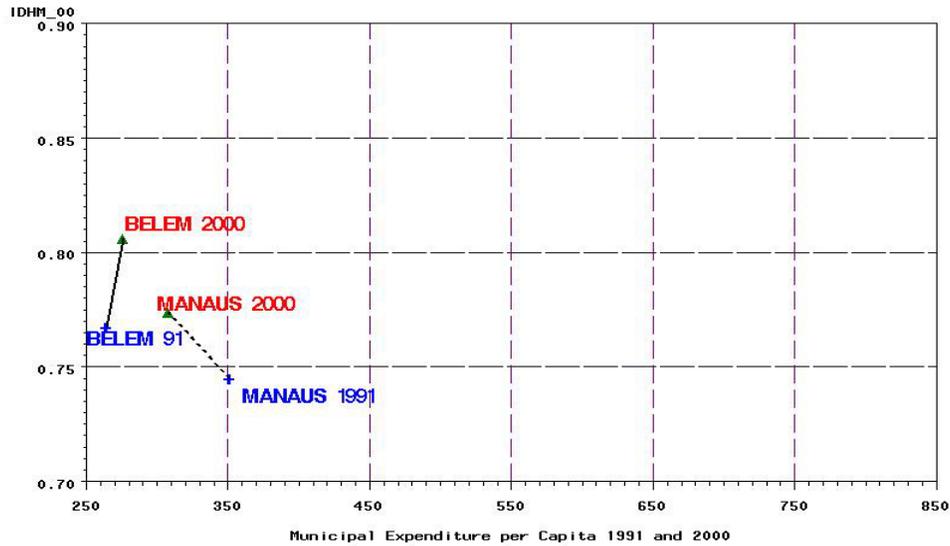


Figure 6.12 Basic IDH-M 2000 Graph for all Municipalities

IDHM_00 and IDHM_91 against MUNEXPER 2000 — NORTH—EAST

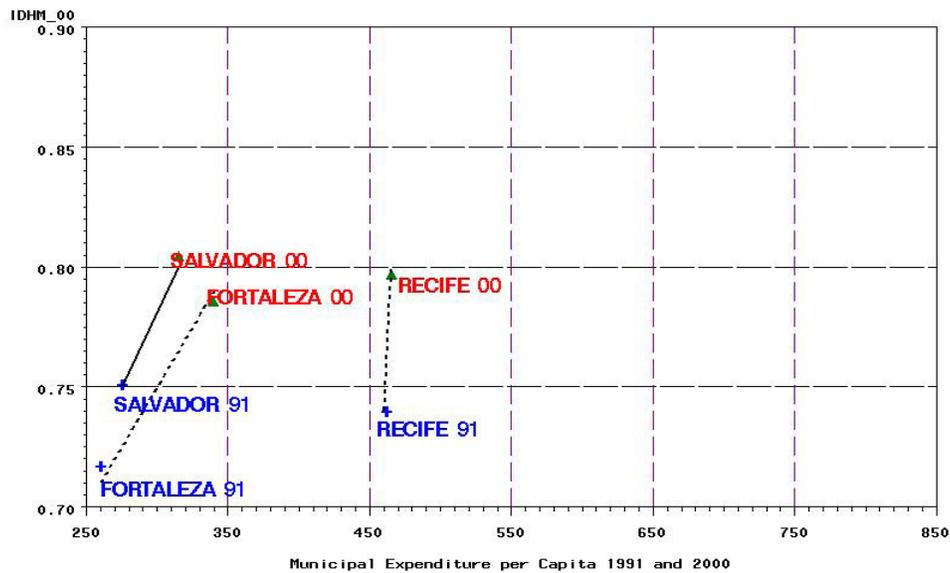


Figure 6.13 Basic IDH-M 2000 Graph for all Municipalities

IDHM_00 and IDHM_91 against MUNEXPER 2000 – CENTRE–WEST

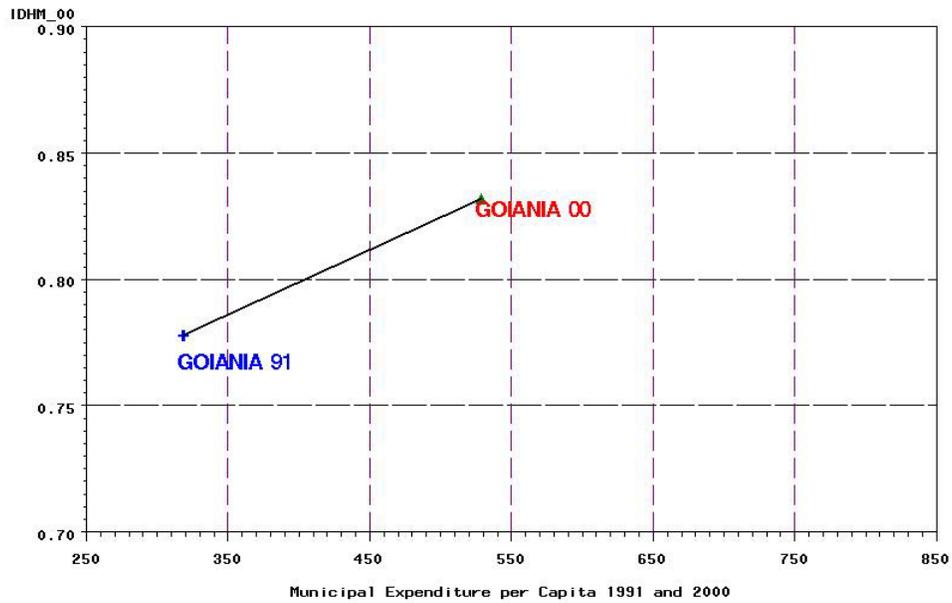


Figure 6.14 Basic IDH-M 2000 Graph for all Municipalities

IDHM_00 and IDHM_91 against MUNEXPER 2000 – SOUTH–EAST

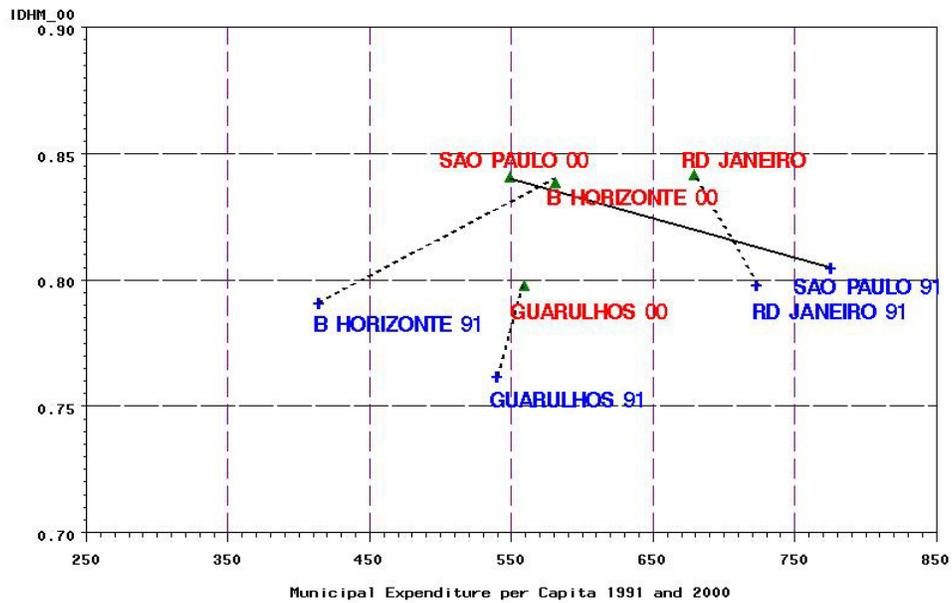
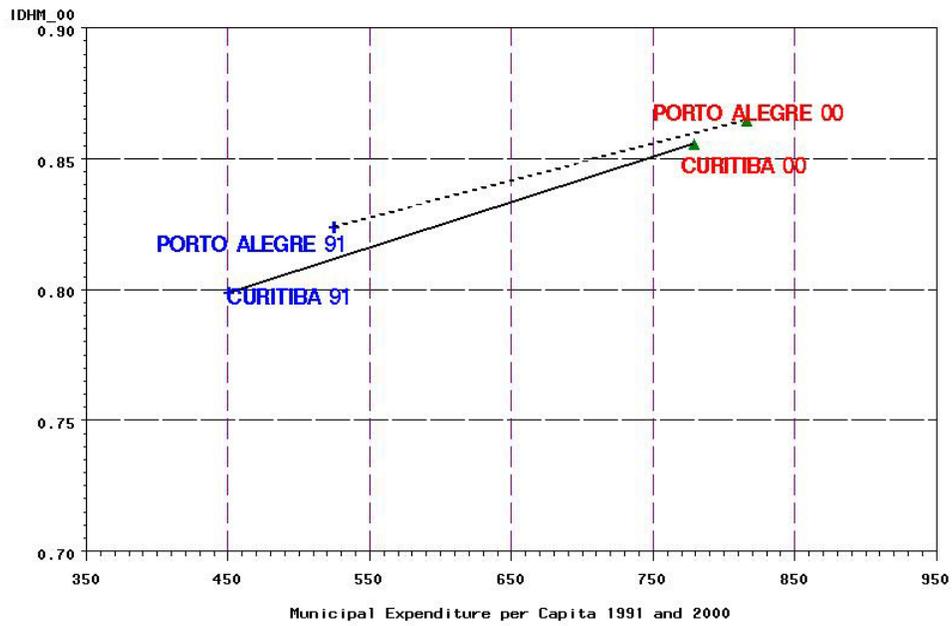


Figure 6.15 Basic IDH-M 2000 Graph for all Municipalities

IDHM_00 and IDHM_91 against MUNEXPER 2000 – SOUTH



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7. Main Aspects of The Regulatory Framework Governing Urban Land Development Processes

by
Edesio Fernandes

1 Executive Summary

7.1 This paper aims to provide a basic analysis of the regulatory framework governing urban land development processes in Brazil, with emphasis being placed on the legal provisions regarding land titling and registration. Following a general presentation of the main dimensions of the broader legal context of urban land policies which should be taken into account for the formulation of successful national land and housing policies, the paper discusses the main constitutional provisions in force in the country on the matter of urban policy. It is argued that the 1988 Federal Constitution has established the basis of a new legal-political paradigm, especially by combining the principles of the socioenvironmental function of property and the democratic management of cities, as well as by recognising the occupiers' right to the regularisation of consolidated informal settlements in urban areas.

7.2 The paper then discusses the groundbreaking dimensions of the 2001 City Statute, the other pillar of the new urban-legal order, and indicates the possibilities the new legislation entails for the promotion of urban reform in the country. At this juncture, the paper makes an assessment of the main shortcomings and constraints affecting the full enforcement of the legal order, initially by discussing external factors and significant gaps in the legal order, and subsequently by criticising from within the principles and values typical of the tradition of regulatory planning in Brazil, which underlie the urban laws enacted in most cities. It is argued that, often being both elitist and technocratic, urban legislation has had a major impact in the formation of land prices as well as in the determination of the process of informal land development.

7.3 Following a brief identification of the main institutional agents responsible for the formulation of urban land policies at all governmental levels, the paper discusses the main legal aspects of land titling and regularisation programmes, as well as the main legal aspects of land registration. Regarding the discussion on land titling, it is argued that there is in the Brazilian legal order a wide range of legal institutes and instruments – and sociopolitical choices – other than the traditional notion of individual freehold rights. Regarding the question of land registration, following a general discussion on the institutes and institutions involved in the general process, the paper identifies the main problems that have been identified within the more restricted context of land regularisation programmes.

7.4 The paper then proposes to discuss critically the main problems affecting the most important, ongoing revision process of the federal law on land subdivision, which, together with the 1988 constitutional chapter on urban policy and the 2001 City Statute, form the tripod supporting the new urban-legal order in Brazil. Self-styled “Territorial Responsibility Law”, when approved will govern both the undertaking of new urban land subdivisions as well as providing general rules to better enable the regularisation of informal settlements in urban areas. Therefore, its revision provides a unique opportunity to further advance the principles of an articulated national urban land and housing policy.

7.5 As a conclusion, the paper argues that, while there has been an undeniable progress, the consolidation of urban reform requires the promotion of further legal reform in Brazil. In turn, legal reform is a direct function of the improvement of the sociopolitical conditions of urban governance. Finally, the main proposals presented throughout the paper are organised in the form of a set of basic recommendations for interested policymakers.

7.6 The literature on the subject matter of this paper is still very limited, and the ideas here discussed draw largely from the author's own experience dealing with the legal dimensions of urban land development processes for the last 27 years, both as a legal scholar and as a public servant working at all governmental levels.

2 General Remarks: the Broad Legal Context of Urban Land Policies

7.7 It has been widely recognised that the process of intensive urbanisation in Brazil has been a process of social exclusion and spatial segregation. While about 82% of the population lives in urban areas, especially in metropolitan areas, the vast majority of the urban population are living in very precarious material, social and environmental conditions - if not also illegally. Indeed, the lack of affordable and adequate housing options has brought about a proliferation of illegal (although more commonly referred to as “informal” or “irregular”) forms of land use and development. In the main cities, between 40% and 70% of the urban population is living in illegal settlements, and this process has increasingly taken place also in middle-size and small cities.

7.8 This results from the combination of three main factors, namely: the absence of a comprehensive housing policy at all governmental levels, within the broader context of restricted legal-political conditions of state action to control urban development; the highly concentrated, privatised and largely unchallenged land structure formed throughout five centuries; and the unfavourable dynamics of the speculative urban land market, both formal and informal, which has produced a large stock of vacant serviced areas in the main cities. More recent economic changes have also led to the emergence of an enormous number of vacant or under-utilised properties in traditional central areas.

7.9 Over the decades of intensive urbanisation, economic concentration and political centralisation, since the 1930s the two main processes through which the majority of people have had access to urban land have been the acquisition of plots in the widespread “irregular” and “clandestine” *loteamentos* and the formation of thousands of *favelas*. While the former are illegal land subdivisions developed mostly by informal developers or private companies in peripheral areas, the latter result from the unlawful occupation of both public and private land, originally in more central areas. Housing for the vast majority of low-income groups has largely been the result of precarious self-construction in such *loteamentos* and *favelas*.

7.10 Whereas the production of affordable, technically adequate and serviced housing for the lower-income groups by state agencies has been greatly insufficient and inadequate at all governmental levels, in some large cities such as Sao Paulo and Rio de Janeiro unregulated rental practices have also provided housing opportunities to a large number of urban poor. This has increasingly happened especially in *corticós*, the dilapidated private houses, usually in central areas, where thousands of families live in precarious and hazardous conditions. More recently, it has been recognised that, while the older *favelas* are becoming denser new ones are being formed on a daily basis, rental practices have become increasingly significant also within *favelas*.

7.11 Full, formal security of tenure is virtually non-existent to all such people who live in illegal/informal/irregular settlements, although the legal, political, social and economic consequences of this fact have varied according to the different situations. People living in unauthorised peripheral *loteamentos* have long had restricted access to public services and official credit and finance, as well as several other sociolegal limitations resulting from their illegal situation. However, as a rule, *favela* dwellers have been the most vulnerable groups in legal terms. Having the same legal and socioeconomic difficulties, they also have been historically more directly exposed to forced eviction and/or removal attempts. This powerful combination between legal discrimination, political vulnerability, economic incapacitation, social exclusion and spatial segregation have turned these tens of millions of urban poor into second-class citizens in socioeconomic as well as in legal-political terms. Although this process has affected all low-income social groups, the impact it has had on women and children has been particularly stressed by researchers.

7.12 The central role of the legal order in determining this pattern of sociospatial segregation – and illegality - cannot be underestimated. Invasions, irregular land subdivisions and all other forms of precarious occupation, as well as the widespread practice of illegal construction, are certainly a reflection of the powerful combination between the (formal and informal) land markets and the overall, profoundly clientelist political system. But, it has to be said that they are also the result of the nature of the legal system in Brazil, especially the land, urban development planning, property rights and registration laws in force, which are deeply elitist and exclusionary. The fact is that both the adoption of legal instruments which do not reflect the socioeconomic realities

determining the conditions of access to urban land and housing, and the lack of proper regulation and law enforcement, have had a perverse role in aggravating, if not in determining, the process of social exclusion and spatial segregation.

It is in this context that the regulatory framework governing urban land management in Brazil has to be discussed.

7.13 Although this paper focuses on the regulatory framework regarding land titling and registration - two very important, inter-related dimensions of overall urban land management - it is important to stress from the start that in, the Brazilian legal system – as for that matter in any legal system - there are many other legal dimensions in urban land management. All such dimensions are intertwined, play a significant role in the process of land development, and need to be better understood. In particular, they have all contributed to the growing phenomenon of illegal/informal land development in the country. For this same reason, several existing legal problems need to be properly addressed – and confronted as a condition for any national urban development and housing policy to be successful in Brazil.

7.14 The main legal issues to be discussed could be organised in three blocks, namely:

- The evolution and organisation of Urban Law as such;
- The articulation between Urban Law and urban management;
- The role played by the urban-legal order in the production of informality.

7.15 Regarding the evolution and organisation of Urban Law – a new and still not fully recognised field of Brazilian Public Law - as such, some main issues require special attention, namely:

- What is the nature of the regulatory framework in force in Brazil?
- What are the limits of state intervention in the process of urban land development in the face of the definition of private property rights?
- What is the dynamics of the land planning and management system, particularly regarding the articulation of the legal mechanisms governing land regulation, decision-making, and conflict resolution?
- How do urban laws relate to each other, from basic perimeter laws and construction codes to more complex zoning schemes and master plans?
- What are the conditions governing land titling and registration?
- What is the legal treatment of public land?
- What is the relation between urban laws and environmental laws?
- What are the conditions of access to courts, judicial interpretation and conflict resolution?
- What are the conditions for the recognition of social and collective rights and diffuse interests?
- How do official laws relate to customary norms?
- What are the gender implications of Urban Law?

7.16 Regarding the articulation between Urban Law and urban management in Brazil, three inter-related levels of urban management should be considered, namely politico-institutional, politico-social, and politico-administrative.

7.17 The legal dimension of politico-institutional urban management refers to, among other issues:

- The distribution of legal powers for land use and development control;
- The relations among urban laws enacted at different governmental levels;
- The dynamics of intergovernmental relations;
- The conditions of metropolitan administration and intergovernmental consortia;
- Land taxation sources and possibilities;
- The conditions of fiscal responsibility of all governmental levels.

The legal dimension of politico-social urban management refers to, among other issues:

- The overall political quality of the decision-making process;
- The legal scope for popular participation in urban planning and management, including the budgeting process;
- The legal regulation of NGOs and CBOs.

7.18 Finally, the legal dimension of politico-administrative urban management refers to, among other issues:

- The regulation of Public-Private Partnerships;
- The flexibilisation of administrative contracts;
- Planning gains and construction credits;
- Legal aspects of the financing of urban development;
- Legal possibilities and constraints of extrafiscal and value capture instruments.

7.19 Although this paper will focus on the main aspects of this general legal framework on urban land development control, it should be said that there are many other laws in Brazil's legal system that should be considered during the formulation of a national housing policy, particularly those specifically regarding housing finance – a complex web of laws, decrees and internal provisions of several public organisations such as the Finance Ministry, Caixa Economica Federal and the Social Welfare Institute.

7.20 Last, but not least, it should be noted that a national housing policy in Brazil should be broader than the terms of a national policy proposing the regularisation of informal settlements – necessary as it is. For this reason, land titling and registration should be discussed both in general terms, from the viewpoint of a housing policy, and in more specific terms, from the viewpoint of the requirements of a regularisation policy.

3 Urban Policy in the 1988 Federal Constitution

Prior to the 1988 Constitution, the Brazilian state – at all governmental levels - had little legal scope for regulating the process of urban land development, other than was determined by its elitist, undemocratic nature.⁸¹

7.21 In the context of Brazil's historically contradictory federal system, the lack of a proper constitutional treatment of urban and territorial jurisdiction issues led to endless legal controversies and conflicts between federal, federated-state and municipal governments concerning the power to enact urban legislation and implement urban land policies. While municipalities have always had basic legal powers to promote territorial organisation, effective state intervention in urban areas to implement infrastructure and equipment, particularly during the years of authoritarian rule between the 1964 military coup and the 1988 Constitution, which corresponded to the peak of urbanisation in the country, was largely decided at the federal and federated-state levels under conditions of weak political and fiscal accountability. This corresponded with the growing attrition of the autonomy of more than 5,000 municipalities, which lacked legal, technical and financial resources and instruments to tackle the many socioenvironmental problems brought about by rapid urbanisation.

7.22 The vast majority of municipalities did not have – and still do not have – land development control legislation other than precarious perimeter laws based on unreliable data and anachronistic cadastres, which laws were often manipulated so as to artificially incorporate rural areas into the urban perimeter in an attempt to generate more tax revenues. Municipal services and infrastructure tended to be concentrated in the regulated urban areas, while residential areas produced through illegal processes by the urban poor were long treated and even tolerated by the public authorities as if they were invisible, when they were not directly confronted through forced eviction or removal policies.

7.23 Those few municipalities, especially the capital cities, which tried to build a more solid urban-legal order through the enactment of land use and subdivision legislation, as well as more articulated zoning schemes, had to face the longstanding opposition of conservative legal doctrine and jurisprudence favouring an unqualified

⁸¹ For a more detailed analysis of the legal foundations of the Brazilian land law system in force prior to the promulgation of the 1988 Federal Constitution, see Fernandes (1995; 2002a).

approach to individual property ownership rights in the terms of the 1916 Civil Code – which was in fact the main legal document in force throughout the process of rapid urban development in Brazil, having been altered only in 2003. Many attempts at urban planning were undermined, jeopardised, constrained or plainly rejected on the grounds of their alleged “unconstitutionality” in the face of the civil legislation.

7.24 This longstanding civil law approach to property ownership - largely considered as a commodity, the economic content of which is to be determined by the individual interests of the landowner - has significantly reduced the scope for state action in the domain of property rights to impose socioenvironmental and other collective values. Typical of such a liberal legal paradigm – which is still the dominant one, given the conservative training of legal professionals in Brazil – is the virtually absolute emphasis on individual freehold rights to the detriment of other more restricted and/or collective forms of real rights. Construction rights are assumed to be mere extensions of property rights, and there is no place for the notion that the public authorities should capture the surplus value generated by public investment in urban areas through public works, services, infrastructure as well as changes in the legal possibilities of land use and development.

7.25 This civil law paradigm has been aggravated further by an excessive bureaucratisation of contractual and commercial practices regarding land use and development, especially insofar as the requirements of land registration and access to formal credit are concerned. A whole intricate and self-contained legal system was created around the cycle of titling-registration-credit intertwined provisions governing formal socio-legal land relations, thus excluding the vast majority of people who had to step outside of the law to have access to urban land.

7.26 Moreover, in legal-political terms, the urban population was virtually excluded from the law- and decision-making processes on urban questions at all levels, especially in the nine institutionalised metropolitan regions, which were administered in a blatantly authoritarian fashion between 1973 and 1988.⁸²

7.27 It was in this context of distorted political-institutional urban planning and management that the private interests of minority groups led the process of urban land development, towing the state along in their search to facilitate the conditions of capital accumulation in cities. Throughout the urbanisation process, most state interventions in urban areas consisted of sectoral policies, and as such they were capitalised upon by the economic groups that controlled the state, whereas the needs of the urban poor were, and still are, neglected.

7.28 Urban space in Brazil clearly reflects, and reinforces, the unequal conditions of wealth distribution in the country (amongst the world's worst). It also reflects and reinforces the tradition of political exclusion of the less favoured population. The legal order in force has played a most significant role in this process.

7.29 This contradictory and conflicting process is directly related to the broader process that has promoted changes in Brazil's socioeconomic and legal-political order over the past 20 years. Since the late 1970s, federal government enacted more progressive urban legislation, such as the laws governing the subdivision of urban land and the formulation of a national environmental policy.⁸³ If, on the one hand, this was a response to the increasing social mobilisation in urban areas, on the other hand it was a response to growing pressure by important sectors of the real estate capital affected by the extent of land speculation, thus aiming to create new opportunities for capital investment and reproduction in urban areas.

7.30 The pace of legal-political reform was slow throughout the 1980s and 1990s, given the complexity of the diverging social, political and economic interests involved. While many different versions of a national urban reform bill of law had been inconclusively discussed at the National Congress since 1983, the legal-political scope for municipal action under general national directives (such as those introduced by Federal Law no. 6,766/1979, which governs the subdivision of urban land nationally) was gradually widened. Of special importance was the promulgation of the 1988 Federal Constitution.

⁸² For an analysis of the legal-political treatment of the metropolitan regions in Brazil in the 1973-1988 period, see Fernandes (1995).

⁸³ For an analysis of the evolution of Brazil's environmental legislation, see Fernandes (1996).

3.1 *The Constitutional Chapter on Urban Policy*

7.31 The innovative constitutional chapter on urban policy, which resulted in a most significant improvement to the conditions for the political participation of the urban population in the law- and decision-making processes, also resulted from a process of intensive social mobilisation. Indeed, tens of organisations of civil society formulated and submitted to the Constitutional Congress the remarkable “Popular Amendment on Urban Reform”, signed by over 130,000 people. This Amendment defined the notion of social property in such a manner that it would impose itself as a new legal paradigm, replacing the liberal one established by the 1916 Civil Code. The main claims put forward by this “Popular Amendment” were: the recognition of the social right to housing; legal regularisation and upgrading of informal settlements; the democratisation of the access to urban land and adoption of measures to combat land and property speculation; and the adoption of a democratic and participatory form of urban management. Several compromises were eventually agreed upon and a groundbreaking chapter dedicated to urban policy was eventually inserted in the 1988 Constitution, thus considerably improving the general legal provisions on the matters of urban policy and property rights.

7.32 The 1988 Constitution contains a more coherent approach to the urban development process as a whole, defining the notion of the “social function of property and of the city” as the very condition for the recognition of individual property rights in urban areas. It also improved the conditions of legal, political and financial autonomy of the local state.

7.33 Initially, the 1988 Constitution did not recognise the social right to housing, but this was subsequently approved by an amendment in 2000. The Constitution makes no specific mention of *favelas*, but it considers the provision of housing as a matter for the concurrent power of the federal union, federated-states and municipalities. Each should “promote housing construction programmes and the improvement of the existing conditions of housing and basic sanitation”. They should also “combat the causes of poverty and the factors of marginalisation, promoting the social integration of the less favoured sectors” (1988 Federal Constitution, Article 23, IX and X).

7.34 It can be said that the legal basis of a new urban-legal order in Brazil was provided by the 1988 Federal Constitution. Private ownership of urban land is recognised provided that it accomplishes a social function, but, instead of being defined by a list of formal criteria, this fundamental principle of the “social function of property and of the city” is to be as materialised by the contents of municipal master plans.

Three major points deserve to be stressed.

7.35 Firstly, the 1988 Federal Constitution conferred on the municipal authorities the power for the enactment of laws governing the use and development of urban space, in order to guarantee the “full development of the city’s social functions” and the “welfare of its inhabitants” (Article 182). Cities with more than 20,000 inhabitants are now obliged to approve a master plan law, which is considered to be the “basic instrument for the development and urban expansion policy” (Para. 1). They have to do so by October 2006, and for this reason there is currently a significant nationwide process involving over 1,500 municipalities which, in different ways and to differing extents, have been formulating or (in a few cases) updating their master plans.

7.36 Secondly, the right of private property was again recognised as a basic principle of the economic order, provided that it accomplishes a social function according to the “dictates of social justice” (Article 5, XXII, XXIII & article 170, II, III). Significantly, however, it was stated that urban property only accomplishes its social function when it attends to the “fundamental requirements of city orderliness expressed in the master plan” (Article 182, Para. 2). As a result, the more developed and articulated the master plan is, the more concrete, advanced and progressive the conception of social function will be. The deepest implication of this constitutional clause is that, rather than having a predetermined content, the property right is supposed to turn into a “right to property”, that is, a socially oriented “obligation”.

7.37 Thirdly, another progressive constitutional development was the approval of the right of special urban *usucapião* (adverse possession rights) for those who have occupied less than 250m² of private (never public) urban land for five consecutive years (Article 183 of the 1988 Federal Constitution). Proposed with the situation of *favelas* and *loteamentos* dwellers in mind, this aimed to render regularisation policies more viable, thus

strengthening the local regularisation programmes that had been initiated in 1983 by Belo Horizonte and Recife. Applied in theory to perhaps half of all existing *favelas*, it was a major step towards recognising *favela* dwellers as citizens. Regarding the informal settlements on public land, the Constitution makes a vague reference to the instrument of the concession of the real right to use.

There were two other important innovations that, in the long term, may contribute towards changing the quality of the city-planning process in Brazil.

7.38 Firstly, the 1988 Federal Constitution reserved for the municipalities the most important role in this process. Although both the federal and federated-state governments have concurrent power to enact laws and to formulate policies and programmes on the matter of land use and territorial development, their scope is limited to very generic directives or related to specific situations that cannot be solved at local levels. Municipal government, being responsible for the actual enactment of urban legislation and for the implementation of specific urban policies, is the real authority on the subject.

7.39 Taken alone, however, this development would not be enough to change the character of the city-planning process. It was clear from past experience that, to be socially effective, the effective handling of urban questions presupposes the democratisation of decision-making. In general, the processes of political management and conflict resolution which have determined the models and techniques of urban plans and the choice of instruments of control in force in Brazil have not resulted from a social process with significant participation of the different, often conflicting, interests in land use. It is in this context that the 1988 Constitution ensured the possibility of some, though still incipient, degree of popular participation in the decision-making process of urban questions. Besides favouring the reinvigoration of classical representative democracy, the 1988 Constitution accepted the possibility of relative direct participation at local level in the urban planning process. Groups of people and even CBOs and NGOs are now able to formulate bills on some urban matters, and to submit them to the relevant legislative body – from the National Congress to the municipal legislature. Some important urban laws that have been subsequently approved originated from this form of popular participation, including the recently enacted Federal Law that created the Popular Housing Fund. By the same token, some groundbreaking judicial decisions have recently annulled municipal master plans formulated and approved without effective popular participation. The very existence of this precept is a sign of change in the national political process.

7.40 Moreover, it coexists with a broader recognition of the “collective right for diffuse interests” (Article 5, LXXIII), which offers more scope for the citizens and NGOs to have recourse to judicial power for the defence of urban rules, as well as of social and environmental values.

7.41 Therefore, according to the new legal-urban order introduced by the 1988 Federal Constitution, the economic content of urban property is to be largely decided by municipal government through a participatory legislative process, and no longer by the exclusive individual interests of the landowner. This principle was also realised through the creation of new legal instruments such as compulsory edification, progressive taxation and flexible expropriation, which, together with other instruments to be created by local legislation, aim to put the local state in the lead of the urban development process.

7.42 The local population is now entitled to participate in decision-making over the urban order, both through their elected representatives, and directly, through the action of urban CBOs and NGOs. By doing so, the 1988 Federal Constitution recognised that the decision-making process of urban questions is indeed a political process, to which the definition of the patterns and limits of economic exploitation of real property is entrusted. For the first time, the urban population was to some extent considered to be a political agent. Therefore, the popular mobilisation against dominant economic groups is to take place also within legal and institutional spheres. While the state was confirmed as the preferential promoter of the urban growth process, a new collective right was also recognised – “the right to urban planning”. Much more than a mere faculty of the municipal administration, it is one of its main legal obligations, as well as an expression of social citizenship. The main novelty, surely, is that urban law has been unequivocally put where it has always belonged, namely, in the political process.

7.43 Whereas the main prevailing difficulties preventing the recognition of security of tenure in irregular/ clandestine *loteamentos* have a financial nature, one should expect that all legal controversies on *favela* legislation and regularisation programmes would have ended with the inclusion of the “social function of property and of the city” in the 1988 Federal Constitution. However, as discussed below, while there is decreasing resistance to the approval of general zoning laws and master plans in most cities, those laws supporting *favela* regularisation programmes still face fierce opposition, especially when it comes to the legalisation of the invaded plots.

4 The 2001 Urban Policy Law: A new statute for Brazilian Cities

7.44 Following the promulgation of the 1988 Federal Constitution, several municipalities in Brazil fully embraced the banner of the “Urban Reform Movement” and started to reform their own urban-legal order, now that municipalities had become stronger politically. As a result, many interesting experiences of urban management have been attempted since the early 1990s. While Belo Horizonte and Recife have furthered their groundbreaking urban policies, many other municipalities – Sao Paulo, Diadema, Santo Andre, Rio de Janeiro, etc. – have also approved a number of innovative urban laws and policies, creating in the process new legal instruments and urban planning tools. In fact, in the aftermath of the 1988 Federal Constitution Brazil has become a true laboratory of experimentation with new urban planning and management ideas and processes.

7.45 However, the lack of formal regulation of the 1988 Federal Constitution provisions on urban policy made it possible for conservative interests – and jurists – to question the full legal validity of such municipal laws and policies, thus jeopardising and undermining the process of urban reform. For this reason, the social mobilisation proposing the approval of a national urban development law had to be renewed throughout the 1990s, under the leadership of the National Urban Reform Forum.

7.46 As a result, on 10 July 2001 a groundbreaking legal development took place in Brazil with the enactment of Federal Law no. 10.257, entitled “City Statute”, which aims to regulate the original chapter on urban policy introduced by the 1988 Constitution. The new law provides consistent legal support to those municipalities committed to confronting the grave urban, social and environmental problems that have directly affected the daily living conditions of the Brazilians who live in cities. Resulting from an intense negotiation process which lasted for more than ten years, within and beyond the National Congress, the City Statute confirmed and widened the fundamental legal-political role of municipalities in the formulation of directives for urban planning, as well as in conducting the process of urban development and management. It has been acclaimed internationally, because it is an inspiring example of how national governments can materialise the principles and proposals of the UN-HABITAT Global Campaigns on Good Governance and on Securing Tenure for the Urban Poor.

7.47 It is impossible to underestimate the impact the new law can have on Brazil’s legal and urban order, once its possibilities are fully understood and its provisions effectively put into practice.

7.48 The City Statute has four main dimensions, namely: a conceptual one, providing elements for the interpretation of the abovementioned constitutional principle of the social function of urban property and of the city; the regulation of new legal instruments for the construction of a different urban order by the municipalities; the indication of processes for the democratic management of cities; and the identification of legal instruments for the comprehensive regularisation of informal settlements in both private and public urban areas.

7.49 In conceptual terms, the City Statute broke with the longstanding, individualistic tradition of civil law and set the basis of a new legal-political paradigm for urban land use and development control, especially by reinforcing the constitutional approach to urban property rights, namely: that the right to urban property is ensured provided that a social function is accomplished, which is that determined by municipal urban legislation. It is the task of municipal governments to control the process of urban development through the formulation of territorial and land use policies in which the individual interests of landowners necessarily co-exist with other social, cultural and environmental interests of other groups and the city as a whole. For this purpose, municipal government was given the power to, through laws and several urban planning and management instruments,

determine the measure of this – possible – balance between individual and collective interests over the utilisation of this non-renewable resource essential to sustainable development in cities, that is, urban land.

7.50 In order to materialise and widen the scope for municipal action, the City Statute regulated the legal instruments created by the 1988 Federal Constitution, as well as creating new ones. All such instruments can, and should, be used in a selective as well as in a combined manner aiming not only to regulate the process of land use development, but especially to induce it according to a “concept of the city” to be expressed through the local master plan. Municipalities were given more conditions to interfere with, and possibly revert to some extent, the pattern and dynamics of formal and informal urban land markets, especially those of a speculative nature, which have long brought about social exclusion and spatial segregation in Brazil. In fact, the combination of traditional planning mechanisms – zoning; subdivision; building rules, etc. – with the new instruments – compulsory subdivision/edification/utilisation order, extrafiscal use of local property tax progressively over time; expropriation-sanction with payment in titles of public debt; surface rights; preference rights for the municipality; onerous transfer of building rights; capture of surplus value; the creation of special zones of social interest, etc. – has the potential to open a new range of possibilities for the construction of a new urban order which is, at once, economically more efficient, politically fairer and more sensitive to social and environmental questions.

7.51 Another fundamental dimension of the 2001 City Statute concerns the need for municipalities to integrate urban planning, legislation and management so as to democratise the local decision-making process and thus legitimise a new, socially orientated urban-legal order. Several mechanisms were recognised to ensure the effective participation of citizens and associations in urban planning and management: public audiences, consultations, creation of councils, reports of environmental and neighbourhood impact, popular initiative for the proposal of urban laws, and above all the practices of the participatory budgeting process. Moreover, the new law also emphasised the importance of establishing new relations between the state, the private and the community sectors, especially through partnerships and urban/linkage urban operations to be promoted within a clearly defined legal-political and fiscal framework.

7.52 Last, but not least, the City Statute also recognised legal instruments to enable the municipalities to promote land tenure regularisation programmes and thus democratise the conditions of access to urban land and housing. As well as regulating the constitutional institutes of special *usucapiao* rights and concession of the real right to use (a form of leasehold), to be used in the regularisation of informal settlements in, respectively, private and public land, the new law went one step further and admitted the collective utilisation of such instruments.

7.53 The section of the City Statute that created a third instrument, the concession of special use for housing purposes, was vetoed by the then President on legal, environmental and political grounds. However, given the active mobilisation of the National Urban Reform Forum, the Provisional Measure no. 2,220 was signed by the President on 4 September 2001, recognising the subjective right (and not only the prerogative of the Public Authorities) of those occupying public land until that date, under certain circumstances, to be granted the concession of special use for housing purposes. The Provisional Measure (which has all legal effects) also established the conditions for the municipal authorities to promote the removal of the occupiers of unsuitable public land to more adequate areas. This is a measure of extreme social and political importance, but its application will require a concentrated legal, political and administrative effort on the part of the municipalities to respond to the existing situations in a suitable legal manner that is compatible with other social and environmental interests.

7.54 The approval of the City Statute consolidated the constitutional order in Brazil regarding the control of the process of urban development, aiming to re-orient the action of the local state, the land markets and society as a whole according to new legal, economic, social and environmental criteria. Its effective materialisation in policies and programmes – and the actual replacement of the longstanding civil law paradigm - will depend on the reform of the local legal-urban order by the municipalities. Although the role of the federal government and, to a lesser extent, the federated-state governments needs to be better understood and further emphasised, ultimately the role of municipalities is crucial so that the exclusionary pattern of urban development can be reverted. However, it

the last analysis the future of the new law will fundamentally depend on the wide mobilisation of Brazilian society, within and without the state apparatus.

5 Prospects for Progressive Urban Planning and Participatory Urban Management

7.55 Following the trail of the 1988 Constitution and the 2001 City Statute, several federated-state Constitutions and municipal organisation laws (which are in fact true municipal constitutions, thus expressing the unique level of political autonomy conferred onto Brazilian municipalities) have recently reinforced many of the abovementioned progressive principles. Moreover, through the enactment of all sorts of urban and environmental laws, some municipalities have been consistently reforming their urban-legal order, and many more are for the first time discussing the contents of their master plans. Whatever its shortcomings and backlashes, urban reform is gradually taking place in many Brazilian cities, supported by an increasing social awareness of the urban question.

7.56 However, while from a legal viewpoint the prospects for urban planning are better than ever before, the scale of the urban, social and fiscal crisis formed throughout the last four decades is still enormous. The changes in legislation brought about by the 1988 Federal Constitution and 2001 City Statute were certainly not sufficient to structurally modify the previous situation, as there are many macro-economic factors at play. Brazil is still struggling with a deep economic and fiscal-monetary crisis; therefore, the reach of progressive local experiences has been limited by the broader national context. In particular, since the 1980s metropolitan areas have been badly affected by the crisis. Both the increase in urban poverty and escalating urban violence have contributed to further deterioration in already low living standards and in the fragmented social fabric. The changing local political realities have also been decisive as to whether attempts at comprehensive and/or strategic planning failed or were continued and successful.

7.57 Much of the excluding order of distribution and exercise of political and judicial power was maintained by the 1988 Federal Constitution. Urban policies and the standard of living of urban society will only change provided the political process in the country leads to deeper changes in the class-bound nature of the state, hence improving the conditions of legal-political, as well as socioeconomic, citizenship of the Brazilian people. In this context, the future of urban planning, and hence the fate of cities, will depend on how the current political reforms combine measures of wealth distribution with the recognition of citizenship rights of urban dwellers. The success of local initiatives will primarily depend on the consolidation of the country's fledgling democracy concerning the promotion of social justice. Therefore, as I have insisted, the renewed social mobilisation of the urban population is of crucial importance.

7.58 Indeed, despite the improvement of the legal order, the reality is that the vast majority of the population in the larger Brazilian cities still live in illegal conditions. While new invasions have occurred almost daily, the progress of the legislation has yet not altered the situation of most long consolidated *favelas* and irregular or clandestine *loteamentos*. The arbitrary distinction between the "legal" and the "illegal" cities remains, and it has even been reinforced by the perverse impact of the new urban laws on the speculative land markets.

7.59 Regardless of the increase in urban poverty resulting from the changes provoked by economic globalisation, the country's concentrated (urban and rural) land structure and its elitist capital and income distribution system remain largely unchallenged. More and more people have had to have recourse to informal means of access to urban land and housing over the last two decades. In the main cities, even the acquisition of plots in illegal *loteamentos* has not been an affordable option to an increasingly larger number of people. *Favelas* have been daily formed in urban areas, now including peripheral areas.

7.60 The fact is that even the action of the most progressive local administrations has been hindered by the extent of the accumulated housing deficit and other urban, social and environmental problems. Local state action has also been affected by the problems resulting from Brazil's long-standing financial and monetary crisis. Another grave problem has been the lack of a proper legal-institutional sphere in the country's constitutional

order to address the metropolitan dimension of most urban, social and environmental problems. The scope for municipal action is clearly restricted.

7.61 However, the effective enforcement of a growing number of urban and environmental laws, especially at municipal level, has been seriously undermined not only by the perseverance of several political, financial and institutional factors, but also by longstanding legal factors and problems.

7.62 In conceptual terms, in keeping with the constitutional clause discussed above the 1993 Civil Code that replaced 1916 Civil Code introduced a more socially-oriented approach to the definition of property rights; however, there are still controversies among conservative lawyers and judges as to the possibilities for state intervention in the domain of property ownership through urban legislation. This situation will persist as long as the training of legal professionals in Brazil is not thoroughly changed so as to fully incorporate the progressive principles of Urban Law as opposed to the individualistic approach of typical of Civil Law.

7.63 There are still significant gaps in the wider set of urban legislation at the federal level, some which have been gradually addressed. Of special importance was the recent approval of the federal laws regulating intermunicipal consortia; public-private partnerships; the abovementioned fund for popular housing; and the action of social organisations of public interest. A most important gap still to be filled refers to the need for redefining the legal framework on urban land subdivision (Federal Law no. 6,766/1979) as well as the conditions for the regularisation of informal settlements; as discussed in detail below, an important bill of law on these matters has been discussed by the National Congress for some five years now.

7.64 Other federal laws that need to be thoroughly reformed at the federal level include those governing the Federal Union's land; the protection of historic heritage; expropriation of urban land; and the overall system of property registration. A more concentrated effort of doctrine and jurisprudence needs to be promoted so as to reconcile the ever-growing environmental legislation in the country with the less developed urban development legislation, especially by proposing a more adequate framework – that of the socioenvironmental function of property – which would put an end to the potential conflicts between environmental and urban laws. Many other grey legal areas still exist and require proper legal attention and/or modernisation: rental rights and rent control; horizontal and vertical condominiums; gated communities; land development in rural areas; etc.

7.65 Other than these gaps in the urban-legal order, the main legal constraints to proper law-enforcement remain the archaic structure of the judicial system, the problematic definition of the federal regime, and the overall organisation of the political system. The political autonomy of municipalities has not been matched by proper financial autonomy, thus placing municipalities in a chronic position of dependence vis-à-vis the other governmental levels; that said, it should also be said that most municipalities have not made good use of the financial resources they have, keeping as they do outdated land cadastres, politically manipulating their taxation systems, exchanging exemptions and amnesties for political favours, and failing to recapture surplus value resulting from state intervention in urban areas.

7.66 Though greatly improved by the 1988 federal Constitution, the legal-institutional order in Brazil still does not express the nature of the existing urban-territorial order, especially given the lack of a proper legal treatment of the metropolitan areas. Nor does the politico-institutional order recognised by the Constitution express the real dynamics of sociopolitical relations. The distortions provoked by the legal-institutional order have been instrumental in maintaining and widening long-existing economic inequalities and social injustice.

7.67 The 1988 Federal Constitution adopted a broader approach to both diffuse interests and consumers' rights, providing some legal mechanisms, which, if combined, may prove powerful for the judicial defence of collective interests in urban matters. The 2001 City Statute went one step further and recognised the "urbanistic order" as a collective right. In this context, the change in the current judicial attitudes to the matter of state intervention in the definition of property rights will depend on how successfully social organisations, especially those representing the interests of the vast population living in irregular or clandestine *loteamentos* and *favelas*, manage to put their claims forward. However, the collective access to the courts remains blocked by costly, lengthy, bureaucratic and individualistic procedures.

7.68 The question of access to urban land and housing cannot be left to market forces alone, and the recognition of the long claimed “right to the city” – which was formally recognised by the 2001 City Statute - is the condition for the consolidation of Brazilian democracy. However, urban reform is not given by law, instead it has to be attained through the political process.

5.1 *A critique from within*

7.69 Having identified a number of gaps and external factors constraining the efficacy of the new urban-legal order in Brazil, it is also necessary to promote a critique from inside this new order itself.

7.70 Many myths have long dominated the discussion on the phenomenon of rapid urban growth internationally, especially in developing and transition countries, but two inter-related arguments have remained largely unquestioned: the idea that the growing process of sociospatial segregation in cities is due to the lack of territorial development planning, and the notion that territorial planning is in fact ineffective, as most master plans, zoning schemes and such urban planning laws tend not to be properly implemented and are often abandoned. Apparently contradictory, such arguments express the same frustration felt by urban managers, policymakers, and above all by urban citizens, who have felt increasingly powerless in the face of the speculative, socially unjust, and environmentally unfriendly market forces and political interests that have actually governed the development and use of urban land.

7.71 It is true that, in Brazil as in many other countries, the scope for state intervention through urban planning laws in the determination of the dynamics of the land and property market, as well as of the corresponding social relations of property, has still been substantially limited by the prevalence of a longstanding tradition of individual rights, which has provided support to an extreme commodification of urban land and considered property rights in an absolute way. Most Brazilian cities still do not have an articulated set of urban legislation expressing clearly defined urban planning values and territorial development policy directives; in fact, until 2001 Brazil did not have national legal guidelines on the matter of land use and development.

7.72 More recently, another argument has gathered momentum; that is, the notion that, where such urban planning laws do exist, they have been ineffective and even harmful to the urban economy, and as a result the urban regulatory framework in force should be flexibilised, if not totally dismantled.

7.73 However, a more critical analysis of the role played by urban legislation justifies the argument that, far from being inoffensive, the urban laws in force in many cities have been a powerful factor determining the process of sociospatial segregation. Moreover, the non-enforcement of urban laws has generated all sorts of negative consequences, such as: conflicting judicial interpretation due to existing loopholes; institutional tensions and inaction; social unrest due to legal ambiguities; economic inefficiency of cities and high urban management costs; widespread discredit of legal-political institutions; endemic corruption; and the growing development of informal justice mechanisms. Needless to say, all such problems have contributed to maintaining the *status quo*.

7.74 The fact is that, far from being ineffective, given their elitist and technocratic nature urban laws - from simple perimeter laws to complex zoning laws - have been highly efficient from the viewpoint of some economic interests that view the city as a mere stage for capital accumulation. Master plans and spatial development laws may not work for the majority of the people living in urban areas, particularly the most vulnerable social groups, and they may not address other social, environmental, and cultural needs adequately, but they have been instrumental in determining the formation of land values and housing prices in the formal market, the overall dynamics of informal land markets, as well as the renovation of traditional clientelist, sociopolitical relations of property. Urban law has been one of the main factors determining the production of urban illegality. In most cases, urban laws have promoted a generous distribution of present and future economic land values to private landowners, without being articulated with compensating value capture mechanisms and proper land taxation.

7.75 If they have failed to address broader social concerns, it is because such urban laws have expressed a dominant tradition of spatial development planning which, instead of departing from the recognition of the real city and its many land and socioenvironmental conflicts, establish instead “technical” criteria completely dissociated from the socioeconomic processes that have actually determined the conditions of access to urban land

an housing, including the existing land structure and tenure regimes. They have thus also determined the place - and the space - for the urban poor in the city, which have increasingly become those areas excluded from the formal land market, such as risky areas, steep hills, preservation areas, water reservoirs, public land, etc. Most such laws, as well as not being properly articulated with the existing environmental legislation, do not even identify the long established informal settlements on their accompanying maps, treating these areas and their invisible communities as fictional green areas or areas reserved for public equipment.

7.76 More recently, many cities have approved increasingly sophisticated urban planning laws, but these are frequently laws which, as well as establishing long, bureaucratic, and costly procedures, have often failed to take into account the capacity of local government for action and urban management, monitoring, enforcement and repression, and as a result end up being disrespected by the rich and the poor alike. These are laws based on complex technical notions, but the contents, purposes, and language of which have not been properly understood by most people, including judges - although they are fully incorporated by land market agents.

7.77 Moreover, these are laws that tend to be rhetorical, given the fact that their principles and objectives have not properly translated into legal-urbanistic instruments, institutional-fiscal mechanisms, and sociopolitical supporting processes. More often than not, responsibilities and resources have not been properly defined; public-private partnership schemes have also been promoted without a clearly established legal framework, thus generating distortions and perverse effects. This situation has also been due to the exclusionary, manipulated nature of the urban law making process at all governmental levels, but especially at the local level, which has very often been prone to corruption.

7.78 Above all, these are laws that, far from confronting, and responding to, the existing land structure and the dynamics of land markets, have ignored longstanding social inequalities and cultural differences and adopted instead ideal criteria and homogenous standards which, although formally based on the presumption of equality of all before the law, open immediately room for the exception, by introducing the categories of "social interest" or "popular" in which little is required, aggravated further by the systematic practice of "urban amnesties".

7.79 Largely inspired by a left-wing agenda of social inclusion, the urban reform movement in Brazil has still to learn how to relate to both formal and informal land developers and promoters, as well as responding effectively to the dynamics of land markets, other than by imposing a fictional urban order through urban legislation.

7.80 As well as ignoring the differing political powers and possibilities of the players in the game of the city, such laws have not recognised the different ways through which urban space has been historically produced, as well as the undeniable fact that the unequal conditions of the socioeconomic development model prevailing in most countries have already left their profound imprint on the process of land and spatial development.

7.81 On the one hand, the tradition of technocratic, comprehensive planning which wants to regulate all spatial development processes in detail, on a scale of 1:1, but which abandons or fails to recognise the most vulnerable social groups and other socioenvironmental concerns; on the other hand, the growing neo-liberal pressure that pushes for the total flexibilisation of the rules of the game: this is the dilemma faced by urban managers and policymakers in Brazil and other developing and transition countries.

7.82 Reverting this situation will require significant changes in the rationale, contents, and conditions of urban law making. Re-thinking the tradition of comprehensive regulatory spatial planning does not mean giving up on the idea that a regulatory framework is crucial: it means getting the regulatory framework right. The necessary balance would consist of regulating less in some areas, better in others, and even regulating more in some areas. In other words, the challenge is to regulate more and better those urban use and development processes that need to be regulated and that require state intervention, leaving to the regulation by the land market those urban processes more directly affected to the most privileged social groups, naturally with the establishment of basic socially-oriented criteria such as height of buildings, location, and nature of activities.

7.83 Reverting this situation would also require a significant change in the political-institutional process of urban planning and law making, so that it is a truly participatory and inclusive decision-making process at all

levels. The simplification of the criteria, standards, requirements, and procedures is a must. A more accessible language is also important, and, in that respect, it is of particular importance to demystify the role of urban planners; an interesting example has been set by the successful “Popular Urban Planning School” created in Fortaleza, Brazil, by the NGO Cearah Periferia.

7.84 In special, this means giving a special legal expression to the need for the democratisation of the processes of access to urban and housing, including through the recognition of the specificities of the urban forms already created and consolidated through decades of informal occupation. Many of the municipal laws in force try to impose absurd technical criteria on long consolidated realities, even within the context of the special zones of social interest – width of streets and pavements; distance between construction and pavement and between constructions; percentage of green and public areas, etc. – and as a result they have rendered unviable the few existing regularisation programmes.

7.85 Rather than validating merely nominal notions of individual equality, an effort must be made to recognise socio-cultural differences. An enlightening justification for this argument has been provided by the sociologist Boaventura Sousa Santos: one should fight for equality when difference generates inferiority, but one should fight for the recognition of difference when equality decharacterises social groups. While such extreme socioeconomic disparities persist in the overall process of access to urban land and housing, the legal protection of certain social groups and other socioenvironmental values is fundamental, as history has proved over and over again that the market forces alone do not respond adequately to those needs.

6 The main Institutional Actors

7.86 In the terms of the new urban-legal order implemented in Brazil, given the fact that the power for approving urban legislation is a concurrent one – with emphasis placed on the action of municipalities, municipal government being the ultimate level in which territorial organisation is to be decided – at all governmental levels there are several institutional actors somehow involved in the process of urban land planning and management.

7.87 At the federal level, the Ministry of Cities created in January 2003 (comprising of the Minister, Executive Secretary, and National Secretariats for Housing, Sanitation, Transport and Mobility, and Urban Programmes (which is in charge of the national programmes supporting master plans and land regularisation) took over, organised and expanded the responsibilities until then precariously assumed by the Urban Policy Secretariat and other previously existing federal organs.

7.88 Of special importance was the installation, in April 2004, of the National Council of the Cities, resulting from the greatly participatory process that led to the 1st National Conference of the Cities in November 2003, and involving wide participation by all the major stakeholders in civil society, involving NGOs, associations and academic organisations, as well as with representation from municipalities and federated-states as well. The Council’s resolutions have deliberative nature, and as a result the action of the Ministry has to be supervised and authorised by the Council.

7.89 At the Presidency’s Civil Cabinet, the Committee of Federative Articulation has been co-ordinating Working Groups on land regularisation of informal settlements, the regularisation of land development in the Federal District, and the utilisation of the Federal Union’s land and properties. Caixa Economica Federal has a broad mandate on housing and sanitation matters, having filled throughout the 1990s the space left vacant by abolition of BNH – the National Housing Bank. The integration of Caixa Economica Federal and the Ministry of Cities has its tensions and needs to be greatly improved.

7.90 Other important institutional actors at the federal level which, to some extent, have a stake in the formulation of a national urban land and housing policy are the Ministry of Planning (responsible for the Union’s land patrimony); CONAMA - National Council for the Environment (which passes resolutions on environmental matters, and which has little sympathy for the rights of people in informal settlements on environmentally-sensitive areas); the Union’s General Advocacy and *Ministerio Publico*; IPHAN – the outdated Institute for Historic Cultural Heritage; ANOREG – National Association of Notaries and Registrars; IRIB – National Institute

of Property Registry; National Front of Mayors; Brazilian Confederation of Municipalities; Brazilian Association of Municipalities; the Ministry of National Integration (responsible for the formulation of a national territorial planning); INCRA (agency dealing with rural land); BNDES – National Bank of Social and Economic Development, etc.

7.91 However, a proper inter-ministerial integration is still to be achieved. The action of all such bodies is far from articulated, and the leadership of the Ministry of Cities has still to be clearly recognised.

7.92 At the National Congress, the Urban Development Commission of the Chamber of Deputies has gradually achieved more political influence through the discussion of important bills of federal laws on urban matters. It has centralised the discussion on the new land subdivision and regularisation law, and it annually promotes the “Citizen City” conference.

7.93 At the federated-states’ level, few states have specific constitutional provisions on land use and development control and even fewer states have enacted urban legislation, including the adaptation of Federal Law no. 6,766. As a result, few states have State Secretariats for Urban Development or suchlike agencies, and, given the fact that they have traditionally dealt with sanitation and environmental matters, there is a growing potential conflict with the action of municipalities on these matters. Some states like Sao Paulo and Rio Grande do Sul have made a consistent effort to have a say in the land use and urban development control process by formulating state-level urban and land policies. The federated-states-led metropolitan apparatus in force between 1973 and 1988 was dismantled by the 1988 Federal Constitution and few states have replaced it with some kind of functioning institutional arrangement.

7.94 In some states, the State Ministerio *Publico* has played an important role regarding environmental matters, but much less so regarding urban matters. The organisation and control of the property registration offices takes place at the states’ level and the conditions vary enormously nationwide.

7.95 At the municipal level, while few municipalities have formulated their own municipal organisation laws such as determined by the 1988 Constitution, fewer municipal organisation laws have specific provisions on land use control, have adapted federal Law no. 6,766 through municipal legislation or have adapted the City Statute and formulated master plans. In fact, few municipalities have significant urban or environmental laws other than very traditional Building Codes and *Codigo de Posturas* (“Behaviours’ Code”), and as a result they lack have a specific institutional apparatus to deal with land use and development control. Moreover, few municipalities have formed inter-municipal associations or consortia.

7.96 Some municipalities have had a major influence in determining the re-orientation of urban policy and legislation nationally – including the 2001 City Statute - through the introduction of progressive urban management strategies and inclusive urban planning legislation, but most of those municipalities that have approved urban legislation including the main capital cities, do not have the full capacity to monitor its enforcement.

7 Main Legal Aspects of Land Titling and Regularization Programmes

7.97 Historically, Brazil’s legal system has always recognized the co-existence of different land tenure systems. During the colonial period (1500-1822), the Portuguese legislation - based to some extent on the notion of the social function of property - included several forms of leasehold rights. Many of these rights have survived the political changes in the country, being eventually incorporated and/or modernized in the 1916 Civil Code and subsequent land-related legislation, especially the 2001 City Statute.

7.98 In theory at least, there are several forms of real rights in Brazil, of which freehold rights is just one. Others would include *enfiteuse*, *servidoes*, *uso*, *habitacao* and, more recently, *concessao de direito real de uso*, *concessao de uso especial para fins de moradia e direito de superficie*. Freehold and leasehold rights can be recognized as individual or collective, condominium rights. Nominally, all such real rights provide security of tenure and protection against eviction.

7.99 However, the fact is that, since the colonial period, and especially since the first Brazilian Constitution (1824), the notion of individual freehold rights has always been the dominant one, whereas the other forms of real rights have been much less significant. Indeed, most of the few existing tenure systems based on real rights other than freehold rights are usually obsolete remnants of Brazil's colonial past, often corresponding to land belonging to the Church or the state. Other legal institutes are totally anachronistic, such as the regulation of coastal land belonging to the Federal Union, the so-called *terrenos de marinha*.

7.100 In this context, one of the main problems affecting urban land management concerns the fact that, despite the rhetorical constitutional and legal provisions, alternative, socially-orientated tenure policies - implying as they do a broad scope for state action - still lack full legal support in the basic provisions of the overall legal system, especially in that they have not been fully recognized and validated by the judiciary, registration offices, banking and financial organizations, and even by the public opinion.

7.101 In fact, the assumptions of many progressive tenure policies, such as those supporting tenure regularization programmes which are not based on the notion of giving freehold titles to occupiers, have long been at odds with the still prevailing individualistic legal definition of property rights, typical of liberal legalism, such as materialized in the 1916 Civil Code in force until 2003.

7.102 Perhaps the most important legal problem in Brazil is of a conceptual nature, as the progressive constitutional and legal provisions of Public Law have been read, interpreted and constrained by a legal - and sociocultural - interpretation still determined by civil law. That is the reason why a powerful movement needs to be orchestrated to inform, train and capacitate legal professionals in the country - judges, prosecutors for the government, lawyers, counselors, advisers, registration officers, etc. - so that they fully understand the principles of Urban Law.

7.103 In particular, as has happened in many other countries, there has been in Brazil a general confusion between housing rights and property rights, and an ill-thought, immediate association between security of tenure and the recognition of - individual - property rights. In other words, most people and (governmental and non-governmental) organizations and agencies advocating the promotion of security of tenure through regularization policies seem to think that only through the recognition of individual freehold titles would security of tenure be achieved, enabling the beneficiaries to remain on the land as well as to obtain credit and invest in their houses and businesses.

7.104 In some cases, this unfounded association between individual ownership and security of tenure has had a (not always explicit) political motivation, especially when the adoption of tenure policies has been defended by groups - such as some groups linked to the progressive branch of the Catholic Church which were influential in the 1980s - which view the recognition of individual property titles as a means of promoting a long overdue land reform in the country. Besides which, the powerful ideological and cultural implications of the notion of full individual ownership should not be underestimated, given the central role land ownership has historically had in Brazil, among other factors because of the country's unstable economic production and lack of a social security system. Indeed, to most people in *favelas* and elsewhere, security of tenure equals individual ownership, and therefore the perception of security often tends to be associated with individual rights. It is interesting to remark that a recent survey among the members of the *Movimento dos Sem-Terra - MST* (Landless Movement) in the countryside of Brazil - deemed by many to be subversive, dangerous agents who have violently questioned the country's land structure - indicated that 75% of them wanted to be given individual freehold titles.

7.105 Political re-democratization and economic restructuring since the 1980s have gradually brought changes in the pattern of urban management, including the increasing recognition by some municipalities - given the absence of a national policy until 2003, when the National Programme to Support Sustainable Urban Land Regularization was formulated by the Ministry of Cities - of the need to confront the process of social exclusion and spatial segregation. As a result, important tenure policies have been formulated in some cities within the

context of regularization programmes aimed at upgrading and legalizing *favelas* and irregular/ clandestine *loteamentos*.⁸⁴

7.106 A fundamental change in the orientation of tenure policies has become evident in many cities. After decades evicting the communities living in illegal settlements, or denying them services, credit and rights, the local state has increasingly come to tolerate them in different manners, eventually - albeit in an incipient way - proposing the improvement of tenure conditions and the legal and technical regularisation of such areas and communities. Since the late 1980s/early 1990s, experiences of land tenure regularisation have been attempted in some cities, especially in those municipalities explicitly committed to promoting democratic urban management as well as democratising the access to urban land and housing. Municipal government has become the main agent in this process.

7.107 The action of the federal government on that matter has long been ineffective, although the formulation of an original national programme in 2003 may help to improve this situation. So far this has been done only by providing occasional financial transfers to federated-state and municipal programmes, as well as by improving the overall regulatory framework and creating some new, specific legal-financial mechanisms.

7.108 Generally speaking, the tenure policies implemented within the context of the tenure *favela* regularisation have been more consistent, systematic and successful than those proposing the regularisation of irregular/illegal *loteamentos*. This is probably due to the fact that there has been a greater degree of sociopolitical mobilisation in *favelas* over the decades - which can be explained by the fact that *favela* dwellers have always had a more precarious legal status and thus forced to organise themselves. Therefore, they have been more likely to be evicted from the occupied areas than the residents of illegal *loteamentos*, who had originally bought the land titles to the plots from whoever presented themselves as the legitimate owners.

7.109 Since the pioneering regularization programmes of Belo Horizonte and Recife were formulated in the early 1980s, most municipal programmes have followed the same formula, that is to say, a combination between the demarcation of Special Zones of Social Interest - ZEIS; upgrading works and service provision; the formulation of specific urban regulations expressing the specific conditions of the informal settlements; participatory urban management processes; and the recognition of legal titles to the occupiers.

7.110 In so far as the question of land titling is concerned, following Belo Horizonte's lead most regularization programmes by local government are still based on the recognition of individual freehold rights to the occupiers - which has proved to be one of the main factors determining their failure. On the whole, many regularization programmes have been relatively successful regarding the undertaking of upgrading works and service provision, but they have largely failed to promote land legalization, especially in those *favelas* occupying private land, given the high financial costs and legal and technical difficulties involved. Bureaucratic requirements and high transaction costs have been aggravated by the several obstacles that have also been created by the registration offices and by the action of judicial power, which has often reduced the scope for state intervention in the domain of individual property rights, even in situations where the land occupation has been consolidated for a long time.

7.111 It is in this context that, as an expression of their peculiar sociopolitical and historical circumstances, other municipalities have attempted to formulate innovative tenure policies to support regularization programmes based on different legal-political notions and instruments. Learning from the accumulated experience in Belo Horizonte and elsewhere, and following the lead of Recife, Porto Alegre and other municipalities have formulated innovative tenure policies taking into account the difficulties involved in promoting the legalization of invaded public and private land through the transfer of individual property titles. They have also taken into consideration the known situations in which legalized plots had been immediately sold by the original occupiers - who then moved on to invade other peripheral areas, thus starting the whole process all over again.

7.112 As a result, the tenure policies implemented in municipalities such as Recife and Porto Alegre have been based on the assumption that, even if it may create individual security of tenure in more immediate terms, the mere attribution of individual property rights does not necessarily achieve the main goal of most tenure

⁸⁴ For a detailed analysis of the evolution of regularisation policies in Brazil, see Fernandes (1995; 2000; 2002b; 2005).

regularization programmes, that is to say, the full integration of illegal areas and communities into the broader urban structure and society. They have also been based on the principle that tenure regularisation policies have to be reconciled with the need to improve conditions of sociopolitical citizenship.

7.113 In another interesting development, policymakers in those cities have tended to look at the phenomenon of urban illegality from a different sociopolitical viewpoint, and therefore they have viewed the state's social obligations in terms of providing adequate and affordable housing rights and not necessarily providing property rights – let alone individual property rights. Among other factors, this political attitude has entailed a different treatment of invaded public and private land. In particular, it has implied in the refusal of the traditional legal-political choice based on the transfer of individual freehold titles in public areas. The new tenure policies formulated in Porto Alegre and Recife, for example, have supported the notion that the recognition of social housing rights does not entail the privatization of public land, especially in the Brazilian urban context in which the amount of existing public land in urban areas is negligible in most cities.

7.114 In both Porto Alegre and Recife, tenure policies have favored the recourse to the legal institute of *usucapiao* as the principal means of promoting the improvement of tenure conditions and the legalization of settlements in private areas. Such policies are based on the political notion that, whenever possible, the original landowners should not benefit - through the payment of compensation by means of public money - from the fact that, having failed to fulfill its social function, their vacant/under-utilized land has been occupied by people whose housing needs had not been met by either the state or the market. They have also supported the legal notion that times creates rights as much as it abolishes rights, and that the occupiers of private land should be recognized as subjects of property rights of their own - and not as the beneficiaries of property rights forged by the state through expropriation followed by sale or donation. In other words, whenever possible the role of the local state in private areas should be restricted to facilitate, and possibly help mediate, the confrontation between the occupiers and the original landowner for the judicial recognition of the occupiers' freehold rights acquired through *usucapiao*.

7.115 To a lesser extent, the new tenure policies have also considered the economic implications of regularization programmes on the land market and on the financial capacity of the residents in informal settlements. The tenure rights recognized are supposed to promote legal security of tenure as well as minimizing distortions on the land market, besides making the sociospatial integration of the areas and communities possible and guaranteeing the permanence of the original occupiers on the land once it has been upgraded and regularized. Such policies also have a basic gender dimension, as they support the notion that, regardless of their legal marital status, women should be given a priority treatment once the recognition of titles is promoted. As a rule, tenure titles have been issued on the names of both partners.

7.116 As mentioned above, there is in the Brazilian legal system a gamut of alternative legal-political options to be considered apart from the transfer of individual freehold ownership, ranging from diverse forms of leasehold to still largely unexplored forms of collective ownership, allowing for varying degrees of state control. Until the enactment of the 2001 City Statute, the most "innovative" approach to tenure rights in urban areas in Brazil, as applied in both Porto Alegre and Recife, concerned the utilization of Concession of the Real Right to Use as the means of recognizing security of tenure. This was done within the context of broader municipal programmes aimed at the legalization and upgrading of *favelas*.

7.117 Until the promulgation of the 1988 Federal Constitution, the regularization of informal settlements was a matter within the discretionary power of public authorities, who would decide on when and how best to proceed with the programmes. Individual or collective titles to be given to the occupiers would result from land expropriation, sale, donation, adverse possession, or concession of the real right to use. This situation was fundamentally changed by the 1988 Federal Constitution and the 2001 City Statute, following which there are two main legal categories of land regularization: situations in which, according to the legal criteria in force, there is a subjective right of occupiers to the regularization, even against the wish of the public authorities; and situations which remain within the discretionary power of the public authorities, but now under the umbrella of the newly recognized constitutional social right to housing. In the former situation, titles result from judicial processes

(individual, joint or collective adverse possession, individual or collective special concession for housing reasons) or extrajudicial processes (individual or collective special concession for housing reasons).

7.118 A third category would consist of the regularization of specific situations of illegal land development not covered under the social housing right, especially settlements in private or public land not occupied by the urban poor.

8 Main Legal Aspects of Land Registration

7.119 Among the main issues tackled by the Ministry of Cities in 2003 and 2004, within the context of the legal strategies adopted by the National Regularization d, the discussion on the activities of the land property registration offices (*cartórios*) is of utmost importance. Indeed, from several parts of the country there are reports indicating that it has been difficult, if not impossible, for municipalities and federated-states to register the newly regularized settlements at the local registration offices.

7.120 Despite their different legal characteristics, one of the main factors linking illegal settlements such as *favelas*, irregular or clandestine land subdivisions, and even most public housing estates is the fact that they all have not been registered at the registration office. This has been due to several factors: the existence of some form of legal problem with the original ownership of the subdivided land; the fact that the land subdivision had failed to respect the urban and environmental regulations in force; the fact that, having obtained the approval of the land subdivision by the municipal administration, the (private or public) land developer then failed to implement the required infrastructure or to observe all the bureaucratic requirements necessary for the registration, etc.

7.121 However, if the land subdivision is not properly registered, even when it has been approved by the municipal administration it does not fully exist legally, and as a result no individual plots can be legally recognized either.

7.122 This is indeed a major problem in a legal system such as Brazil's, in which it is the act of registration that constitutes the property right, as summarized in the popular saying *Quem não registra não é dono* (that who does not register the title is not the owner).

7.123 The lack of a registered title is one of the main causes for the residents' lack of security of tenure. Given the absence of full official recognition of the land subdivision and resulting individual plots, the implications of the lack of a registered title are manifold:

- the lack of a proper official address has several forms of impact not only on the residents' daily lives (for example, there is no proper postal service), but it also leads to discrimination by the labour market, to such an extent that an informal market of "addresses for hire" is thriving in some cities;
- access to official credit is considerably more difficult, and even impossible as regards the possibility of using the property as collateral;
- legal problems resulting from demarcation conflicts, neighborhood and domestic conflicts, marital separation, inheritance, etc., worsen over time;
- it becomes impossible for the municipal administration to properly control the further urban development of the area, thus allowing for a situation of total tolerance as regards the expansion of built areas;
- the residents remain politically vulnerable and become regular pawns in political games involving service provision, the implementation of infrastructure and land titling, thus reinforcing traditional clientelist relations;
- several obscure legal situations are created or aggravated further, as many municipal administrations subject the non-registered areas to property taxation anyway; etc.

7.124 *Cartórios* (for property registration and other purposes) have a peculiar legal status in Brazil, in that they are private entities providing public services, in a twisted form of a privatization scheme *avant la lettre*. They are inserted into the structure of the judiciary at the federated-state level (although Brazilian municipalities are autonomous federal entities, there is no organized judicial power at the municipal level) and as such they are

supervised by a judicial *Corregedoria* also at the federated-state level. In the main judicial circumscriptions, usually corresponding to the large cities, specialized judges deal exclusively with conflicts concerning the registration of several activities, including all conflicts concerning real rights and land property.

7.125 The main problem is that, even though they have the fundamental task of providing legal security to all sorts of socioeconomic relations, including property relations, Brazilian *cartórios* have long been powerful remnants of a highly anachronistic political system based on clientelism, patronage, and corruption. Until recently, *cartórios* were hereditary family businesses, often created by, and given away for, political reasons, or even as wedding presents by traditional politicians or by the military. Property registration *cartórios* were, and still are in parts of the country such as the rapidly growing Amazon region, historically instrumental in the configuration of Brazil's concentrated land structure, which has to no small part resulted from land invasion and illegal transactions, imprecision of land demarcation (made possible by the fact that there is in the country no tradition of land surveys), falsification of documents, and all sorts of bureaucratic tangles.

7.126 Traditionally associated with lengthy and costly bureaucratic procedures, inefficiency, cronyism, and total lack of social and financial responsibility and accountability, over the last two decades or so from several fronts there have been growing claims for the promotion of profound legal-political changes in the registration system, and some important changes have indeed been introduced. Given the escalating, widespread crisis of sociopolitical legitimacy concerning the action and the very existence of *cartórios*, the hereditary rule has been abolished and public selection has been gradually introduced. One of the national entities representing the registration offices – IRIB/ the Brazilian Institute of Property Registration – has led a most commendable process of modernization of *cartórios* and some related legal provisions such as the possibility of extra-judicially rectifying the terms of existing registrations which do not express physical realities. Ironically, there has been a progressive “publicisation” of the service in recent years. However, more structural changes still face the opposition of powerful vested interests.

7.127 Given this complex legal-political context, a specific workshop was promoted by the Ministry of Cities in 2003 to discuss the matter of property registration – not in general terms, which would require a major and highly sensitive political articulation to be led by the Ministry of Justice, but within the specific context of the national regularization d - aiming to identify the reasons for the longstanding difficulties, as well as alternatives for their solution.

Three main orders of problems were detected:

- the high costs of registration;
- the erratic procedures adopted by the registration offices; and
- the nature of frequent practices on the part of these offices, which have long been putting insurmountable obstacles to the development of municipal and federated-state regularization programmes.

7.128 Following this initial discussion and further political articulation with the entities representing the registrars nationally, IRIB and ANOREG - The National Association of Notaries and Registrars - significant gains were achieved still in 2003.

7.129 Although ANOREG has long been widely regarded as the national entity legally representing the registrars while IRIB has been viewed as a sort of academic institute-cum-think-tank, the fact is that there is much overlapping in the actions of both institutions – and some deep political tensions too, as both institutions have increasingly fought for political hegemony.

7.130 Since 2003, ANOREG has been publicly making powerful political statements, clearly seeking to confer sociopolitical legitimacy on the legal institution of property registration such as it exists, even if on a redefined basis. Indeed, there are many calls for the registration system to be totally redefined, including by its municipalisation and replacement by the municipal land cadastres, thus questioning the very existence of existing *cartórios*. Some bills of laws with this purpose have been discussed. Although IRIB has also been progressively promoting the reform and modernization agenda, there are still several political and conceptual differences

between the two organizations. However, it is undeniable that IRIB has better technical capacity for action than ANOREG, and for this reason IRIB has had a strong presence in the public debate. IRIB has also been firmly supporting seminars and other debates aimed at discussing the new legal-urban order consolidated by the 2001 City Statute.

7.131 Regarding the matter of financial costs, ANOREG (but not IRIB) initially declared publicly that they would not charge for the registration of the newly regularized land subdivisions, or for the first matriculation documents of the new legal instruments of special urban usucapiao, concession of the real right to use, or the special concession for housing purposes. Some registration offices acted on this decision immediately, such as that of Gravataí in Rio Grande do Sul, but the challenge remains to turn this into a standard national guideline to be followed by all registration offices. More recently, IRIB has strongly opposed this free registration principle, which had indeed been introduced by Federal Law no. 10,931/2004, and it has been trying to overturn this principle within the context of the ongoing revision of Federal Law no. 6,766 – as discussed below in more detail.

7.132 Another significant development concerns the legal and administrative procedures adopted for the registration of the subdivided areas and plots resulting from regularization programmes. Each Brazilian state has different guidelines generally issued by the *Corregedoria*, and to complicate things further the registration offices have given completely different interpretations to such guidelines, often questioning or refusing to register the newly regularized areas and plots. The existing bureaucratic requirements are enormous and the procedures are lengthy and time consuming. One common complaint is that the interested parties have to obtain all sorts of documents in all existing offices, one no one *cartório* has all the relevant information affecting a given property – which is a costly and lengthy process. Another common complaint made by the public authorities promoting the regularization programmes is that they are frequently treated by the registration offices as if they were private promoters acting in bad faith.

7.133 In this context, ANOREG (IRIB is more skeptical) proposed the creation by the Ministry of Justice of a national council to regulate all registration offices, and among other tasks this council would be in charge of defining uniform and simplified legal and administrative procedures to be followed for the registration of regularization programmes.

7.134 That would put an end to some of the main problems that have been affecting even the most advanced municipal regularization programmes, such as that of Porto Alegre. Having systematically promoted regularization programmes since the early 1990s, with recurrent utilization of the concession of the real right to use both individually and collectively, Porto Alegre's municipal administration has failed to proceed with the registration of most regularized land subdivisions, and as a result the individual or collective titles are still legally precarious.

7.135 Also regarding the legal and administrative procedures, a more difficult task will be to reconcile the highly anachronistic databases used by the registration offices with the more modern cadastral databases used by the municipalities, given the fact that there is a wide gap between them. This compatibility can only be provided by the use of GIS, in the same way as has been already determined for the registration of rural areas by Federal Law no. 10,267/2001. The challenge then is to define the technical criteria to be followed so that this compatibility could also happen in urban areas. Also in that respect, IRIB has been strongly supporting the modernization and capacity building of existing *cartórios*, although there is a heated debate as to who is going to foot the bill. Another important factor regarding the actions of the registration offices concerns the nature of some of their practices.

7.136 On the one hand, unsure of how to proceed, in many cases the officers submit the matter to the consideration of the specialized judges, thus making the whole process a very lengthy one. There are also many instances of registration offices that have clearly refused to get involved in regularization programmes, deliberately creating all sorts of obstacles (sometimes for ideological reasons). On the other hand, most municipal administrations have little understanding of the importance of getting the registration offices involved in all stages of the regularization programmes.

7.137 Systematic partnerships need to be formed between the registration offices and the municipal administrations. In fact, it was as a result of one such solid partnership that thousands of titles of the special concession of use for housing purposes were given to residents by the Municipality of Sao Paulo in 2003, although until recently, given the political changes in the city administration, even those titles had not been properly registered.

7.138 Registrars and other legal actors have to be permanently involved in this attempt to work out adequate legal solutions to the question of regularization of consolidated informal settlements. The challenge faced by the Ministry of Cities in this respect is to give continuity to this discussion with IRIB and ANOREG and to consolidate and expand the new partnerships, so that the achievements already made become general rules valid for the whole national territory.

9 The Ongoing Process of Land Law Review: Proposed Changes to Federal Law No. 6,766/1979

7.139 The important bill of law currently at the Chamber of Deputies aims to reform Federal Law no. 6,766/1979 which governs the subdivision of urban land nationally. As mentioned above, the approval of this law in December 1979 was a most significant development for the materialization of the constitutional principle of the social function of property. This principle had been repeated in every constitution since the 1934 Constitution (1937; 1946; 1967/1969), but, given the lack of a clear definition by federal law, the 1916 Civil Code, a typical expression of classical legal liberalism, had long provided the dominant criteria for legal and judicial interpretation of the nature and contents of real property rights. Until then, the main law governing the process of urban land development in Brazil at the federal level was the highly inadequate *Decreto-Lei* no. 58/1937.

7.140 The enactment of Federal Law no. 6,766 took place during the so-called “political opening” period which marked the transition from military rule towards democratization. Resulting from a process of intense sociopolitical mobilization, it combines the interests of three main pressure groups, namely: residents in peripheral irregular land subdivisions (*loteamentos*), which claimed for the regularization of their situation; municipal administrations, which urgently needed to control the growing process of land use and development; and sectors of productive real estate capital, which felt undermined by the harmful impact of speculative interests on the land and property market.

7.141 Federal Law no. 6,766 thus established a set of technical criteria and obligations to be met by land developers, including the stipulation of a number of infrastructure works and the determination that at least 35% of the land to be subdivided had to be reserved for public use and thus incorporated into the municipal patrimony. It also had a chapter dedicated to the regularization of existing irregular land subdivisions.

7.142 This chapter on regularization failed to have an impact given the fact that it did not address the variety of existing situations, did not remove longstanding legal obstacles, and did not express the sociopolitical dynamics existing in informal settlements.

7.143 However, although no proper studies have been done to assess this, the provisions regulating new land subdivisions have long been blamed for the subsequent growth in the process of informal land subdivision, which would have resulted from the Federal Law’s excessive technical requirements, its impact on land prices, and the municipal administrations’ lack of capacity to cope with the bureaucratic procedures established by the law. As a result, throughout the 1990s from several quarters there were claims for a legal revision, which was partly promoted in 1999.

7.144 Federal Law no. 9,785/1999 dispensed with some of the original legal requirements, including the minimum percentage of public land, and it introduced some mechanisms to facilitate the regularization of irregular land subdivisions. However, also this law proved to be insufficient to make an impact on the realities determining the conditions of urban land development, and the calls for a thorough revision increased. One of the main claims supported by powerful groups of land developers concerned the need for the revised federal law to regulate the widespread practice of urban condominiums (gated communities), which had not been covered by Federal Law no. 6,766.

7.145 Over the years, many proposals were submitted at the National Congress to change specific points of the law, and during President Fernando Henrique Cardoso's second term all such proposals were integrated at the Urban Development Commission in the form of a bill of law that totally re-writes Federal Law no. 6,766. This bill was submitted to a series of public audiences and the Commission's Rapporteur prepared a favourable report. At this juncture, the Lula government took over and the Ministry of Cities was created. New national policies started to be conceived for both the promotion of social housing and the regularization of informal settlements. While the revision of the Federal Law is perceived to be crucial for the success of the new housing and land policies, the bill of law was deemed by the Ministry of Cities to be totally inadequate. Contacted by the Ministry, the Rapporteur agreed to replace the bill with a different version to be prepared together with the Ministry of Cities. He also accepted that the new bill of law should cover two main processes, new land subdivisions (including the polemic matter of urban condominiums) and the regularization of existing informal settlements, in two specific, comprehensive parts. A process of national mobilization around the new proposal then began, and a very successful second series of public audiences was promoted at the Urban Development Commission.

7.146 Throughout 2004 and 2005, there were many meetings to discuss the terms of the bill, which, following several compromises involving the main stakeholders, was eventually approved by the Urban Development Commission in December 2005. The bill of law is currently being discussed by the Constitutional Affairs and Justice Commission, and it has a long way to go before it is approved.

7.147 It is fundamental to remember that this law-making process was initiated and is controlled by Legislative Power, and for this reason whatever articulations to be promoted by the Ministry of Cities have to take into account the timing, internal dynamics and political requirements of the National Congress. Many changes are still expected, unless powerful political pacts are formed so as to guarantee its approval as it stands. The 2006 elections will certainly make the law-making process even more uncertain and complicated.

7.148 The first thing to be said about the bill of law currently being discussed is that its approval is crucial for the success of the Ministry of Cities's proposed housing and urban land regularization policies, as the law regulates the main processes which have structurally produced urban space in Brazil. However, it is fair to say that the central importance of this bill of law has not been fully understood yet by sectors of the Ministry of Cities, particularly the National Housing Secretariat, which has not participated actively in the broad public debate that the Ministry of Cities's National Secretariat for Urban Programmes has been promoting since 2003. Ideally, the bill of law should express the same main principles underlying the Ministry of Cities' land and housing policies, namely:

- broad democratization of the legal, political, financial and institutional conditions of access to urban land and housing;
- the production of new social housing developments and serviced sites for low-income groups, by the public authorities in all spheres of government;
- the opening of new lines of official credit and housing finance, especially for the population between 0-3 minimum salaries;
- inclusive urban planning and democratic management of cities, especially through the instruments, mechanisms and processes of urban land use as per the 2001 City Statute, in order to induce the occupation of vacant land, rehabilitation of urban centers and the full realization of the socioenvironmental function of urban property and of the city;
- the promotion of urban land regularization programmes, which should be considered as one of the central axes in formulating municipal master plans, such as required by the 1988 Federal Constitution and the 2001 City Statute;
- the use of redistributive fiscal and extra fiscal policies, as well as mechanisms for surplus value capture by the public authorities, always in the terms of the 2001 City Statute;
- the creation of mechanisms and processes of various orders to involve the formal land and property market in the production of regular serviced sites and buildings for the low-income population, in good locations, accessible prices, and sufficient quantities;

- encouragement to the action of housing co-operatives;
- incentive to the formation of public-private partnerships, etc.

7.149 Given the scale and extent of the current urban and housing crisis in the country (with the housing deficit estimated as 7.2 million units and the number of vacant properties estimated as 5.5 million units), it is imperative that a new federal law, valid in the whole national territory, strikes a proper balance between technical criteria; the determination of obligations imposed to private and public land developers; and the individual or collective nature of the land rights to be recognized.

7.150 In particular, it is no longer sufficient for urban planners and managers to impose urban and environmental technical criteria and obligations without a clear understanding on how such criteria and obligations impact on the dynamics of land price formation in both the formal and informal land and property markets. It is also imperative that planners and managers take into account the management capacity of municipal administrations when defining such technical criteria.

7.151 It can argue that the regular production of serviced plots of land for the lowest income groups – and the efficacy of the new federal law – will depend on how his elements of the following equation are combined:

- technical (urban and environmental) criteria;
- obligations of land developers;
- conditions for the fulfillment of such obligations;
- guarantees to be provided by land developers;
- management capacity of municipal administrations; and
- Conditions for social control of the development process.

7.152 Another fundamental factor to be considered is the nature of the federal law to be approved: at the same time that the law has to respect municipal autonomy to legislate on matters of land use and development and therefore impose only general guidelines, the truth is that in the vast majority of Brazilian municipalities there are no other land and urban laws other than the federal law, which means that the general rules end up becoming the sole rules governing the process of land subdivision and development.

7.153 In this context, it is undeniable that, even with all its shortcomings, the bill of law already improves on the current legal order, especially by regulating the widespread, but still unregulated, development of urban condominiums and by establishing general rules for the regularization of informal settlements in the country.

7.154 However, such as it stands, the bill of law still has many serious problems that need to be urgently confronted. Generally speaking, the section on new land subdivisions needs to be fully revised, especially to make sure that it expresses all the abovementioned principles; in particular, the new regulations of urban condominiums need to be better integrated. The section on regularization, which is wholly original, has improved in relation to previous drafts, but there are still many conceptual and technical legal problems to be confronted. Moreover, there is little integration between the two sections, and there are many formal problems with the bill of law regarding its legal language and internal coherence.

7.155 It can be argued that the section on new land subdivisions has not yet found a proper balance in combining the abovementioned elements, and that it is not likely to lead towards a significant production of cheaper and more accessible serviced plots of land. There are two main problems to be confronted:

- the original bill of law seemed to presume that all persons are equal and did not explicitly introduce and specifically regulate the category of “popular land subdivision”, which has been part of the Brazilian legal tradition, as if all land subdivisions approved in accordance with the new law would be accessible to all,

including the urban poor. This might be interpreted as a mistake, as laws do not have the power to render people equal, on the contrary, laws tend to aggravate long existing socioeconomic inequalities. The latest version of the bill does introduce the mention of the land subdivision of social interest, but the conditions and requirements are still debatable;

- although the bill of law distinguishes to some extent between those few municipalities with better management capacity and the vast majority of others, the general rules valid for the latter (covering over 90% of municipalities) still do not properly consider the precarious municipal realities nationwide.

7.156 Indeed, further discussions need to be promoted regarding the materialization of the abovementioned equation, involving the definition of technical criteria (particularly regarding the minimum size and width of plots) and the obligations to be fulfilled and infrastructure works to be solely or partly implemented by the developer (the bill of law mentions water, public and domestic light, sanitation, drainage, environmental regeneration, a percentage of public land, etc.). A solution has also to be achieved regarding the possibility of more flexible conditions for the progressive implementation of urban infrastructure, the nature of the guarantees to be required from the developer, the very definition of who can promote land subdivision (including by involving housing co-operatives and encouraging public-private partnerships, etc.). On the whole, despite the widespread criticism of Federal Law no. 6,766/1979, the bill of law currently has a broader and more demanding set of regulations and requirements than that of the law in force. Special attention needs to be given to the discussion as to how the combined requirements will impact on land prices, given the socioeconomic realities prevailing in the country. For all the proposed technical changes, the bill of law still expresses still a very traditional rationale.

7.157 Also from the viewpoint of the municipal management capacity, it can be argued that the bill of law still does not express the national realities and needs to be revised. In fact, not many municipalities would be capable to cope with the proposed requirements of compulsory geo-referencing and complex administrative procedures for the approval and monitoring of the process of land subdivision.

Combined, these two orders of problems could seem to provide a recipe for further informality.

7.158 Perhaps the bill of law, as a general rule valid for the whole country, should focus on the conditions necessary for the production of serviced plots for the majority of the population – families earning less than five minimum wages - by private and public developers, leaving further regulation to municipal laws and assuming that the formal land market will always produce more sophisticated products for the other socioeconomic groups. The bill of law should also simplify the administrative procedures as much as possible, especially by imposing an integrated licensing system in which environmental organs have to participate together with urban planning organs, thus breaking with the problematic current situation of duplicity of procedures and licences. The current bill of law does propose a similar solution (although it still has a very bureaucratic nature), but there have been strong reactions against the proposal coming from environmentalist groups and prosecutors for the government.

7.159 Another crucial aspect is the need to define a precise timetable for the municipal administrations to approve (or not) the land subdivision projects, as the current situation - in which the average process takes between three and five years - is totally unacceptable. The current dichotomy between (often conflicting) urban and environmental legal requirements and separate licensing procedures can no longer be sustained. A good idea, launched but still under-explored in the bill of law, would be the creation of the legal category of compulsory owners' associations who would be involved in the social control of the licensing and implementation processes. The regulation of the matter of contracts also deserves better attention, and its implications from the viewpoint of consumers' rights have been strongly criticized.

7.160 Regarding the matter of urban condominiums, which lies at the root of much of the political pressure for the approval of the new law, the bill of law needs revision so that it is given a more integrated treatment, and especially in so far as the proposed sizes and obligations are concerned so as to guarantee that, if approved, the law will not be completely out of touch with the existing realities.

Again, the National Housing Secretariat should actively participate in all such discussions.

7.161 The section on regularization deserves to be fully revisited and greatly improved. Successive changes in the bill of law have tried to promote a clearer legal and political distinction between the two existing situations, namely, informal settlements occupied by low-income people where there is a collective right to regularization, and informal settlements where regularization still is a matter for the discretionary action of the public authorities. Especially in the former case, a broad discussion needs to be promoted in order to define the most appropriate technical criteria, obligations and procedures to be included in the new law.

7.162 The bill of law also needs to consider in proper detail the variety of existing situations of consolidated informal settlements on urban land, including those processes that are more frequent in regions of Brazil other than the South and South-East, as well as indicating their different legal implications. In all such cases, though, the bill of law should further reinforce the importance of creating ZEIS - Special Zones of Social Interest corresponding to the settlements to be regularized.

Three Important Issues need to be Better Treated in a Revised Bill of Law.

7.163 Firstly, a new federal law needs to provide the conditions for the effective regularization of consolidated informal settlements on land directly or indirectly belonging to the Union, in general and particularly on *terrenos de marinha* (coastal land), by removing the existing obstacles to municipal and state regularization programmes. A new federal law of this importance cannot afford to neglect this matter, which directly affects the federal government.

7.164 Secondly, a good solution needs to be found regarding the regularization of consolidated informal settlements on areas somehow subjected to environmental laws. Although it is a good idea to involve the participation of the *Ministerio Publico* in this process, the terms of such a participation should be clearly defined, especially in those cases where there exists a right to regularization.

7.165 Thirdly, a great deal needs to be done to improve the chapter on the registration of regularized settlements. Although it is necessarily a complex chapter, given the many legal aspects and technicalities involved, it is imperative that the new law confront the longstanding problems. A good idea would be to bring the registrars into the integrated licensing process in a more systematic manner.

7.166 Special attention needs to be given to the bill of law's organization, internal coherence, and legal language, especially in order to close existing loopholes and clarify confused provisions and contradictions, so as to minimize the scope for conflicts of interpretation.

7.167 Last, but not least, advanced as the law-making process already, there is still a long way to go and the Ministry of Cities – acting as a united front - should reinforce the strategy it has adopted to promote the formulation and discussion of the new law. There are many conflicting interests at stake, and a total consensus will never be achieved. For this reason, much as it should try and get the broadest possible front to support the new law, it is crucial that the Ministry of Cities take a firmer stand on key aspects of the law, even inside the federal government as a whole – particularly in the negotiation with the Ministry for the Environment and the Secretariat for the Union's Patrimony of the Ministry of Planning. It is crucial that the new law clearly express the Ministry of Cities's mandate and agenda of urban reform and sociospatial inclusion. The dissatisfied parties can always take their claims to the discussion at the National Congress.

7.168 That said, it is fundamental to remember once again that this law-making process was initiated and is controlled by Legislative Power, and for this reason whatever articulations to be promoted by the Ministry of Cities have to take into account the timing, internal dynamics and political requirements of the National Congress.

7.169 Regarding the abovementioned question of *cartorios*, this is a discussion that is also directly, and crucially, related to the ongoing discussion on the draft of a new federal law, but also in this context much still needs to be done by the Ministry of Cities to achieve a consensus with the national entities representing the registrars. However, the fight over the free registration principle has provoked tensions and some estrangement.

7.170 The proposed bill of law covers two different matters in two separate sections, that is, new land subdivisions (including urban condominiums) and the regularization of consolidated informal settlements. Each of these sections has to include a chapter on the procedures to be followed for the registration of the land development, be it a new land subdivision or condominium, or be it a regularized informal settlement. This is a unique opportunity to confront and overcome the long existing legal problems, especially by simplifying the registration procedures as well as lowering the financial costs involved.

7.171 ANOREG and especially IRIB have actively participated in the public debate co-ordinate by the Ministry of Cities, including during the 2003 cycle of public audiences at the Urban Development Commission. In particular, IRIB was deeply involved in the political articulations promoted by the Ministry of Cities in 2004 aiming to produce a complete new draft of the bill of law to be approved by the main stakeholders prior to its submission by the Rapporteur and subsequent approval by the Urban Development Commission. However, one of the main reasons why this articulation failed and the bill of law had to be taken out of the Urban Development Commission's voting agenda that year was exactly the impossibility of reaching an agreement with IRIB. A final version was eventually approved in December 2005, but it still has many problems and shortcomings regarding the matter of land registration.

7.172 While there are no major obstacles to be overcome as regards the proposed registration procedures applicable to new land subdivisions and urban condominiums – other than the great need for further simplification, integration and lower costs - a great deal still needs to be done regarding the registration of regularized informal settlements, and this is not going to be a straightforward process. As mentioned above, there are political questions at stake, as for example IRIB's reluctance to follow ANOREG's lead and accept the gratuity of the registration process. There are also many detailed technical questions, especially concerning the registration of the new legal instruments regulated by the 2001 City Statute.

7.173 To some extent, the existing difficulties result from the fact that this whole legal discussion is original and there are no clear precedents, as, even given due respect to the great achievements of the 2001 City Statute, the prevailing legal order still has not tackled the problem of land registration in an adequate manner. It should also be said that registration officers are more used to dealing with individual freehold rights, and a more consistent conceptual effort needs to be made by them in order to fully understand the legal implications of the collective rights introduced by the new legal-urban order.

7.174 The agreement between the Ministry of Cities and IRIB is possible, but it requires that the debate be conducted with precision and diplomacy. Although the matter involves complex legal details and all sorts of technicalities beyond the experience and knowledge of its limited team, the Ministry of Cities needs to make an effort to take a more pro-active stand and offer concrete solutions to the current impasses.

10 Final Remarks

7.175 The Brazilian experience of urban law reform has already given some indications of how this can be achieved. The 1988 Federal Constitution recognized five inter-related collective rights, namely: collective right to city and spatial planning; to environmental preservation; to the democratic management of cities; to social housing; and to the regularization of informal settlements. Both the 1988 Federal Constitution and the 2001 City Statute attributed to the master plan legislation the power to recognize the contents and reach of individual property rights, which thus result from the fulfillment of the social and environmental functions of the city and of property. The urban law making process was both decentralized and democratized, and all municipalities with more than 20,000 inhabitants have to approve their master plans by 2006, being up to them the adaptation to their local realities of the constitutional principles and diverse legal-urbanistic instruments regulated by the City Statute.

7.176 Democratic management of cities is to be achieved through effective popular participation in the decision-making process at all levels and in all forms: in executive power, through participatory budgets, popular participation in committees and commissions, and popular consultations; in legislative power, through public

audiences as the condition for the validity of master plans and other urban laws, and the popular initiative to propose bills of urban laws; and in the judiciary, through the civil public action, which enables NGOs and social movements to initiate judicial procedures to defend the urban-legal order. A particularly successful aspect of the Brazilian urban regulatory framework has been the creation of “Special Zones of Social Interest”, corresponding to both urban areas occupied by consolidated informal settlements and vacant private land reserved for social housing programmes. Such zones have specific urban regulation and their own participatory management processes, and initial studies have indicated that they have been instrumental in keeping land prices low.

7.177 However, one of the main lessons of the Brazilian experience is that urban law and urban management have to be conceived together, under a comprehensive urban and land governance framework. Again, the enormous challenge put to Brazilian cities, as for that matter also to other countries and cities that are promoting urban law reform, is to guarantee the full enforcement of the newly approved laws.

7.178 Urban planning is a most powerful process; if urban laws have long been capitalized upon by certain economic groups and thus directly contributed to the process of sociospatial segregation, the promotion of urban law reform may substantially contribute towards creating the conditions for more inclusive and fairer cities. To put it briefly, urban reform cannot be promoted without legal reform.

7.179 Political re-democratization and economic restructuring have recently had several implications for urban land policy in Brazil, including the approval of legal, urban and fiscal measures aiming at addressing, to some extent at least, the need to provide affordable access to land and housing and security of tenure for the urban population. In fact, a fundamental change of orientation of the public policies regarding illegal urban settlements has become evident in many cities. After decades of removals from illegal settlements, the state has become increasingly more tolerant. Eventually, though reluctantly, the state has proposed the legal and technical regularization of illegal settlements. Since the 1980s, partly as a result of the increasing social mobilization for the recognition of housing rights, several regularization policies were formulated and implemented. They had the explicit objective of promoting the sociospatial integration of the excluded communities living in *favelas* and peripheral *loteamentos*.

7.180 Prior to the 1988 Federal Constitution, and in the absence of a national policy, there were few local experiences combining physical upgrading and legalization of the illegal settlements such as those of Belo Horizonte and Recife in the mid-1980s. With the promulgation of 1988 Federal Constitution and the 2001 City Statute, these local programmes have gained a new legal vigour. However, they still suffer the effects of legal, political and financial constraints that have long put obstacles to the success of progressive urban management in Brazil.

7.181 Despite efforts by the collective entities comprising the National Forum for Urban Reform, and regardless of the recent development of Brazilian urban legislation at the municipal level, most regularization policies are still unsatisfactory with regard to the legalization of the occupied areas, and particularly of those illegal settlements that occupy privately owned urban land. The necessary legal-political conditions have not yet been created to promote the reform of liberal legalism still prevailing in doctrine and jurisprudence, which still does not recognize the centrality of the principle of the social function of urban property.

7.182 It should be stressed – albeit in passing - that reforming the national legal-political order is only part of the challenge. The concentrated and exclusionary land structure formed throughout centuries of economic development in Brazil must be urgently confronted, both in cities and in the countryside, as an indispensable condition for the promotion of regularization policies. Urban reform cannot be dissociated from agrarian reform, as emphasized by the critical experiences of several countries in Africa and in Latin America, including Brazil.

7.183 As a result of increasing social poverty, even the acquisition of cheap plots in irregular *loteamentos* is beyond the possibilities of an increasingly larger group of urban poor, and the “problem” of *favelas* is worsening. Besides the increase in residential densities in traditional *favelas*, new *favelas* have formed in the urban peripheries. Private and public areas have been invaded daily, mainly in the surrounding cities of the metropolitan areas, where legal control of land development has not been as strict as that applying to central areas. Political

demobilisation and new socioeconomic activities, including those revolving around increasingly organized drug trafficking, seem to be transforming life in the *favelas*. Notwithstanding government involvement in some basic upgrading works and public services in the main *favelas*, and to a lesser extent in peripheral *loteamentos*, on the whole state action has failed to promote the integration of the *favela* areas and irregular *loteamentos* into the broader sociospatial urban context. Thus the prospects for traditional regularization programmes remain not very promising, especially as far as the objective of sociospatial integration is concerned.

7.184 Past experience has shown that the mere approval of legislation does not guarantee its enforcement. *Favela* dwellers, as well as residents in peripheral *loteamentos*, must re-define their means of collective action to have regularization measures implemented. Having fought long for the law, they must keep on fighting to see it materialized. In the case of *favelas*, the question of perceived security of tenure must be addressed. More local programmes involving the relocation of *favela* population have been adopted in recent years.

7.185 It has to be stressed that regularization policies have an inherent remedial nature. They should not be dissociated from much needed comprehensive land, urban and taxation policies based on direct state intervention and substantial public investment in urban areas, through, for instance, occupation of vacant land and under-utilized constructions, large-scale rehabilitation projects, social housing and urban renewal programmes. They should be based on effective preventive policies aimed to transform the nature and dynamics of urban development to the benefit of the whole community and require explicit political and financial commitment on the part of the local authorities.

7.186 The recognition of some form of land tenure rights of the population already living in illegal and precarious conditions is of utmost importance. Whatever the chosen legal formula is, it is fundamental that the recognition of urban and tenure rights takes place within the broader, integrated and multisectoral scope of city and land use planning, in order to prevent distortions in the land market and thus minimize the risk of displacement of the traditional occupiers. The laws supporting regularization programmes must be properly integrated into the overall urban legislation in a given context. Moreover, for a legal solution to work properly, it must result from a democratic and transparent decision-making process that effectively incorporates the affected communities.

7.187 Above all, the recognition of housing rights and of security of tenure must be promoted within a broader context in which urban reform and law reform are reconciled. Law reform is a direct function of urban governance. It requires new strategies of urban management based on new relations between the state (especially at local level) and society, renewed intergovernmental relations and the adoption of new forms of partnership between the public and the private sectors, within a clearly defined legal-political framework. Law reform requires a fundamental renovation of the overall decision-making process, so that traditional mechanisms of representative democracy and new forms of direct participation are combined. The democratization of access to land and housing depends on the democratization of the political process as a whole. Whatever its limits are, a most promising experience is that of the “participatory budgeting” adopted in several Brazilian cities, in which a significant scope has been created for the participation of community-based organizations in the formulation of the local investment budgets.

7.188 Finally, the need to promote a comprehensive legal reform and judicial review can no longer be neglected, especially in order to promote the recognition of collective rights and to broaden collective access to courts to guarantee law enforcement. To some extent, Brazil has already incorporated the notion of collective rights in its legal system, thus enabling the judicial defence of so-called “diffuse interests” in environmental and urban matters by both individuals and NGOs.

7.189 Put briefly, urban reform and the recognition of security of tenure are not to be attained merely through law, but through a political process that supports the recognition of the long-claimed “right to the city”, not only as a political notion, but also as a legal one. The collective action of NGOs, social movements, national and international organizations, and individuals within and without the state apparatus, is of utmost importance to guarantee both the enactment of socially oriented laws and, more importantly, their enforcement. There is also a fundamental role to be played in this process by lawyers, judges and prosecutors for the government.

7.190 If these are truly democratic times, the age of rights has to be also the age of the enforcement of rights, and especially of collective rights. It is only through a participatory process that law can become an important political arena to promote spatial integration, social justice and sustainable development.

11 Recommendations for Policy Makers

- a. Although it has been greatly improved as a result of the 1988 Federal Constitution and the 2001 City Statute, there are still some significant gaps in the urban-legal order in force in Brazil, and new federal laws should be enacted to modernize the legal treatment of important matters such as the use and development of the Federal Union's land; the protection of historic heritage; expropriation of urban land; and the overall system of property registration.
- b. A most important gap relates to the need for modernization of the federal law governing the subdivision of urban land nationally, and for this reason a concentrated effort should be made to further improve the contents of the bill of law currently discussed at the National Congress, for which purpose a clearly articulated politico-institutional strategy needs to be formulated, within and beyond the Ministry of Cities.
- c. Special emphasis should be placed on creating the necessary conditions for the effective enforcement of the provisions of the 1988 Federal Constitution and especially the 2001 City Statute at all governmental levels, including by supporting the ongoing campaign for the approval of municipal master plans.
- d. Efforts should also be made towards minimizing at least the other existing legal constraints to proper law-enforcement resulting from the archaic structure of the judicial system, the problematic definition of the federal regime (particularly the legal treatment of metropolitan areas), and the overall organization of the political system, which still foments a tradition of clientelist sociopolitical relations.
- e. A concerted effort should be made to promote better information on, and conceptual awareness of, the principles of the new urban-legal order to legal professionals – students, lawyers, judges, prosecutors for the government, counselors, advisers, etc.
- f. Urban planners and policymakers should re-think the notions and values that have oriented the formulation of urban legislation, especially in order to take into account both the socioeconomic realities determining the conditions of access to urban land and housing and the capacity of (especially local) public administrations to fully enforce urban laws, as well as the impact such laws have had on the formation of land prices.
- g. Regarding the discussion on land titling, policymakers should take into account the wide range of legal instruments in force, including those of a collective nature, with the choice of a given instrument being determined by the existence or not of subjective rights; the original public or private ownership of the land; and the broader objectives of the regularization programmes.
- h. The demarcation of special zones of social interest seems to have had a positive impact in keeping land prices low, thus contributing towards the permanence of the population in the regularized areas.
- i. The registration of regularization programmes and resulting individual plots requires the approval of cheaper and simplified procedures that obey uniform and clearly defined rules nationwide.
- j. The Ministry of Cities's "National Programme for the Sustainable Regularization of Informal Settlements in Urban Areas" should be reinforced and expanded, both within the Ministry and the Federal Government as a whole.

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8. Land Markets in Brazil: Capturing Land Value to Finance Infrastructure Improvements

by

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Acknowledgements

The authors wish to thank all those who have participated in this project, including David E. Dowall, Maria Emilia Freire, Martim O. Smolka, Paulo C. Ávila and Edesio Fernandes for their excellent comments and suggestions. The fruitful dialogue with Antonio Augusto Veríssimo, Paulo Fernando Cavallieri, Elizabeth Castanheira, José Agostinho Leal and Maria Clara Vejarano was of immense help in the development of this document. Any error or omission in the analyses or the conclusions are however the entire responsibility of the authors.

Executive Summary

8.1 The purpose of the present paper is to discuss the theoretical bases and state-of-the-art of urban land value capture policies in Brazil, and to estimate the capacity of these policies to contribute to basic infrastructure programs in large Brazilian cities and programs involving access to urbanized land by the low-income population, and to suggest ways in which these policies could be most effectively applied.

8.2 In Brazil, as in almost all of Latin America, land value capture policies for funding urbanization costs (public projects, activities, services etc) are nothing new. These policies have however been applied piecemeal and despite significant recent progress a number of aspects of the subject are still relatively obscure. To date, leaving aside the tax instruments directly linked to cost recovery for public works, regular and consistent accounting by public authorities of value increments flowing from urban operations and even from property taxes is an almost inexistent practice. With the exception of Colombia, for reasons that will be discussed below, these practices not only failed to evolve in the sense of providing a body of theory and doctrine in urban management but to a certain degree appear to have *gone into reverse* during the developmentalist interlude that occurred between the two major 'modernization projects' focused on urban centers: the first during the first half of the 20th century and the other concerned with the major 'inner city renewal projects' underway at the beginning of the new millennium.

8.3 On the one hand, the interest shown by public sector authorities in land value capture is obviously related to chronic weaknesses in the area of real estate taxation in Latin American cities. On the other, evidence clearly shows that the factors underlying this interest/lack of interest has been the flow of external investment and loans to the region over the years as well as fluctuations in cities' share of national revenues. In the period between 1950 and 1980, when external loans for development projects were abundant, the promising future of value capture in Brazil evident during the first half of the century was virtually extinguished. In a similar vein, it is interesting to note that earlier in the century the interrupted flow to Colombia of external funds due to the Panama Canal crisis created propitious circumstances for Colombia to emerge as an undisputed theoretical and practical reference point for the rest of Latin America on the subject of value capture. This was especially true where value capture was associated with resources earmarked for financing *infrastructure projects* (the focus of the present study). Finally, the prevailing atmosphere of deep fiscal tightening and constraints on further indebtedness at the beginning of the 21st century, linked to processes of administrative decentralization and increased municipal autonomy, highlight once again the relevance of value capture not only in Brazil but also throughout the whole of Latin America.

8.4 Estimated financial potential and improved understanding of the efficacious conditions for land value capture as a source of urban infrastructure financing indicate that the subject is worth revisiting as a matter of some urgency. The aim of this study is *inter alia* to clear the way for those who wish to do this. This will

necessarily involve examining the historical background of the inner-city renewal projects since the early 20th century in cities such as Buenos Aires, Rio de Janeiro, and Santiago de Chile, and the vast experience of Colombia with its 'Valorization Contribution' and more recently its programs to set up urbanized plots. The exercise also calls for putting together an 'inventory' to record the multiplicity of practices undertaken by municipal administrations regarding their appropriation of increased land values resulting from the urbanization process, together with their respective *modus operandi* and the values involved.

8.5 The capacity of the large metropolitan centres of Brazil to generate wealth has to be acknowledged. One of the striking features of these cities is the coexistence of high returns on private property ownership with concentrated poverty and precarious living conditions. From the standpoint of the sustainability of large cities, it would appear to be a reasonable aim to secure from incremented property values a more than proportionate contribution towards the financing of social urban development projects. In addition to this being done through cost-recovery programs it could be done through spatial transfer of land-based returns via taxes, building authorization waivers and other methods applied to high value areas; through taxes on property in areas benefited by social urbanization programs; and through self-sustainable programs involving the production of urbanized plots based on public administration principles governing land rights and consortiated action.

8.6 In our country, urban land value capture for financing housing and social urbanization programmes (viz: infrastructure for low income settlements) began to emerge as a discernible public policy from the time the 'Municipal Urban Development Master Plans' gained approval. On the basis of Articles 182 and 183 of the 1988 Constitution, these Plans gave rise to the Municipal Urban Development Funds. These funds were fed by counterpart contributions paid by property developers in exchange for receiving waivers of certain additional land use and development rights permitted by law. Although the Municipal Funds have suffered major resource shortfalls, they have nevertheless been successfully employed in social urbanization programmes since the late 1980s. In these circumstances, it would be difficult to claim that such mechanisms should not be allowed to play a major role in shaping policies targeted on the housing deficit which tends to be concentrated on the peripheries of the large metropolitan conglomerations.

8.7 The most widespread form of land value capture in Brazil is the standard property tax (IPTU). Explicitly or implicitly, the IPTU - although it has not been officially defined or managed as a land value capture mechanism - is in effect the fiscal tool most intensively and widely applied to assessing the value of urban land. In the case of the segment of the IPTU that corresponds to incremental land value capture (in other words the increased value of the land accruing to the owners as a result of the urbanizing process), a reasonable argument would appear to be that if this segment (part of the total tax imposed by the municipal authorities) were to be extracted from the 'extraordinary' (windfall) revenues, this could be earmarked, within the context of a policy aimed at balancing and redistributing urban revenues, for urban social development projects through the Municipal Urban Development Funds. At this point, it is worth questioning why, notwithstanding Brazil's valuable experience in urbanizing irregular and informal settlements, we fail in general to collect the IPTU from properties that have benefited from urbanization interventions. Could this not be done on the basis of differentiated tariffs to produce the revenue needed to cover costs?

8.8 Other classic forms of public land value capture (or anticipated capture) occupy, as we shall see, their own historical space in Brazil, but the connection between these and the financing of basic infrastructure is far from clear. Furthermore, there is little evidence that these mechanisms have succeeded in penetrating the larger cities where infrastructure needs are most acute. This is the case for example of the direct sale of plots created by urban renewal projects that are now a feature of the downtown areas of our major cities. It is also the case of the *Contribuição de Melhoria* ('Betterment Levy') that has existed in our legislation since 1934, although it has been applied only in piecemeal fashion and to date has been almost entirely confined to small and medium-sized towns, most of them targeted on road/street surfacing. Duly combined and adapted to the economic circumstances of both purchasers and developers, these two land valorization management modalities could well fulfill a pertinent role in executing projects to urbanize informal settlements. More importantly they would help to boost the available amount of serviced land on the peripheries of our large cities.

8.9 It is to be hoped that a clearer conceptual basis can be established with regard to the relationship between urban land value capture and the series of practices that emerged from the privatization of public services at the turn of the millennium. The latter include private firms taking over urban amenities and undertaking commercial services in locations that were formerly the responsibility of the public sector, maintenance of public squares and urban equipment under private 'adoption' programmes and the payment of 'rights of passage' for image and data transmission network services. It would be reasonable to suggest that these resources should be regarded as 'public revenues' produced by the same socio-economic phenomena embedded in private land value capture which could be channeled into social urbanization programmes via the Urban Development Funds.

8.10 We are also aware that in view of the automaticity of licensing buildings to comply with zoning and construction regulations under the law and, in the majority of cases, the existence of what can be termed antiquated 'notarial' structures, some Brazilian cities have for many years managed 'virtual portfolios of urbanistic and counterpart obligations'. The latter 'obligations' have sometimes consisted of donations of land for road widening; laying down basic infrastructure in urban land-parceling projects; building schools and public amenities - all of which absorb part of the revenues originating from land value capture. One of the remaining tasks of land capture management policy is to identify these resources, measure them and direct them towards more effective targets.

8.11 Finally, increasing the availability of serviced land in urban expansion areas (a vital consideration in any policy aimed at reducing land prices for low income populations) cannot be further delayed. In this respect, *consortiated* action modalities based on incorporating land valorization into the development of large-scale urban projects - as an alternative to the classic modalities of a direct subsidy for poor families - are gaining prominence in the Brazilian urbanistic culture and normative framework. Capital invested in infrastructure can be recovered by means of state operation of *land valorization generating variables* such as expropriation of rural land at compatible prices or the re-parceling of the plots involved, the calculation of occupancy rates and assessment of building potential subject to legal building waivers (*outorga onerosa*).

8.12 The resulting cost-saving, reflected in the final price paid by the purchaser of the plot, could equal the price at present normally paid to the owner of the land in the informal low-income market - a price which is based upon the *expected benefits* accruing from future urbanization works to be undertaken by the municipal authorities.

Urban Land Value Capture

Conceptualization

8.13 Urban land value capture represents a determination by the public authorities to recover (as public revenue) profits accruing from urban land value increments. The 'market' normally allocates these increments to private property owners (not necessarily perverse or antisocial), but the initiative by the public authorities aims at intervening in this process by transferring the increments for the benefit of the community at large.

8.14 This initiative aims basically to restore a previous situation. Despite the fact that these increments can be considered to involve both past and future (for example to recover land value increments that could have been - or are *de facto* or potentially - incorporated in particular properties), the situation has in fact been created by the market, requiring intervention by the public authorities. Intervention by the authorities might be needed for a variety of reasons but including primarily: (i) the concept that incremental values are a perverse structural feature of the land market; and (ii) acknowledgment that action needs to be taken to remove impediments to the proper functioning of the market. This means above all that the subject of land value capture can be potentially appropriated by different currents of economic thought. Indeed it could be developed on the basis either of 'interventionist' or 'free market' theories.

8.15 This idea lends itself to two interpretations. The first postulates that all economic revenue from land represents value capture. Any portion of the value of the land of a given property, whether it refers to land value increments accumulated in the past or to anticipated increments, would be classified as liable to value capture for the benefit of the community as a whole. An alternative interpretation of the term 'urban land value increments'

as a target for recovery by the public power, takes into account the increased value (or valorization) accruing to pieces of land undergoing a process of urbanization and more specifically the portion of that valorization that has been received free of charge by the owner of the land without him having to contribute any effort.

8.16 Given that in practice it is not feasible or appropriate in political or administrative terms to capture all the revenue, or because the interpretation usually adopted is the more restrictive of the above two, the issue takes on a more general meaning: *recovering for the community those socially agreed portions of urban land value increments arising from activities undertaken by the public sector in the name of the community.*

8.17 From this more general interpretation, a series of value capture instruments can be especially designed to secure a greater or lesser (or a more generic or more specific), portion of urban land increment value 'generated' in the course of the urbanization process. In this way, different value capture instruments can be used to address the different components or groups of components that comprise the value of a piece of land (Furtado, 1999). The range of instruments includes the property tax⁸⁵, which is charged without distinction on all the components that make up land values and, more recently, two new instruments designed to recover value increments based on a definition by the public authorities of the exploitation potential and uses of urban land. Instruments also include those that target more specific situations, as for example the 'betterment levy' (*Contribuição de Melhoria*) or the taxes imposed on real estate profits.

8.18 Two ways in which the public authorities can address the process of urban development and increase the economic yield of land are (i) to undertake infrastructure and urban services works, traditionally accepted as being closely associated with urban property value increments, and (ii) to acknowledge the recent impact on land prices occasioned by administrative and urban-related decisions regulating land use by owners. However, the different formulae used by the corresponding instruments do not always reflect merely the portion of the land returns in question. On the contrary this can have deeper origins (and consequences).

8.19 Based upon the ethical proposition that 'everyone should be compensated solely for his own effort'⁸⁶, the situation arises where land value increments which are not the product of individual efforts are undeserved, so this incremental value must therefore be returned to the community. In Henry George's view, the yield of a given property depends solely on community effort: 'Consider what yield actually is. It does not grow spontaneously out of the ground; it is not the product of anything the owners might have done. It represents a value that is created by the entire community. Let us allow owners to have everything that land ownership would give them in the absence of the rest of the community (1992 [...] . p.366).

8.20 This is not however the only way in which this proposition is understood in the area of public finances and taxation principles. Another current of thought is represented by Edwin Seligman (1977, cited in Macon and Mañon [1925], p. 5): 'The theory of betterment charge or assessment in line with the benefit is very simple. It is based upon the almost axiomatic principle that if the government, having carried out some positive action, confers upon the individual a special and measurable advantage, it is only fair in the interests of the community that the individual should pay for it'.

8.21 This alternative view must be approached with care to avoid the ethical principle being transformed from the axiom 'everyone should be compensated solely for his own effort' to 'everyone should be responsible for his own costs'

8.22 In this debate, two criteria govern the theory and practice of this area of taxation: that of *benefit* and *capacity to pay*. As regards the first of these, there is an immediate relationship of barter (ie: swapping taxes for benefits) between the taxpayer and the authorities. In the second, taxes must be charged in accordance with socially acceptable rules and not as the direct result of absolute benefits received (Musgrave, 1959).

8.23 It is our understanding that if the idea of land value capture is based upon the principle of *compensation*, the basis on which the whole subject is founded - the principle of *distribution* - is completely lost. By

⁸⁵ This refers more specifically to the portion of the land tax normally contained in the property tax (*imposto predial*).

⁸⁶ In capitalistic urbanization this proposition cannot be dissociated from 'the capitalist ethic'.

‘distributivity’, we mean the result of an intervention activity by public sector authorities aimed at returning to the community excess yields considered to belong to the community and that are likely to remain in private hands.

8.24 Another important point worth emphasizing is that the principle of *distributivity* (to restore previous distribution) must be understood as different from the notion of *re-distributivity* (to alter previous distribution). This latter concept also relates to our subject generally and assumes particular relevance in the Latin American context. However, it must be understood here as being one of the possible goals of a policy which highlights urban land value capture and not as the principal component of such a policy.

8.25 This distinction is needed because the distribution procedures as defined above, affecting the way in which land value increments are appropriated, do not embrace re-distributive activity. In other words, this action does not alter *per se* the way in which land incremental values are traditionally divided up. Understanding that incremental land value capture is fair because it enables the redistribution of special privately-allocated advantages, is something that cannot be assessed without addressing a number of questions that involve, *inter alia*, how special advantages are indeed allocated.

8.26 Marked differences exist between viewing the subject of land value capture as a means of facilitating the free operation of the urban land market or, alternatively, as an ‘intervention element’ applied to a land market with one outstanding feature: structurally unjust distribution of incremental values.

8.27 From another standpoint, we acknowledge that incremental land value capture, if carried out in a systematic way, involves reduced opportunities for excess funds to be generated. At the same time, by restricting the speculative component of the urban development process, it contributes to establishing the basis for more socially just urbanization.

8.28 It is worth noting that the subject does not signal a particular line of action for either restricting the ‘generation’ of land value increments or bolstering it. Urban land value capture policies aimed at restricting the ‘generation’ of these increments can sometimes incorporate specific projects that *de facto* encourage it. One example of this approach is the rehabilitation of blighted areas of cities. For each of these city projects, different instruments or groups of alternative instruments exist, the selection and management of which involves judgments and decisions of a technical and political nature applied to each specific case.

Theoretical And Historical Aspects Applied To Brazil And Latin America

8.29 Historically the development of the idea of land value capture is associated in Latin America with a specific instrument known as the *Contribuição de Valorização/ Contribuição de Melhoria (CM)* - a mechanism designed to tax value increments incorporated in the legislation of the majority of Latin American countries. It aims to capture a portion of the special benefits (land value increments) arising from public investment in infrastructure and public services in order to provide funding for these investments.

8.30 Even given this limited definition, the application of incremental land value capture has been surrounded by controversy and restrictions. Political influence wielded by property owners together with technical (and frequently legal) drawbacks involved in correctly assessing the land values have been identified by academics and government practitioners as undermining its application in many countries. Colombia is perhaps the only case that has an established tradition of using the instrument, but even there it has aroused serious controversy (Jaramillo, 2001).

8.31 However, between the two extremes of total value capture and recovery of part of the costs of public works, it has to be acknowledged that the subject has entered the Latin American mainstream, embracing a range of instruments from the most traditional such as the standard property tax to a series of *ad hoc* and localised initiatives, as well as efforts to elaborate more inclusive instruments.

8.32 In general terms it can be said that the subject and its policy implications in Latin America have been characterised by weak implementation of land value capture instruments, considered on the one hand the lack of

resources for financing provision of urban infrastructure and services and, on the other, the substantial land valorization that has been a feature of cities as the result of rapid urban development.

8.33 The importance of the subject however is not limited to the use of these instruments and their potential for assisting achievement of specific urban policies, or for simply resolving an ethical question. A clearer definition of the relationship between land value increments and activities undertaken by public authorities is, within the Latin American reality, a necessary step for addressing in a more integrated manner one of the basic problems of urbanization in Latin America: how to finance urban infrastructure and services for the low income population.

8.34 Bearing in mind the wealth disparities and the problems of access to urbanized land in Latin America and its spatial fallout typified by the division into affluent urbanized city centres (for the few) and poor services-deficient peripheral areas (for the majority), development of policies and land capture instruments for Latin American countries cannot be considered separately from urban policy targeted on the reduction of socio-spatial inequalities. Moreover, it is important to consider not only relative differences but also the absolute differences in the provision of public infrastructure.

8.35 In order to achieve reductions in the huge existing inequalities, it is vital to undertake direct actions focused on altering the present distribution of land values. This means that, while not necessarily involving the idea of recovery of land values, the concept of redistribution must be specifically incorporated in the development of distributive policies in Latin American countries.

8.36 This structural necessity contrasts with the close link that has been established in Latin America between the idea of land value capture and the CM instrument. Some observers criticize the way in which these charges are implemented in the Latin American version, disregarding the fact that one of the main objectives of the taxation system is income distribution, a factor considered to be 'especially important in Latin America where wealth and income gaps are so wide' (Ward, 1994), while others defend the argument that the charging system is structurally incapable of effecting redistribution. Other observers have pointed out that the mechanism is likely to become disassociated from the distributive principle to risk becoming simply a practical way of financing the costs of public interventions which are not necessarily always in the interests of the community at large.

8.37 In countries with substantial income inequality, undertaking projects financed with land value capture resources will not in principle be redistributive because the presupposition of their viability is the preexistence of '*capacity to pay*' by the people affected. It can only be said that within the overall context of urban policy, value capture has a structural significance that can improve the performance of an economy (global generation of wealth) in which income distribution is sought on the basis of a systemic group of policies. In other words, the redistributive character of a modality of public recovery of land values will never be resolved within the ambit of the modality itself. 'Redistributivity' of the land value capture system is in general only expressed within the context of urban and extra-urban policy as a whole and over the medium-to-long term.

8.38 On the other hand, rejecting the land value capture instruments does not contribute to a more equitable allocation of resources for public works. In order to overcome the contradictions arising between traditional use of land value capture instruments to increase fiscal revenues and the need to embed redistribution targets into such policies, the concept of land value capture must be viewed from a wider perspective, involving the establishment of links between three public actions: (i) the original public action (regulation, investment, etc.) forming the basis for land value increments; (ii) recovery (partial) of this value; and (iii) an action that determines the destination and use of the resources collected.

8.39 Thus the main challenge in the case of Latin America is to refine the ideas and preconditions for the more appropriate use of land capture instruments instead of rejecting them out of hand in favor of innovative instruments with which the population is not familiar and which are likely to encounter similar problems, or alternatively focusing effort on overcoming technical and operational drawbacks in the application of existing instruments.

8.40 This discussion reinforces the argument that, in Latin America, land value capture policies must be preceded by changes in the process of land value distribution in the widest sense, especially if redistribution is

regarded as a priority target in the urban policy agenda. This approach would assist fuller consideration in all public decisions associated with land value distribution of the various other ways in which the public sector can contribute to distribution, including :

- the design and collection of land taxes;
- the allocation of public revenues to urban infrastructure and services works;
- the application (or not) of specific land value capture instruments;
- the sharing out of revenue resources; and
- the definition of the uses and development rights of urban land.

8.41 This wider approach to the theme calls for an improved range of taxation and non-taxation instruments capable of ensuring appropriate distribution of receipts. These instruments may prioritize the revenue-raising aim (eg the Property and Urban Land Tax or the *CM*) or may focus on controlling certain aspects of the functioning of the land market eg: a progressive tax on empty land. The instruments could also be used for mixed urban and fiscal purposes as in the case of Brazil's *Outorga Onerosa do Direito de Construir*.

The following are examples of the use of some of the above-mentioned complementary instruments in Brazil.

Special Taxes on Vacant Urban Land

8.42 Various countries in the region possess taxation instruments enshrined in law that address the problem of prolonged retention by owners of vacant urban land. In certain countries such instruments are linked to incentive devices to encourage occupation of these areas (eg: compulsory building and/or urbanization).

8.43 In general the antisocial nature of vacant urban land can be seen basically from two angles. The first is retention of such land while the areas around them are being equipped with public infrastructure, leading eventually to private appropriation (by the owners) of the value increments. The other is the social perverseness of retaining unused land within a context of scarce public resources that could be used to provide urban infrastructure for all the land concerned.

8.44 The corresponding instruments aim to recover a portion of the privately appropriated value increments, subject to the owner's rights with respect to the social function of the property or, more generically, a combination of these two objectives.

8.45 One example in Brazil is the incentive policy aimed at making full use of vacant land that has been developed in the city of Porto Alegre towards the end of the last century. Constitutional measures covering intervention on unused or underused land were applied within the context of a restructured approach to real estate taxation, municipal budgetary regimes and other urban planning components aimed at the establishment of a broader municipal land policy.

8.46 The possibility of rejuvenating these areas, either as part of inner-city renewal schemes or as a practical manifestation of social housing policy, has more recently attracted substantial interest from local and even national governments, particularly in the context of the regeneration of large Latin American cities. Concrete examples of initiatives in this respect are Buenos Aires, Asuncion, San Salvador and the old historic centre of Havana. While this new approach involves extracting the potential of vacant land in areas that possess infrastructure, the subject of land value capture in this context assumes a wider significance - involving the mobilization, participation and public management in the creation and distribution of land value increments arising from the urban projects undertaken on such land within the cities.

8.47 In Brazil, the progressive land tax is accompanied by other alternative mechanisms such as compulsory land parceling and building/expropriation, both paid for with public debt bond issues.

The *Outorga Onerosa do Direito de Construir* ('*Onerous Granting of Building Rights*')

8.48 This instrument consists of a reinterpretation of the classic notion of *Solo Criado* (“Artificial Land”, based on the separation of land and building rights), under which the person or company requesting a building permit is obliged to pay a proportion as a counterpart sum for exercising the right to build over and above the basic coefficient fixed by law. The latter can apply to the whole city or can vary according to the region, within the maximum coefficient (also fixed by municipal planning regulations).

8.49 Although widely accepted as a mechanism for distributing the obligations and benefits of urbanization, the OODC still excites theoretical controversy on account of its predominant fiscal character or for being viewed as a spur for urban land ordering. Although it is admitted that land capture value may not be initially returned in terms of anticipated increased resource volumes⁸⁷ it nevertheless has strategic importance in terms of affirming the social function of urban land as well as the incorporation of economic aspects into the culture of urban management.

8.50 Other instruments based on the notion of use and building rights according to national urban legislation are the *Outorga Onerosa de Alterações de Uso do Solo* (“Onerous Granting of Legal Land Use Change”), the *Transferência de Potenciais Construtivos* (“Transference of Development Rights”) and the *Operação Urbana Consorciada* (“Urban Operation Consortium”).

Other Instruments

8.51 Completing the ‘portfolio’ of instruments that are available in Brazil directly or indirectly associated with land value capture, traditional tools exist such as expropriation and a number of others with which Brazil has had experience, eg: the ‘Areas of Special Social Interest’. Recently-introduced instruments in federal law concern the regulation of urban policy (City Statute, 2001) such as the real estate consortium (*consórcio imobiliário*) and the right of preemption. It is worth noting that the latter two, plus other instruments enshrined in the City Statute, propitiate urban income redistribution policies but most definitely do not guarantee them.

8.52 Finally, it is worth drawing attention to the failure to take into account other international mechanisms - in the Brazilian normative framework or indeed in actual practice - parts of which could probably be usefully employed to formulate a system aimed at protecting less privileged population groups in our societies. Examples are ‘Tax Increment Financing’, ‘Inclusionary Zoning’ and ‘Land Readjustment’.

Experience In Latin America And Possibilities In Brazil

Basic Chronology

8.53 Although fundamentally associated with the formulation of *contributory* mechanisms to be applied to landowners in order to raise funds for executing public works, land value capture in Latin America presents interesting historical precedents, involving different examples and formats as well as different types of applications resulting in varying degrees of efficacy.

8.54 Taxation aimed at land value capture was instituted in the continent in the 1920s. Until then, land value capture initiatives for financing public works were confined almost exclusively to the domain of companies holding concessions to provide public services. Various historical studies carry accounts of the close relations that existed between *Light*, the biggest public services concessionaire (energy and transport) operating in Brazil at the time and landowners with property in areas served by that company’s expansion plans. In Rio de Janeiro, the then capital of Brazil, two access tunnels linking the main city to the new neighborhood of Copacabana (facing the ocean) were built, for example, by *Light* in the period 1890-1910.

8.55 Between the 1920s and 1940s, laws referring to land value capture were introduced in Argentina, Brazil, Chile, Colombia, Mexico and Venezuela. The legal framework for these instruments was based on the requirement to raise revenue from taxes, against a background of rapid urban modernization and a range of

⁸⁷ In Curitiba, where its application is regarded as traditional and consistent, revenue collected as the result of acquired building potential was only about R\$21 million between March 1991 and November 2002.

distributive principles associated with social reform. There was no initial (or subsequent) consensus regarding the basic taxation criterion ie: whether taxes should relate to the cost of the public works or to the incremental value of the property concerned. The instruments appeared to be of a hybrid type, which led to disputes about their significance and desirability. Shortcomings in the application of such laws contributed to undermine the value capture instrument, limiting it to *ad hoc* applications.

8.56 This was also the period when substantial projects were brought on stream to upgrade whole city centres. Inspired on the Parisian model, Latin American capital cities such as Buenos Aires and Rio de Janeiro undertook the building of impressive boulevards. In Rio de Janeiro, the resale of incrementally valued land was used to recoup the cost of expropriation and public works to make way for the new streets.

8.57 In the third quarter of the 20th century, the concept of value capture tended to be forgotten. In Brazil, as in several other countries in the region, the period of relatively easy availability of international loans was marked by the retreat of the concept of land value capture. At that time, public works began to be executed with loan capital aimed at creating urban infrastructures to underpin the economic development of the countries concerned.

8.58 At the same time, the urban policy agenda became increasingly directed towards the need to provide housing and public services. The theme of land value capture by public authorities began slowly to return to prominence in the face of the alternative of continued private appropriation and the idea/aim of controlling undesirable features of the land market took root. The debate about this began in the 1960s throughout the region, but it was not until the 1970s that it came to the forefront of the public agenda, when instruments were finally introduced in the legislation of a number of countries, including countries not traditionally involved in the subject such as Peru and Ecuador. In Brazil, steps were taken to create value capture mechanisms under the aegis of urban legislation. These were subsequently embodied in the Municipal Master Plans defined by the new Federal Constitution of 1988.

8.59 At the end of this period, the subject of value capture reappears in a number of countries in its original version, with renewed attempts to define revenue-raising charges. In some countries, recrudescence was marked by the drawing up of new instruments targeted on controlling land use. The subject effectively moved back into the mainstream of urban planning, whereas previously it was confined to the public works and fiscal sectors. In Brazil, the decades-old cycle, which began with the 'Solo Criado' proposal in the *Carta de Embu* in 1976, and was enshrined 25 years later in legislation passed under the Federal Law known as the City Statute (*Estatuto da Cidade*), came to an end.

8.60 In the 1990s, the demands of the globalized 'services economy' brought about profound changes in the management strategies of cities. Assailed by low economic growth, forced public spending squeezes and spiralling inequality and informality, large cities began to adopt strategic planning models aimed at 'competitive integration' of the big cities in the world market for tourism, centralities and mega-events.

8.61 The globalizing wave at the turn of the millennium was marked by the appearance of large urban renewal projects based on a combination of public (appropriation of de-activated areas previously used for port, railway and military purposes) and private resources. At a time of increasing public works projects, the fiscal squeeze again raised the question of land value capture as a source of financing. The *trend* is that incremental value capture management will cease being an instrument for redistributive land management to become the timely medium for mobilising resources not tied to debt, either through concession of services or through anticipated capture by integrating real estate value increments with the financing schemes for large urban projects.

8.62 In summary, the historical record of urban land value capture in Latin America indicates that this is a question that can be approached from many different standpoints. There is no doubt that the best and most typical example within the region is the *Contribuição de Melhoria*, developed in specific ways in each of the countries. This charge/fee-based instrument used primarily as a tax revenue raising device has conditioned, as well as restricted, consistent development of the subject in the Latin American countries.

Experiences

Value Capture in Public Projects: Partial Successes, Fortuitous Outcomes and Lost Opportunities

8.63 A paradigmatic example of the application of value capture for the financing of urban renewal projects during the first half of the 20th Century was the construction (from 1940) of the *Avenida Presidente Vargas* in Rio de Janeiro. This is a 100m wide street providing access to the major business quarter of the city. The law that sanctioned the project took account both of anticipated costs of the required expropriations as well as the forecast revenue likely to accrue from the sale of the new plots lining or near to the new avenue. The operation involved issuing bonds called Urban Obligations (*Obrigações Urbanísticas*) with a sale value equal to the prefixed value of the new plots to which they were linked and given as guarantee for a loan from the Bank of Brazil by the Rio de Janeiro municipal authorities. The Vargas Avenue was built more or less in accordance with the forecast plan, but there is no record of the arrangements or the financial results of the operation.

8.64 The principle behind the opening of this avenue is the same later (1963) established by the *Organisation of the Regulating Plan for the Municipality of Buenos Aires* which recommended the prior acquisition by the State of land needed for development in order to avoid public works benefiting solely the owners of properties within the area of influence of the new Plan (Clichevsky, 1990).

8.65 A year later in Venezuela, a contemporary version of the well-known *Informe Lander* illustrates how the idea was applied. In order to build a major avenue in Caracas, the Venezuelan Ministry for Public Works proceeded to expropriate adjacent strips with the aim of capturing in advance the incremental value of the land. In the event, the overall aim was achieved: the price paid as compensation for expropriation did not represent the full potential incremental value of the land, which enabled part of the benefit to be appropriated by the State. Furthermore, some of the land ended up being transferred to the Workers' Bank (*Banco Obrero*) to be earmarked for social housing construction. In this way at least some of the captured funds from the land involved in building the avenue found their way to the intended beneficiaries.

8.66 This method of value capture does not always fulfil the intentions of the public authorities and can occur in a haphazard manner. In Santiago de Chile for example, a project based on the same idea as in Venezuela (selling land left over from expropriation) was set in motion for the *Nueva Providencia* neighbourhood in 1974 - one year after the military coup. This was done despite the Government Junta refusing to condone any interference by the State in the land market and the explicit rejection of the Prefecture of Santiago's consultative approach to the national government regarding the possibility of introducing a value capture mechanism (Sabatini and Caceres, 1998).

8.67 In Nicaragua, the model appears in an indirect form in the urban reform schemes implemented by the revolutionary Sandinista government. The Law of Expropriation of Waste Urban Land (*Ley de Expropiación de Áreas Urbanas Baldías*) dating from 1981, fixed compensation for owners based on out-of-date registered values, and the expropriated land was given free to poorer people or transformed into parks and other public spaces. A land value increments law (*Ley de Plusvalías*) was circulated within the Nicaraguan Ministry of Housing and Human Settlements (*Ministerio de Vivienda y Asentamientos Humanos*) but failed to reach the discussion stage (Morales, 1998, p.4.).

8.68 The history of appropriation of urban land whose value has been incremented as a result of public projects is full of examples of lost opportunities. In the Metropolitan Area of Buenos Aires, during the 1980s, public land prone to flooding around the new *Camino del Buen Ayre* increased in value from \$2 to \$20 per square meter after it had been sold by the State to a foreign-owned supermarket chain for building a shopping center (Clichevsky, 1990).

8.69 In 1995, 20 years after the inauguration of the Number 1 Line of the Rio de Janeiro metro, the *Companhia do Metropolitano* undertook an assessment of the potential for capturing the value of what remained of the expropriated land. The measure had not originally been negotiated as a way of recovering the costs of the building of the Metro. The potential value of the main pieces of land was estimated (1995) at \$US127 million.

However, no further progress was made and the issue became submerged in legal bureaucracy. Also in Rio de Janeiro, the expropriation exercise planned for the construction of the Red Line (*Linha Vermelha*), a super-highway linking the high-income neighborhood of Barra da Tijuca to the International Airport via the suburban areas, failed to take into account appropriate utilization and resale of the expropriated land parallel to the highway - some of which eventually became occupied by slums.

8.70 It is worth mentioning that in Brazil the application of the above model, facilitated by the so-called 'expropriation by urbanistic or extensive zone', arouses to this day much legal argument in view of the potentially speculative position exercised by the State. For many legal experts, nevertheless, the resale of land whose value has increased as the result of public works - providing this is projected as part of the expropriation arrangements - is basically a successor to the *Contribuição de Melhoria* for financing public works.⁸⁸

8.71 Finally, attention should be drawn to a value capture modality much in evidence in Europe and the United States during the last quarter of the 20th century and which gained prominence in Latin America at the turn of the millennium: the major upgrading of areas in or near to downtown areas containing public or 'concessioned' land. The best example of this in the region is the *Puerto Madero* development in Buenos Aires.

Ad hoc Mechanisms - Linkage and Urban Operations in Brazil

8.72 The 'Linkage Operations' are seen by many Latin American practitioners as the most successful Brazilian experiment (or at least the most eloquent) regarding effective implementation of the concept of value capture. In general, the operations consist of special permits requested by the interested parties for *ad hoc* waivers to the urban regulations in force at the time to be granted to developers or others in exchange for building or paying for social housing or other urban amenities which are normally a public sector responsibility.

8.73 The instrument was proposed and applied in different parts of the country in a variety of ways. The criteria established for *ad hoc* modifications to the use and density norms varied from technical criteria such as the requirement to merge the works with available local infrastructure, as in the case of Campinas project in the 1990s (Semeghini, 1996) to more subjective criteria such as the 'urbanistic harmony' demanded in the case of Rio de Janeiro (Compans and Oliveira, 1996). These various appropriation schemes often obscure the real purposes underlying utilization of the instrument.

8.74 In São Paulo, the Linkage Operations Law established since the eighties a direct relationship between the concession of 'exceptional use and land occupation rights' in areas occupied by slums and the construction of new dwellings under the responsibility of private developers.

8.75 In the Shopping West Plaza Linkage Operation which was planned to occupy three blocks in the Western district of the city, the developer during the first stage of the development tripled the permitted use area, paying a counterpart sum for constructing 475 social housing units (*Habitações de Interesse Social*). During the second part of the negotiations involving the construction of walkways over the public road to provide a link between the three blocks, the developer contributed the equivalent of a further 335 HIS valued at almost \$10 million (Sandroni, 2001).

8.76 In Porto Alegre, a variation of the Linkage Operations was developed called *Operações Concertadas* ('Combined Operations') under which conditions were laid down and commitments entered into for the approval of the city's 'Urban Impact Special Projects'. A typical example of this was the Cristal Shopping, a mall covering over 200,000 square meters in an area close to the Jockey Club, clandestinely occupied by over 700 families living in extremely precarious conditions. In accordance with the Term of Adjustment, the developer was obliged to construct infrastructural and road works as well as resettle 717 families in a new area (the development to include a school).

8.77 In Rio de Janeiro, the Linkage Operations have, since the outset, been basically devices to secure waivers to the Building Regulations (the 'right to build') awarded by the Rio Municipality in return for a *cash* counterpart

⁸⁸ Di Pietro, Maria Sylvia Zanella, *Direito Administrativo*. Atlas. São Paulo, 2001 p. 168-9.

contribution directly payable into the Municipal Urban Development Fund. In only one year of its operation, this instrument provided the FMDU with around 40 million reais, producing an increase of 20% in the budget of the Municipal Housing Secretariat which was at the time involved in launching the *Favela-Bairro* ('slum-neighborhood') Programme.

8.78 The Linkage Operations have two distinct approaches. The first concerns large-scale private sector projects which can be regarded as of strategic interest by the Municipality itself and whose positive and negative impacts transcends the capacity of local legislation to judge in anticipation how land will be used and occupied in the future. This type of Linkage Operation requires the public sector to adhere to special measures regarding urban analysis and economic evaluation with the resulting *ad hoc* imposition of counterpart charges. If well-managed by the public sector, these operations can exercise beneficial effects on the urban environment and are generally welcomed by society. In a number of cities, 'Urban Operations' are now being approved with respect to large projects undertaken in partnership with the public authorities, although the first efforts with the new instrument are likely to demonstrate that the details of normative frameworks need regular refinement.

8.79 The second consists of the routine practice of awarding legal exceptions for projects of a *non-strategic* type that possess the capacity for producing cash counterpart funds for the Urban Development Funds. This approach implies the creation of 'extraordinary' value increments beyond those established by market prices based upon current legislation, which the State then shares with private developers. This is basically a device which results in society giving up urban planning standards chosen by society itself in exchange for improved housing conditions for low-income groups. In addition to being widely criticized on account of its broad subjective and even arbitrary character, and always applied to high value areas of the city, these operations have their resource generation capacities restricted by the level of real estate activity, by the relative rigidity of current legislation and, finally, by the perceived low level of legitimacy and political acceptance.

8.80 In the 1990s, the Linkage Operations slowly began to give way to the *Outorga Onerosa do Direito de Construir*, an instrument which became enshrined in Brazil's City Statute as a typical value capture tool within the context of urban administration. In the Master Plans of all the metropolitan capitals and larger Brazilian cities, the *Outorga Onerosa* has now become the main source of funding for the Municipal Urban Development Funds. As for large-scale projects, the process of implementation and management has also acquired a normative framework in the City Statute with the introduction of the instrument known as Joint (in Consortium) Urban Operations (*Operações Urbanas Consorciadas*).

The Valorization Charge

8.81 The most constant element in the history of land value capture in Latin America is undoubtedly the Valorization Charge or *Contribuição de Melhoria* and similar mechanisms. Nevertheless, with the well-known exception of Colombia, the history of this charge in the continent has experienced more setbacks than successes. In spite of having been accurately defined in the majority of national bodies of law, the CM has rarely been put into practice.

8.82 In Latin America, the CM recalls the two concepts of *betterment* and *special assessment*⁸⁹ based upon the understanding that payments of the cost of public works by the beneficiary owners is a simplified but generally difficult-to-measure form of value capture. It is expressed in the 'recurrent clause' according to which the individual share (*cota-parte*) of the cost of the work must be limited to the valorization of each affected property.

8.83 Apart from its artificiality, this conjugation contains an obvious contradiction: if cost recovery is justified by the difficulty of measuring valorization, this could not be calculated as representing a ceiling on the amount of the contribution. Some analysts have criticized the CM as not really being an instrument of land value capture

⁸⁹ The concept refers to a special appraisal of the properties in the event of public works being carried out, as distinct from the generic assessment used for charging property taxes. It is interesting to observe that this distinction is absorbed in certain more up-to-date delimitations of the scope of these charges. The famous Proposition 13 case in California, determining the freezing of the property tax assessment, is based upon this distinction.

(Clichevsky, 1998; Morales, 1998; Jaramillo, 1997) given the inexistence of a direct causal, and necessary, relationship between the undertaking of a public work and the valorization of land.

8.84 Some of the most frequent doubts raised about the adoption of the CM are: the fact that the communities which are most likely to require public works are precisely those that have least capacity pay; the mismatch between the cost of the works and the valorization of the real estate, potentially a generator of under and over-taxation; the intergenerational and socio-spatial inequalities generated by the non-collection of the taxes on properties that have benefited in the past; the possibility of devaluations caused by interurban public works, and other factors (Sandroni, 2001).

Landmark Cases

8.85 The Ecuadorian *Municipal Regime Law* of 1971 is a good example of normative rigor. In addition to the *Contribución Especial de Mejoras*, mechanisms were created such as the *Impuesto Adicional al Solar no Edificado* and the *Impuesto a las utilidades de compraventa de predios urbanos y plusvalías de los mismos*. This latter addresses value capture by means of a progressive tariff table rising to 40% of the incremental value of real estate (Pauta, 1998). Despite these arrangements the costs of public investments in the municipalities have registered a low recovery level.

8.86 In Peru, the *Contribución de Mejoras*, established in legislation in 1981 and regulated in 1985, was not applied by the authorities until the appearance of the 'Metropolitan Program' of 1990. This experiment was regarded as successful because although it failed to generate significant resources (around 0.25% of the current revenues of the municipalities), cost recovery nevertheless covered between 20% to 50% of the expenditure on 30 public infrastructure works - roads, potable water installations, sewage and electrical energy supply in low-income settlements. In middle and high income areas the beneficiaries filed injunctions against the application of the charge which eventually led to the Program being discontinued. In 1993, the charge was replaced by the *Contribución Especial por Obras Públicas* which called *inter alia* for the prior acquiescence of the population liable to be affected. Since then, the instrument has not been used again in Peru (Calderón, 2001).

8.87 In Chile the land value increments charge, a cornerstone of Radical Party policy since the beginning of the 20th century, came to prominence in the 1920s along with the advent of the urban modernization of Santiago⁹⁰. By 1934, the 'Commission for the Regulatory Plan of Santiago' was proposing a charge of up to 50% of the value increments arising from the undertaking of public works. In 1940, a Parliamentary Bill proposing a tax on land value increments throughout Chile was presented but failed to prosper. A 1947 bill seeking to reform taxation recommended among other things introducing a tax on real estate 'overvalorization' with relation to other investments and a progressive charge on empty urban land. After 1952, the subject disappeared from view during the governments of Presidents Frei Montalva and Allende but made an *ad hoc* reappearance during the Pinochet era (Sabatini and Cáceres, 2001). In Venezuela, Luis Lander, a member of the Social Democrat party, presided over a Presidential Commission (1964) that proposed the introduction of a housing and urban/regional development policy targeted on the problems of tenure, scarcity, use and cost of land. The Commission's recommendations included instruments for capturing the land value arising from actions undertaken by the State, but the recommendations were regarded as an attempt to establish a socialist type of urban reform and were rejected even by senior members of the Venezuelan government. The pertinent urban legislation in Venezuela was in fact one of the broadest in the entire continent: instead of limiting contributions to public works costs it involved the payment of 75% of the land value increments arising from public works. It so happens that this legislation, created in 1947, involved an operational process of such complexity that no reports survive of its ever having been applied (Camacho and Tarhan, 2001).

The Colombian Exception

⁹⁰ Other manifestations of the influence of modernist urbanism associated with this subject can be seen in other large Latin American cities. The '*Agache Plan*' for example, presented for Rio de Janeiro in 1930, dealt with this point in a draft federal parliamentary bill.

8.88 Charging the CV (*Contribución de Valorización*) has been an uninterrupted practice in Colombia since it became law in 1921. Part of the explanation for its longevity was the notable ineptness of the central government to provide public services. This in turn engendered a special tradition of ‘*municipalismo*’ (municipal autonomy) in a Latin American context.

8.89 Jaramillo (2001) recounts the history of the CV in Colombia: the broadening of its application area from urban and rural localities (1921) to the capital Bogotá (1936) and later extending to ‘public services’ in general (1943), linking the values to be collected not to the basic costs of works but to valorization of the actual properties involved. A 1968 law established the framework for current legislation, extending general use of the CV to the whole national territory but linking again the value of the charge to the cost of the works, plus 10% contingency expenses and 30% for administration and invariably restricted to the estimated valorization of the property.

8.90 The high point of the history of this mechanism was in the late 1960s to the early 1970s. Indeed, even in 1980, revenue collected on a valorization basis still amounted to 27.7% of the municipal revenues of Medellín and 31.7% in Cali. Since then the tendency has been one of retreat in both absolute and relative terms compared with other fiscal resources and, in the case of Bogotá, in relation to the actual size of the city.

8.91 Among the possible causes of the mechanism’s waning popularity were the discontent caused by the imprecise methods for allocating the charge, the high costs of avoidance and the financial imbalances arising from collection delays and inflation. In the event, municipal authorities tended to apply the instruments in places where the payment capacity of local people gave rise to fewer protests – thereby contributing to accentuating socio-spatial segregation in the cities. While the Colombian CV experiment excluded the poor areas of the city, it was on occasions deliberately deployed as a way of dislodging long-standing occupants prior to large urban development projects. This happened in the case of the *Avenida de los Cerros* in Bogotá at the beginning of the 1970s (Jaramillo, 2001).

8.92 In the 1990s, when the need to carry out ambitious public works plans coincided with the lowest level of revenue collection in the history of the CV, the Bogotá administration decided to introduce a charge of a ‘non *ad hoc*’ type: the *Valorización por Beneficio General*, to be collected from all the real estate in the city, but using criteria combining anticipated valorization with the owners’ ability to pay. Between 1993 and 1998, collection of this charge in Bogotá amounted to 89% of what had been collected in the golden age of the CV - the five-year period from 1964 to 1968. This system, which was contested in the courts because it appeared to be a straightforward extra property tax, was nevertheless widely accepted possibly due to the evident beneficial connection between the charge and its results.

8.93 More recently, the Colombian system has involved the creation of the *Participación en Plusvalías*, a complementary instrument to the *Contribución de Valorización*, to be used in circumstances in which the latter cannot be conveniently applied. The PPV, awarded regulatory status in national legislation in 1997, makes a distinction between the revenue collected and the amount of state investment in situations where valorization is not the direct result of investments made, as in the case of alterations to urban legislation covering land use and occupation, and in situations where the valorization greatly exceeds the share of the property in the cost of a public work. The charge represents between 30% and 50% of the valorization on the basis of municipal authority criteria, with exemptions given for land earmarked for popular housing. Payment must be made when valorization is accounted for, eg: at the time properties are bought and/or sold, or when planning, construction and change-of-use permits are requested.

8.94 At present a new CV joint modality is beginning to be developed in Bogotá for a substantial group of major works (*Plan de Obras de Bogotá*) that will be designed and constructed between 2006 and 2017 over four three-year periods. These works include: (i) roads (ii) different level interchanges (viaducts or underpasses); (iii) pedestrian walkways; (iv) sidewalks; and (v) parks. In addition to criteria such as plot size, distance to the undertaking and the use of the property (higher charges for commercial properties), the socio-economic stratum (1 – 6) in which the property is classified will also need to be taken into account. Exemptions apply to plots classified in a low stratum, when also measuring less than a specifically determined area. The cost of this *Plan de Obras* is in the region of US\$950 million. In practical terms, this begins to approximate a *Contribución por*

Beneficio General but in this case charges are calculated on a public work by public work basis and in due course, when all the benefited areas are juxtaposed, charging may be effected on an overall basis for particular properties.

Alternative Mechanisms and ad hoc Applications

8.95 Variations of the *Contribuição de Melhorias* have been applied in different countries of the region, with some success. Examples include the ‘community street-paving’ programs, under which beneficiary communities share the cost of public works with the responsible authorities, obviously with the approval/consent of the whole community. Work is carried out on the basis of a signed community petition or a ‘Term of Commitment’, with payments in installments as work progresses (extended if the community is resource-poor). Generally applied in poor neighborhoods, these programmes have been acknowledged as being relatively successful in Chile, Colombia, Peru and Brazil. Their success can be partially ascribed to the fact that the CM mechanism makes it possible to undertake works that would be difficult to execute in any other way. In short, the beneficiaries understand that the charges represent an opportunity and not a burden.

8.96 A classic case of application of the CM in the financing of major works is the *Fondo permanente para la ampliación de la red de subterráneos de Buenos Aires*. Created in 1987, this Fund derives its income from the collection of a range of special charges network, including a specially-formulated *Contribución de Mejoras* for areas considered to fall within the direct ambit of the projects (Clichevsky, 2001).

8.97 A typical example of the application of the CM for promoting house-building is that of *El Hatillo*, a municipality in the metropolitan area of Caracas which suffered from serious access problems. Following the rejection of planning applications for siting new developments in the area, developers eventually signed an agreement with the Prefecture making them responsible for financing the local road system in line with population growth in the municipality. The distribution of the cost of the works was imputed in the form of CM to the new housing units (Camacho and Tarhan, 2001).

The Brazilian Experience

In Brazil the first experience with the use of the CM was perhaps the ‘Paving Charge’ (*Taxa de Pavimentação*) created in São Paulo in the 1920s, based on the principal that the beneficiaries of public works should be deemed responsible for paying for the costs of such works.

8.98 In 1934, the CM appeared for the first time in the Constitution, based upon valorization generated by public works, but this was not repeated in the 1937 Constitution. It returned permanently to the 1946 Constitution and was reaffirmed in the 1988 Federal Constitution.

8.99 Despite its limited historic relevance in Brazil, particularly in the metropolitan areas, the CM has been applied in small and medium-sized towns, with results that have not yet been fully appraised. One of the few known cases is that of Guarujá, a tourist town on the coast of São Paulo state, which has used the CM to extend the paved road network. The procedures used included publication of an official announcement containing the description of the project, the budget relating to the works to be undertaken, the portion of the cost to be financed under CM, delimitation of the beneficiary area and the ‘benefit absorption factor’ for the different sectors of the area. A form of deed (*‘carné’*) was issued to beneficiaries after completion of the works. According to the rules, the value of the CM could not exceed the valorization of the properties concerned and, to ensure this, property surveys were conducted before and after the roadworks (Caldas and Silva, xxxxx).

8.100 In some municipalities a similar instrument is employed called the ‘Community Betterment Plan’ (a kind of contract signed between the Prefecture, potential beneficiaries, the construction company responsible for the works and the financing bank) for supplying community street-paving as described above but also for providing rainwater networks and public street lighting.

8.101 A recent major experiment was the Paraná Urban Program funded with IDB resources during the 1990s. This was managed by PARANACIDADE, a body linked to the Urban Development Secretariat of the State of Paraná which managed a substantial portfolio of public works in all the sub-regions of the State. As the result of

scarcity of funds which threatened to cut short the Urban Program, two measures were introduced: (i) inclusion of a clause covering an obligation to recover costs through the application of the CM and (ii) a detailed performance survey of the revenue collection system including recommendations for its improvement. Although revenue increased significantly after these administrative and institutional changes were implemented the results in proportional terms were not substantial. This implied that only the first measure (cost recovery) had any real impact. Cost recovery amounted to around 50% of the total charge-demands sent out. The case provides clear evidence that the obligatory nature of the application of the instrument does not necessarily produce effective results, given the existence of the various measures for avoiding it.

8.102 In summary, this instrument is enshrined in law but is not well known from a normative standpoint or in relation to the procedures and channels needed to ensure its proper operation. Despite the fact that it has been cold-shouldered, its constitutional validity has been reaffirmed by its explicit inclusion in the City Statute.

Using Land Value Capture Instruments For Financing Urban Infrastructure In Brazil

The Present Basic Infrastructure Deficit in Brazil and some Basic Ways for Dealing with it⁹¹

8.103 Brazil's accumulated deficit in basic housing infrastructure is currently estimated at around 12 million dwelling units. Of the existing units, 60% are precarious informal dwellings occupied by families with incomes of below 3 minimum salaries⁹². In the metropolitan areas (RM) alone this deficit amounts to 4 million units. The National Mortgage Bank (*Caixa Econômica Federal*) has estimated that year-on-year investments of around US\$4 billion are needed over a 10-year period to eliminate Brazil's housing deficit (construction, recovery and improvement of existing residential units together with satisfying the demand generated by demographic growth)⁹³.

8.104 In percentage terms, almost one third (32.09%) of permanent urban housing units lack one or more items of basic infrastructure (electricity, water, sewage and garbage collection). In the case of the slums (*favelas*), this proportion is even higher, at around 42%.⁹⁴

8.105 In the 15 largest metropolitan regions in the country (see table), around 2 million households receive monthly family incomes of less than three minimum regional salaries, 750,000 homes get between three and five minimum salaries and in 900,000 homes the monthly income is over five minimum salaries.

8.106 In absolute terms, the total number of units that obey the criteria of 'lack of basic urban infrastructure' is more or less in proportion to the population size of the metropolitan regions. The worst affected cities in this respect are Rio de Janeiro (absolute leader in the overall total and with the largest number of people with salaries of under 3 minimum salaries), São Paulo, Recife and Fortaleza.

8.107 In the population group that receives up to 3 minimum salaries per household per month, the six metropolitan regions of the Northeast lead in terms of the number of families that have no access to basic infrastructure items. In fact, this applies to over 60% of all the families in this low income range (Salvador – 68.63%, Greater São Luis – 68.19%, Fortaleza – 65.22%, Natal – 64.43%, Maceió – 64.24% and Recife – 61.86%). When the situation of families in the income range 'above five minimum salaries' income range is taken into consideration, the figures for the richest metropolitan regions are: São Paulo (32.70%), Curitiba (31.51%) and Porto Alegre (30.47%).

⁹¹ Based on data published in 2005, obtained by the João Pinheiro Foundation from the final data in the 2000 Census.

⁹² João Pinheiro Foundation, 2005.

⁹³ Serpa, Claudia, 2004, p.24.

⁹⁴ The census data for 'abnormal' dwellings (*favelas*) acknowledges this type of housing to be undersized. According to the census surveys, from a total survey of 1.644.267 domiciles in this category, 607.429 lack basic infrastructure.

Table 8.1 Housing Deficit I Brazil

Region	State	Metropolitan Region	FAMILY INCOMES (IN MINIMUM SALARIES)						TOTAL absolute
			Up to 3		Between 3 and 5		Over 5		
			absolute	percentage	absolute	percentage	absolute	percentage	
Southeast	RJ	M.R. Rio de Janeiro	333.003	50.89	139.953	21.39	181.368	27.72	654.324
Southeast	SP	M.R. São Paulo	250.707	43.87	133.898	23.43	186.861	32.70	571.466
Northeast	PE	M.R. Recife	284.168	61.86	76.931	16.75	98.253	21.39	459.352
Northeast	CE	M.R. Fortaleza	217.346	65.22	53.587	16.08	62.329	18.70	333.262
Southeast	MG	M.R. Belo Horizonte	115.758	54.06	49.110	22.94	49.246	23.00	214.114
Centre- West/Southeast	DF/GO/MG	Brasília (DF & Environs/RIDE)	104.534	50.80	43.138	20.96	58.115	28.24	205.787
North	PA	M.R. Belém	105.797	54.74	36.308	18.79	51.166	26.47	193.271
Centre-West	GO	M.R. Goiânia	91.397	47.94	47.557	24.94	51.694	27.11	190.648
Northeast	BA	M.R. Salvador	124.149	68.63	29.096	16.08	27.659	15.29	180.904
South	RS	M.R. Porto Alegre	74.258	45.60	38.975	23.93	49.623	30.47	162.856
Northeast	AL	M.R. Maceió	90.363	64.24	21.082	14.99	29.221	20.77	140.666
South	PR	M.R. Curitiba	48.801	44.80	25.809	23.69	34.328	31.51	108.938
Northeast	MA	M.R. Greater São Luis	71.143	68.19	16.629	15.94	16.560	15.87	104.332
Southeast	ES	M.R. Greater Vitória	51.733	58.06	18.777	21.07	18.590	20.86	89.100
Northeast	RN	M.R. Natal	47.686	64.43	12.912	17.44	13.419	18.13	74.017
		TOTAL 15 RMs	2,010.843		743.762		928.432		3,683.037

Source :

João Pinheiro Foundation (FJP), Statistics and Information Center (CEI)
Housing Deficit in Brazil – Selected Municipalities and Geographic Micro-regions.
Notes:

(1) Urban houses and apartments lacking one or more infrastructure service:
Electricity, general water supply network, general sewage network or septic tank, and garbage collection.

8.108 Value capture arising from the provision of urban infrastructure in areas of ‘incomplete settlement’ is an obvious candidate for financing the provision of basic services. Two basic ways of implementing this mechanism exist through: (i) application of the Betterment Levy (*Contribuição de Melhoria*) an instrument provided by law to recover the costs of public investments benefiting property valorization, and (ii) the effective charging of the IPTU (the Urban Land and Property Tax) levied on the benefited properties.

8.109 These basic formats apply, at least in theory, to all urban areas in Brazil in which the housing deficit/lack of infrastructure is as follows (by income levels):

Table 8.2 Housing Deficit in Brazil

Housing Deficit In Brazil							
Selected Municipalities And Geographic Micro-Regions							
Lack of Urban Infrastructure according to Income Groups - 2000							
Grouped by: Region							
Region	MONTHLY FAMILY INCOMES (IN MINIMUM SALARIES))						TOTAL absolute
	Up to 3		Between 3 and 5		Over 5		
	absolute	%	absolute	%	absolute	%	
Center-West	778.867	50.84	325.716	21.26	427.264	27.89	1.531.847
Northeast	3.241.956	73.66	573.129	13.02	586.445	13.32	4.401.530
North	793.026	58.67	235.886	17.45	322.840	23.88	1.351.752
Southeast	1.503.668	52.67	598.490	20.96	752.559	26.36	2.854.717
South	915.898	49.44	404.263	21.82	532.528	28.74	1.852.689
Total	7.233.415	60.32	2.137.484	17.82	2.621.636	21.86	11.992.535

Source:

João Pinheiro Foundation (FJP), Statistics and Information Center (CEI), 2005
Housing Deficit in Brazil – Selected Municipalities and Geographic Micro-regions.

8.110 Although it is difficult to obtain reliable figures for an estimate to be made of the resources/funds needed to deal with this deficit, and given the lack of information regarding the potential for capturing incremental values on the basis of the two above-mentioned mechanisms, we nevertheless have managed, for the purposes of the present exercise, to arrive at a rough estimate of the size of the resources needed by viewing the number of households receiving a range of monthly incomes (as outlined in the foregoing tables).

8.111 As regards costs recovery, we reckon that the amount of funding needed is of the order of US\$2,500 (two thousand five hundred US dollars) per domicile or household⁹⁵. On this basis, a total of around US\$30 billion would be needed to provided basic services for 12 million domiciles.

8.112 We also considered the need to apply different ‘recovery bands’ for the different households in various income ranges in an effort to overcome one of the biggest drawbacks that has been detected in the *Contribuição de Melhoria* mechanism – the absence of an obvious ‘capacity to pay’ criteria by the poorer families involved. Using the average ‘recovery’ percentages - 20% for the income group under three minimum salaries, 40% for the group receiving between three and five minimum salaries, and 80% for households receiving above five minimum salaries - we arrived at the following approximate values:

⁹⁵ See observations and surveys regarding this amount in Chapter 5.

Table 8.3 Estimate of Recovery Potential of Costs for Putting in Basic Infrastructure

Estimate of recovery potential of costs for putting in basic infrastructure, through the application of progressive recovery charges.					
Income bands	All domiciles	Funds necessary (in US\$)	Aliquots for cost recovery (in %)	Total potentially recoverable (in US\$)	Other resources necessary (in US\$)
Up to 3 m.s.	7,2 Mi	18,0 Bi	20%	3,6 Bi	14,4 Bi
3 to 5 m.s.	2,2 Mi	5,5 Bi	40%	2,2 Bi	3,3 Bi
Over 5 m.s.	2,6 Mi	6,5 Bi	80%	5,2 Bi	1,3 Bi
TOTAL	12,0 Mi	30,0 Bi	-	11,0 Bi	19,0 Bi

8.113 The ‘recoverable potential’ through applying these progressive recovery aliquots would be somewhere of the order of 37% overall, with a residue of 63% of the resources to be financed from other sources.

8.114 Measures for ensuring payment of IPTU would also play a key role. Although it is not yet been possible to make a clear connection between households that lack basic infrastructure and those that do not pay IPTU (ie: housing units not registered in the municipal housing records), it is nevertheless feasible to consider an amount flowing in from IPTU contributions, either as a result of the inclusion of new households in the ‘charging universe’⁹⁶ or by bringing the official property register up-to-date in due course, at least as far as the properties that are already on it are concerned.

8.115 Assuming the existence of a stronger correlation between family income and the value of the properties, and applying average IPTU annual values of respectively US\$30, US\$50 and US\$80 for each of the three income groups⁹⁷ under consideration, we would reckon on around US\$534 million in potential annual revenue.

8.116 These estimates, although necessarily superficial, at least provide an idea of the size of the problem at hand. It is clear that Brazil’s prodigious housing shortage would be extremely difficult to resolve by applying straightforward property value capture to the properties under consideration. Moreover, it must be acknowledged that this is only part of the problem: there can be no doubt that changes are called for in the actual processes that drive ‘urbanization’. These processes give rise to unfinished settlements and, in the absence of an over-arching official land policy, the trend towards more and more informal settlements is bound to result in an enlarged number of households lacking basic urban infrastructure.

8.117 For land value capture to assume a decisive role in the financing of urban infrastructure, we need to articulate a series of distribution and redistribution modalities regarding property incomes that have their roots in the urban dynamic. This involves the mobilization, recovery and management of resources arising from the valorization of land that is in the process of being urbanized.

Analysis of the Modalities of Land Value Capture in Latin America

8.118 This section deals with the distribution and redistribution modalities of land revenues based upon the data accumulated from the experiences of Latin

⁹⁶ Contrary to popular belief, the great majority of land and urban regularization programs do not charge IPTU by the benefited properties. See Chapter 5.

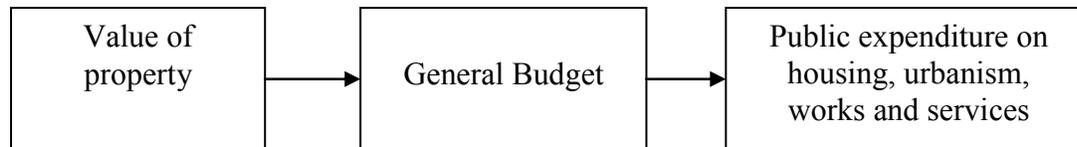
⁹⁷ Considering here the ‘rule of thumb’ IPTU values usually charged with relation to the values of urban properties.

8.119 American countries. It does not pretend to be an exhaustive list. Nevertheless, it seeks to analyze the main management modalities or formats concerned with urban land valorization in terms of administrative mechanisms, financial potential and efficacy conditions, in accordance with the following criteria:

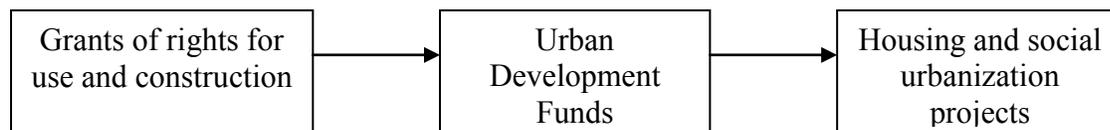
- The circumstances which produce a land value increment which is subsequently appropriated;
- The class or type of financial sub-head or administrative measure to which the corresponding financial outcome is associated;
- Its due application.

8.120 In accordance with this criteria, we propose below 8 basic management formats that can be applied to the valorization of urban land.

Management format (1) - IPTU



- This is the most commonly known format - emphasis on execution of public works with funds arising from general budget provisions and/or loan capital. Although the Urban Land and Property Tax has never been conceived or managed as an instrument for land value capture, it nevertheless contains, explicitly or implicitly, a portion that effectively corresponds to land valorization. As an integral part of the General Budget, application of the IPTU is constrained by the constitutional principle of ‘non-linkage of resources’. On the other hand, nothing should prevent a portion of the IPTU (for example the portion corresponding to land ownership in the higher income neighborhoods, and/or that resulting from charging IPTU in the communities benefited by urbanization and regularization programs) from being incorporated into the urban or municipal policy agenda to be used for social urbanization programs.
- **Management format (2) – ‘Solo Criado’ (separation of land and building rights)**

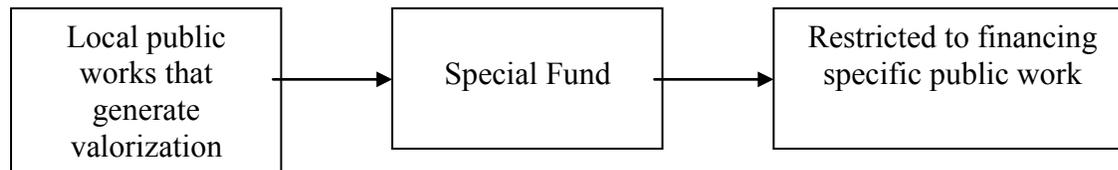


- This is a form of systemic recovery of land values generated in the more high-value areas or those where the potential for incremental values is highest. This mechanism is now enshrined in the City Statute and the Master Plans of all the large Brazilian cities in the form of the ‘Onerous Granting of Building Rights’ (*Outorga Onerosa do Direito de Construir*). It is designed to complement expenditure on long term social urbanization policies in the large cities. The resources accruing from ‘Solo Criado’ are remitted to the Municipal Urban Development Funds and thereafter applied to social urbanization projects. This is the only modality that is explicitly linked to the socio- spatial transfer of property revenues.

8.121 Another traditional form of land value capture as a completely converse alternative to the exercise of ‘urbanistic rights’ is the modality, established in federal land-parceling legislation, of the potential ‘transference’ to the municipal authorities and to firms holding outsourced public concessions, of street/road-building schemes, plots earmarked for public amenities, green areas and basic infrastructure networks. Within the context of the ‘Areas of Special Social Interest’, also set forth in the City Statute, administrative efforts to bring on stream and/or flexibilize this instrument could be extremely useful in the context of the design of programs and projects aimed at regularizing informal settlements. It could be especially useful for enabling more urbanized plots to be laid down.

8.122 Local urban legislation includes many other devices dealing with construction rights. These have survived as part of local tradition or due to the perpetuation of ‘special plans’, as in the case for example of developers’ special obligations to construct and/or donate schools and other public amenities and to make strips of land available for road widening. These counterparts are in fact non-specific and carry non-monetary connotations and are not pertinent to the financing of large urban infrastructure projects.

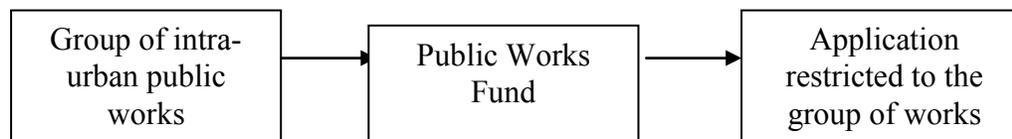
Management format (3) – Betterment Levy (*Contribuição de Melhoria*)



- Emphasis on the partial capture of the benefits of a particular project. Used to complement budgetary resources in the case of emergency works resulting in land value increments. The funds are earmarked only for payment of the costs of the works. More effective when used for intra-urban projects and those on the periphery of small and medium-sized cities with limited fiscal resources and a lower level of social inequality.

8.123 Other associated mechanisms such as neighborhood participation in road building/surfacing projects or contributions made towards financing improved public amenities are sometimes undertaken with the approval of municipal authorities. One of the advantages of this procedure is to circumvent the strict rules governing the Betterment Levy imposed by central government.

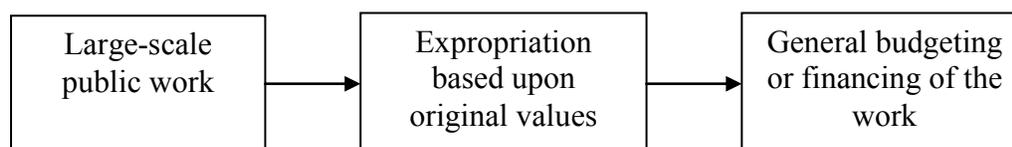
Management format (4) – General Benefit Contribution (*Contribuição por Benefício Geral*)



- Emphasis on the systematic (partial) absorption of the benefits of urban projects. The ‘General Benefit Contribution’ recovers a proportion of the costs arising from the execution of a predetermined group of intra-urban public works. The best-known case of this format being employed is in Bogotá. In the Colombian capital, costs are distributed in a progressive manner in accordance with the classification of the individual property according to valuation statements.

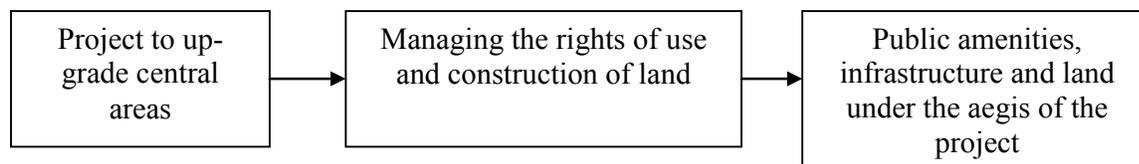
8.124 In Brazil’s large cities, a portion of the resources could be earmarked to the Municipal Urban Development Fund or even to the General Budget. For reasons of efficiency, collection of the GBC could in practice be linked to IPTU collection mechanisms, which would entail updating the Valuation Register with the aim of eventually undertaking infrastructure and urban improvement works.

Management format (5) – Public Sale of Valorized (Value Incremented) Plots



- Mais eficaz em projetos de desenvolvimento intra-urbano em cidades grandes e
- Emphasizes absorption of the benefits arising from land value increments. In order to improve effectiveness and control, land management procedures need to take into account the ‘management design’ of the project. Most appropriate for projects involving expropriations. The central location of infrastructure and major urban amenities such as underground transport (metros) and business sectors certainly bolsters land and property values. These values can be captured on the basis of the resale value of land that has increased in value as the result of the introduction of infrastructural benefits. The revenues from land value capture could be collected along with contributions based upon incremental value and taxes on the property and could also reflect the values accruing from legislative changes regarding the ‘densification’ of the surrounding areas. As for settlements located on the low-income peripheries of the big cities, the benefits resulting from expropriation based upon rural land or ‘non-urbanized’ valuations can be used to amortize the Budgetary or Urban Development Fund costs or alternatively used to provide a subsidy for poor families.

Management format (6) – Urban Operation

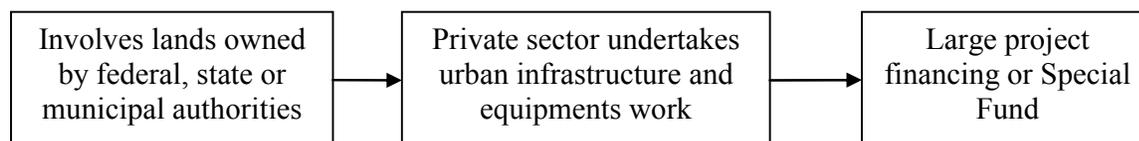


- Emphasis is placed on the *in loco* capture of savings resulting from the more intensive and/or better development of the land/property via the Transfer of Development Rights – TDR (*Transferência de Potencial Construtivo*) and Urban Consortium Operations (*Operações Urbanas Consorciadas*), both provided for in the City Statute. This mechanism is most effective when executing local urban projects and plans through the acquisition of properties for conservation and surety (*tutela*) purposes or green areas, redesign of roads and streets, installation of new public amenities and other infrastructure etc. The construction rights can be sold on the basis of bond or stock issues.

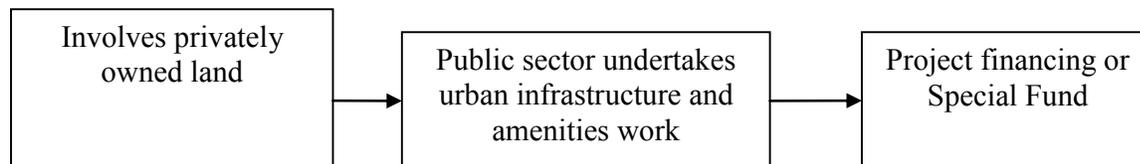
8.125 A potentially workable TDR in areas where a property market exists is the sale of the building potential of the land expropriated by the municipality prior to carrying out public works or installing public services on a local scale - to be administered by a local ‘urban manager’ (of schools, parks, street improvements, etc.). The fact that TDR is written into the City Statute suggests that local urban planning rules need to accommodate the definition of areas earmarked for construction originating from land subject to expropriation for public purposes.

8.126 In the case of the approval of Urban Consortium Operations, the City Statute provides for the issuing of Certificates of Additional Construction Potential (CEPACs) by the municipality which will define a particular number of CEPACs to be awarded in public auctions or used directly for payment of the works that are necessary to undertake the urbanistic scheme. The CEPACs, regulated in 2003 by the management of the CVM (Real Estate Commission), are bonds that are negotiated freely on the market with the resources deposited in an account linked to the corresponding scheme in the Federal Mortgage Bank (*Caixa Econômica Federal*). The scheme can be divided into different sectors, for which a table of equivalence of additional construction square metres or relating to change of use and urbanistic parameters is drawn up. Examples of CEPACs that have been negotiated can be found in the development of the Faria Lima and Água Espraiada Urban Schemes in the city of São Paulo.

Management format (7) – Major Urban Projects



- Emphasis on the optimization of the use of public land or of the subsidies for popular housing projects. Public authorities to share in the revenues and/or profits arising from the project. The case of special building authorizations (*'concessão onerosa'*) by public auction awarded for the land skirting Lake Paranoá in Brasilia for private use as leisure and tourist areas illustrates the way in which this modality has recently been used. This format is commonly employed in major urban projects for inner-city renewal (making best use of spare land) and social urbanization projects.
- **Management format (8) – Urban Property Consortium**



- Emphasis on bringing projects on stream in areas in which urbanization is in the ‘wider public interest’. This format, outlined in the City Statute (through the ‘Property Consortium’ instrument) and applied to compulsory land-parceling or use, can also apply to any situation where the utilization of land is recommended and where the owner or owners do not possess sufficient financial capacity to develop the project. This can involve the *re*-parceling of areas. After owners have been reimbursed with property units of a corresponding value to that of the properties before works began, the revenues obtained should be available to (i) finance the public works (ii) be partially earmarked for other purposes associated with the project (green areas, public amenities, subsidized urbanized plots, etc) or (iii) be transferred to the Municipal Urban Development Fund or to another purpose determined by the Municipality.

Further Considerations

8.127 In a first classification, the formats described above can be grouped according to the types or parcels of land value increments in question and the ways used for their mobilization, management or recovery. The following groups thus emerge:

- Formats 1 (IPTU) and 2 (*Solo Criado*) – Historical / Systemic
- Formats 3 (CM) and 4 (CBG) – Current / Punctual
- Formats 5 (GOP) and 6 (OUC) – Projected / Future
- Formats 7 (GPU) and 8 (CIU) – Strategic / Anticipated

8.128 The basic formats described above are in practice interlinked, either because a major part of the budgetary resources is applied to “projects” or because almost all projects self-financed by land value increments tend to be partially financed and therefore require additional financing and subsidy inputs within budgetary constraints.

8.129 The above basic formats consisting of mobilization and application of value increments form a kind of ‘rising curve’ as far as compliance with specific public policy objectives is concerned: for example, some of the formats are associated with the absorption of land value capture within the projects themselves – which in turn helps to secure local short-to-medium term results, but which also tends to maintain the *status quo* in terms of income distribution. One other point: land value capture application via the budget favors socio-spatial transfer of income, but this can only be achieved over the long-term and is much more difficult to control.

8.130 It is also worth observing that these models are only “commutable” to a certain extent. Revenue from direct appropriations for projects in the budget is only feasible (and indispensable) from an accounting point of view. On the other hand, resources arising within the context of a project that fall within the general budget tend to be earmarked for other purposes. Hence the subtle and immeasurable difference between the IPTU and the

Contribuição de Melhoria: resources collected directly by the Municipal Urban Development Funds are specially earmarked for social programmes and do not flow to a particular subhead or project.

8.131 The systemic capture modalities such as the IPTU and the *Outorga Onerosa do Direito de Construir* refer to traditional land value capture. Modalities such as the *Contribuição de Melhoria* and the *Revenda de Lotes* ('Resale of Plots') have an effect on current (short-term recovery) and future (anticipated) land value increments. Income recovery with an immediate objective tends to be more efficient because it is easier to control and account for. It does not affect the spatial distribution of urbanization benefits unless it is combined with compensatory and inclusive measures applied "in loco".

8.132 Land value capture policies aimed at urbanistic regulation such as the *Outorga Onerosa do Direito de Construir* are fairly irrelevant from the point of view of revenue collection. This is the main weakness of the various Municipal Urban Development Funds as sources of revenue/funds for social urbanization. Only a combination of different land value capture formats could provide the Funds with sufficient resources to comply with their basic objectives.

8.133 It is worth considering whether monetization of all the land value capture modalities used by the municipalities and their absorption into the general budget or into a single fund would be an effective way forward. The response is probably negative, since effectiveness of application is often inseparable from the process by which it is captured. While land value capture in local situations may not be relevant to municipal budgets, it could nevertheless perhaps be effectively converted into public goods of benefit to the local community.

Questions Related to the Urban Land Market In Brazil

Basic Features

The Role of Land and Real Estate

8.134 The context in which the subject of value capture is regarded in Latin America has to take account of a key factor - the role of property in the cultural traditions and socio-economic development of the region's societies. While the oft-repeated 'right to own property' dates back to the historic patrimonial nature of the ruling elites, this assertion is not limited to the better-off but is common to all sectors of society - with little prospect of substantial change.

8.135 One of the ways of understanding the importance of the property rights in the region is to study the way in which it has become embedded legally and institutionally in the prevailing culture. While the maturing of the urbanization process has tended to bring about changes in the role of urban real estate, as set forth in Brazil's (1988) and Colombia's (1991) new constitutions, opposite trends have emerged guided by the principles of neoliberalism - which has had a powerful effect on a number of countries in the region. This is evident in the constitutional changes (or modifications to the Civil Codes) augmenting guarantees to private property ownership, as in Chile in 1980, Argentina in 1994 and Peru in 1995 (Smolka and Furtado, 2001).

8.136 In order to better understand the ongoing significance of property for Latin American society as a whole, the subject needs to be viewed against a markedly unstable historical, economic and socio-political background. Given this familiar Latin American scenario, owning real estate constitutes a major financial asset for different social groups.

8.137 Land - the material basis of real estate - is the best (if not the only) widely recognized alternative in the region capable of withstanding economic turbulence and inflation. The fragility of the capital markets, subjected to a raft of economic policy uncertainties, is a well-known feature of the region. Real estate, underpinned by the principles of economic and social order, is therefore considered as relatively immune to political and other fluctuations. Furthermore, it is the only activity that can offer individuals a degree of security to compensate for

the dearth of adequate social security provision. Families throughout the region continue to regard real estate as an 'investment' and their preferred way of saving.

8.138 In addition to the benefits of land as a stable economic good, the possibilities of increasing the value of this good ('valorization'), as a result of the urbanization process, are widely recognized, expected and desired. This approach is part and parcel of the regional culture: access by owners to valorization is generally understood as an extension of 'property rights' and not a reason for censure or criticism as an undeserved gain. Moreover, the urban property owner feels he has the 'right'⁹⁸ to the value increments inherent in the property and places responsibility for valorization on the public authorities. Property owners normally expect that valorization will benefit their property and, if it fails to do so, they place the blame for imputed loss on the defective public administration of the city. In these circumstances, land value increments are considered to be a 'natural' consequence of property ownership in the same way as private appropriation of value flowing from officially sponsored urban improvements.

8.139 It is clear from the above that given the existing approach to people's 'right' to property valorization, the ethical argument that would generically sustain implementation of value capture instruments - according to which *everyone should be recompensed only for his own effort* (Brown and Smolka, 1997) - is far from being consolidated in Latin America. In short, value capture of private property increments to sustain public works is neither understood nor acknowledged as a way forward by the region's society.

Property Taxation

8.140 In the vast and now traditional literature covering property taxation in developing countries in general and Latin America in particular⁹⁹, a broad consensus exists that taxes on property, and especially the property tax ('*imposto predial*') that forms the basic reference for these studies, are very low. Revenue accruing from these taxes when compared with that in developed countries (especially North America) is considered low from three viewpoints: (i) on the municipal level, judged by the proportion of property tax compared to total local revenue; (ii) on a national level as a percentage of GDP; and (iii) in relation to the low tax percentage rates (aliquots) applied¹⁰⁰.

8.141 Furthermore, property taxes are considered low in relation to the rapid urbanization process taking place in the region. Urban expansion is not, as might be expected, accompanied by any increase in revenues accruing from property taxes.

8.142 Along with the shallow revenue base due to the low registered value of many properties, property tax revenue-collecting systems throughout the region are relatively inefficient and allow high levels of evasion and default. Moreover, the high political costs involved in applying urban property taxes eventually outweigh economic advantages to such a point that the local authorities responsible for revenue collection are often reluctant to improve the system, preferring indebtedness or continued reliance on intergovernmental transfers.

8.143 The legal statutes and constitutions of the majority of Latin American countries contain assurances designed to maintain a basic level of well-being for their populations. Although public authorities are under a

⁹⁸ This word is in quotes to signal that this 'right' is something to be considered as 'fair' but not necessarily in conformity with the law.

⁹⁹ A number of studies promoted by international agencies are particularly relevant such as those done by Guarda (1989), Dillinger (1991), Oldman (1992) and Kelly (1994), which in some cases synthesize or evaluate studies done in the 1970s and 80s.

¹⁰⁰ As a best hypothesis, only 40% of the demanded local taxes are actually collected, compared with local tax revenue collected of at least 75% in the United States and Canada. As for such taxes as a proportion of GDP, it is estimated at a maximum of 0.4% in countries such as Brazil and Mexico, while it represents at least 2.5% of the GDP in the US and Canada. The aliquots applied are rarely over 1% and are in general related to a sale value well below the market price for the real estate involved. It is worth comparing, for example, the data produced by Youngman and Malme, 1994, with that of Smolka and Furtado, 1996.

legal obligation to provide local services they nevertheless find it increasingly difficult to adequately implement property taxation. At the same time, the population does not acknowledge the existence of a connection between public expenditure on the urban built environment and the property taxation system. Given that national governments are traditionally held responsible by the public for providing urbanization benefits, public commitment to local government initiatives is consequently fragile. Moreover, the coercive weaknesses displayed by many local public authorities increase the margins of tax evasion and lead to long payment delays. Evasion and delay, together with other practices, are also encouraged by low fines and frequent tax amnesties, particularly around election time.

8.144 The authorities' weakness displayed in collecting property taxes is accompanied by well-entrenched property speculation based on retention of empty land awaiting 'free' public infrastructure which is expected to produce, in due course, incremental valorization.

8.145 A large slice of local resource provision in Latin American countries arises from the transfers made by state and national governments to local authorities. These transfers have on the one hand a *distributive* effect, but on the other end up making local administrations highly *dependent* on such resources. The overall result is that local revenue collection in Latin America is rarely sufficient to cover current administration costs and even less the cost of urban infrastructure, whether basic or needed for bolstering development. As Guarda (1989) has shown, provision of public services has been systematically funded from other sources.

8.146 In the 1980s, widespread recession of the economies of the region together with the effects of decentralization led the majority of Latin American countries to undertake initiatives to reform systems of administration and collection of property taxes. A combination of legal and administrative reforms targeted on taxing property nevertheless failed overall to produce major, sustainable results¹⁰¹.

8.147 In tandem with these initiatives, a line of studies began to take shape predicating the feasibility of the *Contribuição de Melhoria* as a source of funds for financing local urban infrastructure in Latin American countries, given the existence of the instrument or similar procedures in the legislation of the majority of the countries of the region and their relatively uniform design. Since the ethical argument was of limited appeal in the region, the argument favoring the economic rationality of applying specific charges under CM was advanced as a solution.

8.148 In the view of Macon and Mañon (1977, p.111), 'the fact that payment of the contribution is linked to a real and visible benefit makes the system a form of market-economy financing which is not subject to the same disadvantages, such as political resistance to taxes'. Doebele (1977, p.2) also recommended its use: 'the contribution aims to make provision of urban services in cities in developing countries self-financing by reducing the burden of general municipal taxation ... the CM possesses the potential in the cities to facilitate provision of urban infrastructure in the amounts and at a rhythm commensurate with the rapid growth of the cities'.

8.149 Despite the above recommendations and the efforts made, widespread implementation of the instrument does not appear to have materialized. The recorded experiences in general are episodic and localized (Smolka and Furtado, 2001). The view continues to be firmly held within Latin America that local administrations have a very low own tax-take and therefore weak financial (and consequently political) autonomy. As a result, municipal budgets systematically run a deficit, with municipal services partially financed by debt and a high proportion of basic services provided with central government funding (Clichevsky et al, 1990).

8.150 The absence of expected economic rationality is therefore assumed to be an anomaly of the Latin American situation, typified by the following question: 'why is it so difficult to fund public infrastructure that

¹⁰¹ The basis of the reforms was the understanding that 'resources from the urban property tax failed to accompany the increase in the fiscal base, largely due to the manner in which the charge is administered in developing countries' (Bahl, Holland and Linn, 1983 cited in Oldman, 1992, p.78). This understanding was shown to be insufficient. Both Clichevsky et al (1990) and Oldman (1992) refer to the study done by Bird et al (1987) about the experience of the Colombian reform which demonstrates the recrudescence of politically-related obstacles every time property re-evaluations were necessary.

increases the value of serviced land by much more than the cost of the infrastructure itself?' (Shoup, 1994, p. 236).

Relative Scarcity of Serviced Land

8.151 The chronic inability of public resources to respond adequately to rapid urban growth must be put into perspective. As far as the urban aspects of cities are concerned, it has been observed that this generalized problem does not in fact totally impede provision of infrastructure and that the partial provision that is made over time is not targeted randomly in the cities.

8.152 A profound study is not required to perceive that large Latin American cities possess considerable urban public infrastructure in certain areas comparable, by and large, to any city in the developed world. A picture postcard from one of the Latin American cities (no doubt illustrating the 'best' of that particular city) is proof that those areas appear to have had no difficulties to finance public infrastructure.

8.153 This demonstrates that it is possible to refine the argument that 'difficulties in funding public urban infrastructure impede their provision' (Shoup, 1994). These problems are certainly not evident in the results of the 'short blanket syndrome', meaning that the same areas of the cities are repeatedly benefited while others are relegated to their own fate. Furthermore, nothing guarantees that if credit for investments in infrastructure were in better supply it would be channeled towards infrastructure for less-privileged areas.

8.154 Provision of infrastructure is not a random exercise: it occurs most frequently in the same areas 'cumulatively' or is linked to the expansion of those areas of the cities. As a number of studies on Latin American cities since the 1980s demonstrate¹⁰², the benefited areas are those that satisfy (as a priority) the following premises: the existence of organized formal markets; legally defined properties; spatial concentration of economic and political power; a higher income population; and, finally, the highest urban land values in the city. In contrast, the areas that do not possess basic infrastructure are typified by the informal land market, irregular plots and informal settlements, a low income population, unregistered areas, unresolved land and property tenure problems etc.

8.155 In the current Latin American situation, the question of valorization arising from infrastructure investments necessarily involves acknowledging that, given the existing socio-spatial inequalities in Latin American cities, urban areas possess a dichotomic character. The core of the city *vis-à-vis* the periphery, rich and poor, formal and informal, legal and illegal, up-market zones and proletarian squalor, skyscrapers and hovels, are different images used to explain this dichotomy.

8.156 The areas that lack infrastructure are precisely those where low-income population groups and their informal settlements predominate and which are subject to a series of conditioning factors for the application of taxation instruments. It follows that any proposal for providing these areas with urban infrastructure must take into account at least the existing difficulties and the different concrete forms in which the occupation of those areas is expressed both spatially and socially.

Problems of Self-Sustainability In Basic Infrastructure Provision

8.157 The main aim of this section is to produce arguments that question the idea of using the CM in an overarching and equal way for rich formal communities and informal poor settlements alike.

8.158 One of the reasons put forward by experts for rejecting the application of the CM is the idea of charging it once the particular work has been executed, when in fact incremental gain generally only materializes when the owner sells the property. The potential valorization created by execution of works would not provide the owner with the necessary liquidity to pay the charge. This problem can apply to all situations in which the value of the

¹⁰² For example, studies done by Geisse and Sabatini on Santiago, San Salvador and Bogotá (1982) and by Vetter and Massena on Rio de Janeiro (1981).

property is not in line with the annual return accruing to the owner. In short, we are faced with the question known as that of the ‘property rich/cash poor syndrome’ in which the return to the owner is not compatible with the equity embedded in property-based goods.

8.159 The problem of liquidity affects particularly those property owners with smaller incomes and those who do not have a predictable and reliable income. In these cases, neither the classic method of financing the infrastructure works through the issue of bonds by the public authorities or dividing the debt into long-term instalments would be a viable solution.

8.160 The obvious solution for the technical problem of lack of liquidity of the owners benefiting from public works would be to defer payment of the charges, together with accumulated interest, until such time as the properties are sold, as advocated by Shoup (1994). However, Smolka (1997) warns that this solution might not be suitable in the case of informal settlements. The populations living in poor areas genuinely require access to much-needed infrastructure, but what they need most is an appropriate source of financing, not the type of financing proposed to which they, without the necessary credentials, will never have access¹⁰³.

8.161 A further problem recognized as impeding the use of this instrument is the compulsory transfer of use in the event of valorization to the public work to which it is linked – a public work whose relevance or convenience is not generally a subject for consultation with the beneficiaries. The attempts to encourage implementation through the insertion of ‘adhesion mechanisms’ or ‘prior consultation’ with the beneficiaries are evidence of this. The results are not the ones expected: in general, wealthier communities served well by infrastructure services systematically reject the use of the CM, while poor communities are desperate to receive the benefits of urbanization¹⁰⁴.

8.162 It has to be recognized that even if the supposed beneficiaries were in a position to accept or reject any particular work, the rules for selecting the communities to be prioritized are still undefined, and urban improvement projects continue to focus on the better-endowed areas. This argument has another angle. The charge essentially concerns financing public works of interest to the community as a whole and not only the immediate beneficiary communities, but the latter should nevertheless pay for the costs of the work in view of the special benefits that they have received.

8.163 If we could envisage in any of the Latin American countries a *Contribuição de Melhoria* that would include the entire low-income population in the projects financed by the use of this instrument, with assured protection for those who could afford to pay according to their financial situation and once they had effectively received the ‘special benefits’ (benefits not aimed at the better-off population which had frequently received them free of charge), many of the problems encountered in the use of the instrument would certainly not occur - although the question of how to finance infrastructure in these areas remains.

8.164 The argument of ‘intergenerational’ equality that the North American cities use to encourage imposition of charges on new edge-of-town prestige developments (Altshuler and Gómez Ibáñez, 1993), assumes an inverse connotation in the cities of Latin America: the richest did not have to pay at the time for urbanization improvement, so making the poor pay is highly questionable.

8.165 Traditionally the option for (slow) distribution of public infrastructure has predominated: subsidized by the state, with taxes being subsequently collected for paying concession-holders to provide the corresponding public services. Since this was the traditional way the State provided infrastructure for the city as a whole, the fact that it was subsidized (generally free) effectively benefited the higher income population group living in city center areas.

8.166 A further factor to be considered for using an instrument for recovery of costs, whether for the new formal areas or whether for existing informal areas, is that in general the relative, if not the absolute, cost of providing basic infrastructure for areas that are already occupied, tends to be higher. Thus, the people occupying

¹⁰³ Smolka points to the same fallacy in the well-known work by De Soto, *El Otro Sendero* (1987).

¹⁰⁴ See for example the case of the application of the *Contribuição de Melhoria* in Lima, Peru, described above.

these settlements can end up paying more than others for the same benefits. In this case, we need to remember that people who are attracted to those areas, whether it is by 'invasion' or by the most common form of occupation in Latin America - buying a plot in the informal market that fails to conform to urbanistic norms - do this because they are unable to enter the formal market because of lack of access to credit or simply because they lack ready cash.

8.167 In addition to considering the role of property in general as a traditional mechanism for appropriating value increments, which is true in the case of the poorest for any dwelling unit that has some security of tenure or even a roof to cover their heads, housing can play a crucial role in complementing minimum family incomes. For example, part of the home might be rented to third parties or extra rooms might be added on to accommodate growing families. As pointed out by the numerous studies on this subject, these are mechanisms that can be permanent or simply mobilized at times of need. Furthermore, it could be argued that this scenario would be an additional motive for families to commit part of their incomes to pay for urban infrastructure, but if provision of such infrastructure were subject to the homes being 'regularized', as is often the case, the use of the above informal income compensation mechanisms could be more difficult¹⁰⁵.

8.168 In this way, although the occupants of informal areas do not necessarily pay less than what a formal plot with basic infrastructure would cost¹⁰⁶, the fact is that basic infrastructure is not part of the purchase price of such plots. The solution of using the *Contribuição de Melhoria* as an instrument for attracting installation of public infrastructure in these areas, even if payment were postponed until the time of sale of the properties, effectively restricts value capture for the families concerned. These families, with no capitalization when they sell their homes, might not have the necessary means to acquire a plot in the formal market in some other area. As a consequence, the instrument would risk becoming a mechanism for generating more informality as well as imposing restrictions on residential mobility (Smolka, 1997).

8.169 On the other hand, it must be emphasized that the easy argument of exempting these population groups, and therefore transforming the CM into a redistributive device, does not only not resolve the problem but helps to make it worse and more permanent.

Regularization of Informal Settlements, Production of Urbanized Land and Costs Recovery

Brazil's Recent Experience

8.170 Brazil's experience with the urbanization of informal settlements is already considerable. This was the result of a major turnaround in Brazilian housing policy at the beginning of the 1980s when the State acknowledged that *favelas* were the legitimate housing solution within the reach of poor people. Little progress has however been made in the struggle against the persistent *reproduction* of precarious and informal housing¹⁰⁷ and against the ongoing increase of population groups that have no access to urbanized land. Difficulties in the property titling programs and over the question of costs recovery are recurrent.

The Recent Evolution of Informal Settlements

¹⁰⁵ For example, in the case of the *Favela-Bairro* project in Rio de Janeiro (slum regularization), the families involved signed a Term of Responsibility promising not to make any unauthorized additions to their homes as a condition for being accepted in the regularization program.

¹⁰⁶ Studies such as those done by Smolka and Iracheta (2001) present evidence that – and reasons why - they often end up paying more.

¹⁰⁷ A good example of this, the *Favela-Bairro Program* (acknowledged as an international reference), invested R\$616 million between 1994 and 2003 in the urbanization of 166 informal settlements in Rio de Janeiro, directly benefiting 162,000 families and indirectly a further 40,000 (Cherkezian, 2004). Despite this, the population living in favelas and irregular illegal settlements continues to grow according to the most recent democratic census done by IBGE (2001).

8.171 Between 1940 and 1970, the growth of favelas in the large cities was a result of major migratory flows from the countryside to the cities. However, between 1960 and 1980 official government policy aimed at transferring people to social housing on the peripheries of cities succeeded in producing an absolute reduction in the number of people living in favelas. From the 1980s, external migration slowed down considerably and internal migration began to increase as the result of urban poverty, chronic unemployment and an increasingly precarious employment situation. In Rio de Janeiro, São Paulo and Salvador, the favelas population began to expand faster than the 'formal' population living in the municipal areas.

8.172 The question of urbanization of informal settlements began to take root in the public policies agenda as a result of the social demands culminating and reflected in the 1988 Constitution. The forced displacement policy was in effect replaced by acknowledgement of the right of the favela-dwellers to remain living where they were and thereby to preserve the capital invested in self-built homes. Regardless of its effects over the long-term on urban land prices (perpetuating the cycle of poverty), the policy seeking to urbanize precarious and informal settlements represented a victory by hitherto excluded population groups over the official displacement (removal) policy (Faria, 2004). Given the fact that self-built houses turned out to be half the price of those offered by the government, the State began to adopt the apparently cheaper option of allowing areas to be occupied then later regularized, without effectively trying to understand the causes of irregular occupation. The result was that the State effectively ceased being a provider of popular housing.

8.173 One of the more visible results of this change was the consolidation of the favelas during the closing decades of the 20th century. Many houses in the favelas were built of solid materials and possessed running water, internal sanitation and electricity. The existing favelas tended to expand, become more densely occupied and 'verticalized' (extra floors added to existing buildings). With the advent of security of tenure, the informal market in the older favelas became consolidated and the property market in parts of the favelas away from the centre began to heat up. The transformation of the stock of precarious housing units into permanent homes began to attract middle-income groups that were keen to acquire their own homes but had no access to the formal property market. Thus, access to homes in the favelas began to be confined exclusively to purchase or renting. Prices in the informal favela market began to rise substantially (Abramo, 2003).

8.174 On the other hand, small peripheral favelas began to make their appearance as the result of 'organized' invasions. These tend to be extremely poor settlements where people live on half a minimum salary per capita (Faria, 2004). Self-build has also accelerated in popular informal settlements¹⁰⁸ and occupation of publicly-owned land has expanded. In short, poverty and the informal market have become stratified, with marked differences emerging between favela dwellers and those living on the periphery of favelas. The rise of the illegal developer (*loteador*) led to the virtual disappearance during the 1990s of informal acquisition of land at zero cost.

Observations on urbanization and regularization programs

8.175 A recent study evaluating Brazil's experience with favela urbanization and property regularization carried out by IBAM (Larangeira, 2004) in 10 cities revealed the following funding source matrix:

- 38.9% on resources, including Municipal Housing Funds;
- 6.3% allocations from OGU, including funds from the Habitar Brasil-IDB program;
- 5.4 % FGTS and FAT loans;
- 46.8% external loans, including those made by IDB to Rio de Janeiro;
- 1.2% allocations from bilateral and multilateral agencies.

8.176 Bearing in mind that the resources earmarked by the Federal Government represent a maximum of 6.3% of the total resources mobilized, and considering on the other hand that 46.8% from external resources include the

¹⁰⁸ The FGTS funds that benefit the population earning less than 3 minimum salaries are earmarked for the financing of construction materials that in turn are used almost always in social housing units located in a regular settlements (Veríssimo, 2004).

IDB loan to the Rio de Janeiro municipality, the data would appear to indicate that the housing and infrastructure deficit in Brazil is currently almost exclusively a municipal responsibility. Out of total resources, 54.1% are external loans and not less than 85.7% fall within the ambit of municipal budgets – financial year, funds and external debits.

8.177 If this means that Brazil is far from assuming full responsibility for its economic and social development, it also shows that municipal authorities must redouble their efforts to increase the efficiency and balance of both their revenue collecting systems and their social urbanization spending strategies.

8.178 Far from questioning the positive practical results achieved by the eminently corrective policies applied over the last few years - favela urbanization and the regularization of settlements, it is nevertheless important to recognize that the priority which has been awarded to these questions in the public policy agenda does not help reduce or halt the ongoing vicious circle of precarious housing and poverty. The higher the expectations of people regarding urbanization and regularization of informal settlements, the greater the pressure exercised by the poor population on the existing stock of public and private land subject to ‘invasion’ (illegal occupation) and, above all, the higher the price charged by illegal developers for the infrastructure-free land in peripheral informal settlements (Iracheta and Smolka, 2000).

8.179 Among the main conclusions of the above-mentioned study regarding recent experience in the regularization of informal settlements and favela urbanization are the following:

- Little consideration is given in the design of the programs studied to the subject of cost recovery, a problem that has been aggravated by the existence of demarcation between program management and the actual funding of programs;
- Non-recovery of costs of the installation of water and sewage networks executed by the municipal authorities that subsequently transfer them free of charge to private utility companies (‘concessionaires’);
- The disappointing results achieved and the limited valorization that is attributed by the families to ownership regularization;
- The common practice of introducing a degree of ‘flexibility’ into urban legislation pending the establishment of *Areas of Special Social Interest*.

8.180 Despite the enormous complexity of the problem, as shown by decades of systematic studies and pioneering practical experiments, it has to be admitted that the poorer sectors of the population continue to be pushed into informal and illegal land occupation basically because of their low incomes - insufficient to enable them to enter the formal housing market and live on land that has proper infrastructure. At the beginning of the new century, the gradual loss of job stability added to the serious problems already being generated by increased urban poverty, the chronic scarcity of social housing and the continuing lack of available serviced land.

8.181 The key problem of lack of serviced land has not received due attention by the formal Brazilian market. This has taken refuge in a kind of “comfort zone”, reckoning that poor people’s housing demands can only be satisfied in the illegal market. This applies to successive governments which, for reasons of cost and administrative pragmatism, have clearly opted to give priority to programs for regularizing irregular settlements, principally favela urbanization.

The Production of Urbanized Land Parcels (*lotes*) in Brazil¹⁰⁹: still a pending theme

8.182 The land market in Brazilian cities offers no alternatives for the low-income population. The PROFILURB (‘*Financing Program for Urbanized Plots*’), created in 1975 by the now extinct National Housing Bank, was intended to attend to the housing needs of poorer families. The program consisted of the following:

¹⁰⁹ Information based on CHERKEZIAN, Henry: “Lotes urbanizados no Brasil: Considerações e propostas preliminares”, in Serra, M.V. and da Motta, Diana Meirelles, *Estudos Estratégicos de Apoio às Políticas Urbanas para os Grupos de Baixa Renda no Brasil*. World Bank/Cities Alliance, 2004.

- (1) urbanization of areas, preparation of plots, construction of sanitary facilities including house to house connections; handing over the plots to the future householders;
- (2) occupation of the plot by the respective families; construction of a provisional housing unit at the back of the plot;
- (3) construction of the definitive house, with supplementary funding provided via the FICAM¹¹⁰ for purchasing construction materials;
- (4) family moves into the new dwelling unit followed by the demolition of the provisional home.

8.183 In spite of its apparent simplicity a number of difficulties conspired to undermine the results of this program. Even with a significant increase in the contracts entered into after the reformulation of the program in 1978, the results of the program can be considered to be a relative failure in terms of the housing deficit and the overall impact on the price of urban land.

**Table 8.4 National Distribution of Housing Loans
(contracted operations) by type of investment**

	Type of investment	Financings		Value of loans		Unit value	
		Amount	%	Cr\$ million	%	Cr\$	US Dec/1978
To 1978	Complete units	667.734	94.2	57.770,00	95.8	86.516,49	11,595.83
	Urbanized plots	21.299	3.0	718,00	1.2	33.710,50	4,518.23
	FICAM	19.523	2.8	1.816,00	3.0	93.018,49	12,467.30
	Total	708.556	100.0	60.304,00	1000		
1978	Complete units	191.591	85.3	20.617,00	90.7	107.609,44	14,422.92
	Urbanized plots	14.500	6.5	412,00	1.8	28.413,79	3,808.31
	FICAM	18.457	8.2	1.707,00	7.5	92.485,24	12,395.82
	Total	224.548	100.0	22.736,00	100.0		
total	Complete units	859.325	92.1	78.387,00	94.4	91.219,27	12,226.15
	Urbanized plots	35.799	3.8	1.130,00	1.4	31.565,13	4,230.68
	FICAM	37.980	4.1	3.523,00	4.2	92.759,35	12,432.56
	Total	933.104	100.0	83.040,00	100.0		

Source: *Programas de Natureza Social* division- BNH – 1979.

8.184 In 1980, the World Bank signed with the National Housing Bank the first contract aimed at supporting housing production for low-income families. Among other things, the contract proposed to fund 41,800 urbanized plots, 19,500 finished housing units of the “embryo” type and to provide 23,200 credit notes for people to buy construction materials. At the time it was estimated that 91% of the families benefiting from the program were receiving less than 3 minimum regional salaries. However, the outcome was fairly negligible: only half the production of anticipated urbanized plots materialized and around 10% of construction material financing anticipated through the FICAM.

¹¹⁰ ‘Program for Financing Construction, Finishing, Extending and Improving Housing Units’.

Table 8.5 World Bank National Housing Bank Contract No. 165/BR

Program	PROFILURB			FICAM		
	Urbanized plots (forecast jan/79)	Embryo plots (completed Dec/84)	% completed	Forecast Jan/79	Completed Dec /84	% completed
COHAB-SP	15,500	259	1.7	11,100	0	0
COHAB-PE	11,800	14,281	121.0	8,400	2,295	27.3
URBIS-BA	4,500	7,120	158.2	4,300	0	0
Other urbanized plots	10,000	0	0.0	0	0	0
Total	41,800	21,660	51.8	23,800	2,295	9.6

Source: *Project Performance Audit Report - WB - December 1988*

8.185 From the 1980s onwards, favela urbanization and regularization of irregular informal settlements moved to the centre-stage of Brazil's housing policy. In 1985, the National Housing Bank was disbanded and the housing programs that depended on FGTS resources under the aegis of the Federal authorities failed to lead to the production of urbanized plots. The 'Associative Credit Card Program' (*Carta de Crédito Associativo*) was the only initiative that took this aspect into account, with loans for housing units limited to R\$8.000,00. Data from the Federal Mortgage Bank (*Caixa Econômica Federal*) reveal that only around 1% of the financings from the 'Individual Credit Card Program' was used for the acquisition of urbanized plots in 2002. This means that under 2,000 plots were acquired throughout Brazil in 2002 with FGTS resources.

Table 8.6 Brazil Evolution of Contract Operations Regarding Urbanized Plots by Region
(number of housing units)

Year	North	Northeast	Southeast	South	Center-West	Brazil
1975/76	0	648	1,209	488	0	2,345
1977	0	1,725	393	109	732	2,959
1978	830	5,783	8,362	2,737	0	17,712
1979	520	4,092	1,156	468	0	6,236
1980	296	7,694	90	257	0	8,337
1981	0	1,699	0	981	0	2,680
1982	0	694	0	3,541	0	4,235
Total	1.646	22,335	11,210	8,581	732	44,504
%	3.70	50.19	25.19	19.28	1.64	100.00

Source: *Projeto política Social em Tempo de Crise: articulação institucional e descentralização*.

Ministry of Pensions and Social Assistance (MPAS)/UN Economic Commission for Latin America (ECLAC). Brasília 1990.

Costs Recovery in Social Urbanization Programs

8.186 Traditionally the subject of costs recovery has been a relationship involving two groups: (i) the State providing the costs of basic infrastructure programs and (ii) the beneficiary population. Privatization of public services introduced a third element that has hitherto not been properly taken into account, namely the question of how to cover the costs of programs.

8.187 In only a few cases, especially in the South region, return on investments involved in urbanization programs has been foreseen regardless of the funding source (Cherkezian, 2004). In general, basic infrastructure investments are not recovered either by betterment levies (*Contribuições de Melhoria*) or by ordinary property taxes. In most technical circles, the idea predominates that “in social programs such as for urbanization, one should not be concerned with return on investment”. The majority of developments have been planned without any predicted return (even partial) on the funds which mainly originate in the Federal Government general budget (*Orçamento Geral da União*). Whereas the Federal Mortgage Bank makes provision for return on investment, the Habitar-Brasil/IBD does not.

8.188 A comparative study of the laws designed to encourage private production of urbanized plots in three Brazilian cities –Joinville (Santa Catarina), Rio de Janeiro, and Porto Alegre (Rio Grande do Sul) plus the Colombian capital (Bogotá)¹¹¹ (Veríssimo, 2004) shows that cost recovery is normally foreshadowed in the form of urbanized plots or of predetermined counterpart funds being recouped. However, implementation of the corresponding programs has been far below what would be necessary for this idea substantially to gain ground.

BOX

8.189 Public-private partnerships for the production of urbanized plots: incorporated in urbanistic norms but infrequently activated.

8.190 Joinville, Rio de Janeiro and Porto Alegre have taken initiatives insofar as formulation of legal provisions are concerned in order to encourage the production of urbanized lots by means of different public-private consortiated action modalities, in accordance with the most recent Brazilian urbanistic legislation.

8.191 These initiatives do not automatically produce the desired results. The success of consortiated urbanistic actions aimed at offering serviced land for populations that are excluded for economic reasons from the formal market depends above all on the using initiative, on the quality of the proposal and on municipal executives’ willingness to learn. In this respect, Brazilian experience would appear to be short of results and conceptual/technical appraisal.

8.192 A recent study done by Veríssimo (2004) relates that while the program to encourage the production of urbanized plots in the city of Joinville created 4,700 plots for the low income population in 1977-2000, Porto Alegre only managed to finalize creation of the *Urbanizador Social* program and Rio de Janeiro, although possessing a relatively simple and potentially effective system set forth in the 1992 Master Plan, has never put it into practice.

8.193 The following chart is a summary of the main points of the laws covering the fostering of production of urbanized plots in the three cities:

¹¹¹ See section on ‘Nuevo Usme Urbanistic Scheme’ (*Operación Urbanística Nuevo Usme*), Bogotá, Colombia.

	<i>JOINVILLE</i>	<i>RIO DE JANEIRO</i>	<i>PORTO ALEGRE</i>
Functions of the private agent	To proceed to legal registration of the informal settlement; to execute part or all of the infrastructure works; to sell the plots to families previously registered with the Prefecture	To proceed to legal registration of the informal settlement; to transfer to the municipality a number of plots equivalent to the value invested in urbanization projects and works.	To carry out a gradual urbanization of the informal settlement; to present a cost spreadsheet; to register and approve demand; to make available to the municipality the counterpart stipulated in the Term of Commitment.
Functions of the public agent	To register families interested in acquisition; to carry out surveys and urbanistic projects as necessary; to carry out part or all of the infrastructure works.	To register families interested in acquisition; to undertake urbanization and the infrastructure projects; to carry out the works; to sell to interested parties the plots transferred to the municipality.	To ensure that the area meets the purposes proposed; to define special urban standards; to approve a schedule; to award priority to approving projects and permits for works. In special cases, to draw up urbanization and parceling projects and to authorize transfer of building/construction potential.
Organisation of demand	Prefecture	Prefecture	Prefecture and private initiative.
Funding sources	Municipal and private	Municipal	Private.
Costs recovery	Some of the plots produced made over to the municipality as a counterpart for the investment made in urbanization and infrastructure projects.	Some of the plots produced made over to the municipality in order to meet housing demand from low-income people.	A counterpart corresponding to any previously agreed value between the parties. Since direct public investment is not proposed, it can be taken that this counterpart refers to 'flexibilization' of legislation.

Extracted and adapted from "*A comparative chart referring to laws covering encouragement for urbanized plots production in the cities of Joinville, Rio de Janeiro, Porto Alegre and Bogotá*", Veríssimo, 2004.

8.194 Finally, cost recovery is not carried out even on the basis of charging the IPTU (property charge) from the people in the settlements that have been beneficiaries of urbanization programs. Reports from experts in informal settlement regularization indicate that a charging policy of this kind would be contrary to the aspirations of those who acquire land in this way in order to obtain recognition of their rights as citizens. In the case of the favelas, the alleged reasons for non-collection (eg: it is not cost-effective) contribute to the views of the occupying owners that it is better to stay in the informal market, without taking into account the potentially higher losses over the

long-term. It can be also surmised that the alleged “for reasons of efficiency” excuses have much to do with electoral politics.

Concessionaires and Infrastructure Cost Recovery

8.195 In most cities, the responsibility for infrastructure investment is partially or wholly assumed by program management bodies that then pass on the installed networks to private utility companies (‘concessionaires’) (Larangeira, 2004). Based on information collected in the course of his research, Cherkezian (2004) came to the conclusion that “recovering the costs of investment in infrastructure networks should be automatically done through charges to be collected by the concessionaires”.

8.196 There would appear to be here some confusion between recovering the costs of public investment in basic infrastructure and the revenues arising from the provision of basic services. In general, private sector operators receive the fixed capital represented by installed networks as a donation and appropriate all the profits from ex-public service operations (Larangeira, 2004).

8.197 This concept would appear to indicate the persistence of a management culture that existed before the productive restructuring of the 1990s when it was believed that donating infrastructures to State enterprises was equivalent to ‘giving to the State itself’. This is implicit in Law 6766 of 1979 which obliges the land developer to provide settlements with public spaces and a basic infrastructure to be transferred to the public domain. However, the present concessionaires are either the result of the privatization of public service providers or are obliged by the economic environment to adopt profit-based management methods. In both cases, handing over infrastructure without liabilities is in principle a net transfer of public resources to private capital.

8.198 In short, in government projects infrastructure is provided for free both to the direct beneficiary population (which in the case of informal settlements on the periphery the cost was already charged by the illegal developer) and to the service concessionaires who then proceed to charge for the use of installations that cost them nothing.

8.199 In general, the utility concessionaires are neither willing nor interested in extending their services to help develop communities, and normally make no effort whatsoever to retain specific financial control over the services that are connected to homes located in favelas (Larangeira, 2004).

8.200 A few notable exceptions provide evidence that it is perfectly possible to integrate utility concessionaires fully into efforts to reduce and/or recover urbanization costs in informal settlements. In Goiânia and Porto Alegre, the utility companies have developed, executed and financed works and services (Cherkezian,2004). Some companies such as the State Sanitation Company (COPASA) of the State of Minas Gerais and *Light*, the private company that runs the electricity network in Rio de Janeiro, run programs specifically designed to serve informal communities.

8.201 In addition to a ‘Favela Coordination Department’, *Light* has been running for over two decades the *Favela Electrification Program* which has substantially reduced losses from rogue connections and which during the 1980s increased by 90% the number of households connected as part of a major effort to bring electricity to everyone (Larangeira, 2004).

Property Regularization

8.202 The IBAM study has revealed that the results achieved in terms of property regularization in the 10 cities are modest, in particular Belo Horizonte and Teresina. In Rio de Janeiro, only 10% of the settlements included in the first stage of the *Favela-Bairro* program succeeded in completing the procedures required for the issue of property titles.

8.203 This study emphasizes the lack of interest in acquisition of proper title by the population groups benefited with urbanization programs. In general, it would appear that people prefer informality. Many families who acquire title choose to sell their properties. On the other hand, the case of Goiânia is worth highlighting. Through rigid enforcement/inspection, the authorities were able to prevent benefited families from transferring title of their benefited properties.

8.204 In the majority of replies to Cherkezian's questionnaire (2004), Property Ownership Regularization - undoubtedly the most difficult task to be successfully carried out in this type of program - is always viewed as the final stage of an enterprise/development. Since the average time of finishing a development is around 60 months, the regularization phase has in general not been reached.

8.205 A major part of the settlements occupy public land belonging to the municipality (in Porto Alegre 70%, in Goiânia 56% and in Vitória 55%). On the one hand, local administrations have tended to adopt this as an eligibility criterion for access to the range of programs; on the other hand, this forms part of a strategy by invading settlers who count on (i) the lesser risk of being expelled and (ii) the greater probability of eventually securing services and tenure.

8.206 The granting of *direito real de uso* ('real right of use') is a widespread mechanism. Alternatives are '*aforamento*' ('leases/grants of privileges') - in eg: Belém, Teresina and Salvador - and, depending on circumstances, the award of *títulos individuais ou coletivos* ('individual or collective titles').

Value Capture For Financing Infrastructure In Informal Settlements: Two Basic Questions ...

8.207 The empirical evidence that land valorization generated by factors such as basic infrastructure and acquisition of titularity tend to be greater than the cost of the infrastructure itself, pointed out in the study *Urban Land Markets and Urban Land Development: An Examination of Three Brazilian Cities: Brasilia, Curitiba and Recife* (Serra et al, 2004), has contributed to inspire renewed interest in the subject of land value capture for the financing of urban infrastructure in countries under pressure from high levels of external and internal indebtedness.

Table 8.7 Brasilia, Curitiba and Recife 2002/2003

Brasilia, Curitiba and Recife 2002 / 2003 (Estimates of land prices based on interpretation of regression results)			
Values in bold type: R\$ / m²			
	Brasilia 2003	Curitiba 2002	Recife 2003
Constant value, no paved road, no title and small plot	426	87	53
Value adjustment for having paved road	1,189	184	100
Value adjustment for having title	-	-	64
Value adjustment for having both paved road and a title	-	128	-
Value adjustment for having large plot	158	57	-
Distance value adjustment per kilometer from city center;	-0.089	-0.117	-0.047
intercept value at 10 kilometers	175	27	33

Source : Serra et al, 2004, table 28

8.208 This hypothesis immediately raises two basic questions involving the public and private branches of the economy. The answer is critical for the development of successful infrastructure financing policies through the use of value capture.

8.209 From the point of view of public finances (and from that of a democratic government) the question to ask is the following: to what point is the motive behind "urban productivity" valid, according to which scarce urban government resources must be priority invested in central areas where direct or indirect return is higher? Would it

not be a good idea to invert - or at least to substantially modify - the spatial matrix of the application of fiscal resources?

8.210 The second question refers to the private sector: if servicing land increases its value so much why is it so difficult to find private agents in the formal property market with an interest in investing in land for low-income populations? Why is this market not considered to be profitable despite the substantial increases in the property prices? Are the alleged legal difficulties, the lack of clear rules, the high cost of building permits and the lack of information all prohibitively costly for legal developers? Or is it that the lack of stability inherent in the precarious living and working conditions of the target public make this sub-market such a risky venture that it becomes non-interesting for formal agents?

8.211 As regards participation by the private sector, it is also worth asking the following: given that essential services such as water, electricity, telephone and public transport are in effect supplied on the basis of charging customers, what needs to be done for suppliers of public services, currently largely in private hands in Brazil, to join forces with private capital to undertake land infrastructural projects for poorer populations?

...And an Alternative Hypothesis

8.212 The questions raised by the dissemination of the idea that valorization arising from the provision of basic infrastructure would always be higher than the cost of that provision, could be partly resolved by the alternative hypothesis in which the costs referred to are properly qualified. The consensus is in effect that the cost of providing basic infrastructure is much higher when this provision is done *a posteriori*, in other words during the urbanistic regularization processes concerned with informal settlements. It is estimated that the costs in this case are much higher - in the order of up to three times greater than the original costs. Seen in this way, there is nothing to guarantee that valorization is sufficient to cover these costs of curative interventions, even if the same valorization was more than sufficient to self-finance the infrastructure when effected at the time that the settlement or subdivision is laid down.

8.213 The simplest way of verifying the validity of the "hypothesis of self-sustainability of programs involving urbanization of precarious and informal settlements" is to conduct an empirical study of prices before and after the projects have been executed. Unfortunately, this item is not on the agenda even of large-scale programs funded with external resources such as the *Favela-Bairro* Project.

8.214 Contrary to theory, in practice the hypothesis of valorization being greater than the infrastructural costs is not regarded by specialists and consultants (with years of experience on similar projects) as being possible to execute in irregular peripheral low-income settlements and it is regarded as scarcely possible in programs that deal with urbanization in consolidated favelas¹¹².

8.215 The average cost of urbanization in the favelas of Rio de Janeiro is in the region of US\$4,000-US\$5,500 per unit, taking into account all the infrastructural components and urban amenities with the exception of award of titularity (Cavallieri).¹¹³ It can be observed that this level of cost is equivalent roughly to the standard adopted by the Federal Mortgage Bank for the cost of basic dwelling units in programs for low-income populations (*Habitat-Brasil*). This obviously casts doubt on the least-cost argument to defend prioritizing favela urbanization. In the

¹¹² Data according to referential data and opinions from municipal and state public officials from Rio de Janeiro, in January 2006.

¹¹³ Urbanization projects concerning informal settlements under the aegis of the Rio de Janeiro State Government involve infrastructure costs in the region of US\$2,500 per unit in favelas and US\$1,800 in regular settlements (Castanheira). The IBAM survey in 10 cities revealed infrastructure costs per family of R\$7.454,00 and a total cost per family of R\$5.957, 22, with a minimum of R\$3000,00 and a maximum of R \$13.645,00 (October 2002). Abiko (2004) reports that the costs detected by ANCONA & LAREU (2002) in a group of 32 favelas urbanized under the Guarapiranga Program (Sao Paulo) were R\$10.624,00 (December 2000) per family, with R\$9.701,00 (91,3%) relating to infrastructure. Cherkezian (2004) obtained - using data secured from 100 informal settlement urbanization programs throughout the entire country - average values of investment per family that were extremely varied according to the different regions, owing to the differences of the solutions adopted. In the southeast zone of the city of São Paulo, which hosts the above-mentioned Guarapiranga and Favela-Bairro Programs, the average per family was R\$9.150,00 (July 2003).

case of regularization of peripheral informal settlements, the average cost obtained is around US\$2,200 per plot, including title (Cavallieri).

8.216 Valorization assessed in favelas that have benefited from basic infrastructure programs and urbanization is up to around 90% (Abramo, 2003). Thus, the principal sale value of a property in consolidated favelas benefited by the *Favela-Bairro* program to meet the hypothesis of valorization equal to investment, will be of the order of US \$10,000 - an estimate which would appear to confirm the overriding opinion of those in the aforementioned technical circles.

8.217 However, it must be acknowledged that in spite of being substantially more expensive, investments in consolidated favela urbanization would appear to produce synergic effects with the pre-existing economies of location. The process of “verticalization” of the favelas is sure proof of a kind of “maturity” of the irregular property market in these settlements¹¹⁴.

8.218 The tendency for property to increase in value in the consolidated favelas is explained by factors such as: (a) immediate access to the benefits of urbanization such as proximity to places offering jobs, to shops and plentiful public transport - even occasionally a metro station; (b) good neighborhood relations and solidarity networks; (c) a substantial increase in the search for housing by segments of the middle-class who, on account of reduced incomes, the expanding price of formal properties and the added disadvantage of precarious and/or informal employment, are forced to resort to the informal housing market¹¹⁵.

8.219 In the present peripheral informal settlements, even the regularized ones, the inverse phenomena would appear to be occurring. According to Furtado and Oliveira (2002):

“...there are indications that the occupation of these informal settlements, instead of valorizing the plots that remain vacant, in reality undermines their value in relation to the values practiced at the time the informal settlements were first launched, since what people are selling is the idea of a aesthetically pleasant and organized neighborhood. What is clear is that over the time that it takes to occupy the informal settlements the settlement is slow to consolidate, with a majority of buildings still unfinished. This often makes it difficult to distinguish a legal informal settlement from an illegal one (...) Purchasing plots and leaving them vacant in the expectation of some future valorization was a deeply rooted practice that now appears to be losing some of its appeal in these areas, although according to one illegal developer “people who buy plots for resale are ‘crazy’... they will never manage a profit except in exceptional cases. But we come across people everyday who do it... individual buyers with the idea of making a profit but never manage it...they end up losing money”. [Otávio Aruaújo, partner/proprietor of ECIA, the largest urbanizing company in the west zone of Rio de Janeiro” (p.50)].

8.220 This suggests that substantial valorization of properties resulting from infrastructure and urbanization projects being executed presupposes the existence of a reasonably well-developed market with a ‘critical mass’ of property wealth, even when regulated by informal means. The extent and depth of poverty that is so characteristic of informal peripheral informal settlements can reflect the absence of agglomeration economies (urbanization added to location) that is necessary for public investment to result in the property dynamic capable of generating effective and consistent property valorization.

8.221 Such a hypothesis involves two key consequences for cost recovery policy arising from the regularization of peripheral informal settlements: (1) valorization would be proportionate to the scale and degree of geographical concentration and urban centrality on which the programs offering serviced land and regularization of informal

¹¹⁴ In the Rocinha favela, south zone of Rio de Janeiro, properties of 7, 9 and even 11 floors exist according to recent widely disseminated press reports. In September 2002, Dimmi Amora reported that according to the Regional Administration, the approximately 25,000 dwellings registered at the beginning of 2001 could have grown by at least a further 1000 new homes - in other words an increase of 4% in just under one year (*O Globo*, 8/9/2002).

¹¹⁵ In spite of the possible “discontinuities” in the property valorization record of the city (legalized property on the periphery of the favelas can be worth substantially less than a non-legalized property within the favela), the informal property market is governed by the same economic laws as the formal market, of which it is in effect an integral part.

settlements on the peripheries were planned; (2) cost recovery based in some way on charging property valorization (for example, via a betterment levy) could impede the formation of a minimum stock of family property capital capable of driving the market and, eventually, impacting on valorization.

The *Nuevo Usme Urbanistic Scheme*:¹¹⁶ A new model of production of urbanized plots based on public land management

8.222 As an alternative to the classic policies of direct subsidy for poor people and access to property credit or a policy of tolerance towards informality followed by eventual corrective programs, the *Nuevo Usme* scheme in Bogotá is presented as a third alternative whose elaboration and execution may serve as an example for other initiatives throughout Latin America.

8.223 The project involves the integrated use of land management instruments set forth in Colombian legislation, including land price control and redistribution of land valorization aimed at affording poorer people access to urbanized land.

Recent types of popular housing production in Bogotá.

'PIRATE' URBANIZATION SCHEME	FORMAL URBANIZATION SCHEME	'METROVIVIENDA' SCHEME (local property company)
Acquires rural land for around US\$0.30/m ² .	Land acquired at rural or peri-urban prices, or owners and 'urbanizers' join forces and distribute land valorizations among themselves.	Purchases or receives allocations including urbanization expectations (average of US\$8/m ²). Sells land at same average price, to state enterprises, for main roads and public service infrastructure.
Levels land and subdivides into plots of 50 - 72 m ² .	General costs involved in service networks, main thoroughfares, amenities and green areas for general use tied to the public budgets.	Main infrastructure falls to public budget. Very high indirect costs: around 16%-24% of total costs.
Utilizes a minimum of 70% of gross land and sells without street grid or services at prices ranging between US\$ 19 - 27 /m ² .	Plot-by-plot development. Projects include minimum assignment of green areas and amenities.	Urbanized land sold to construction firms for between US\$ 30-40 /m ² , with control over price of housing unit.
Costs of services and infrastructure in public regularization and urbanization projects rise by 3 to 5 times.	All urbanistic improvements are appropriated by owners and 'urbanizers'.	Price of a basic housing unit measuring 17-35m ² , with the possibility of constructing 3 floors: around US\$ 200 /m ² .

Extracted and adapted from *Operación Urbanística Nuevo Usme*. Alcaldía Mayor de Bogotá, District Planning Administrative Department; CIDER, University of the Andes, Bogotá; Lincoln Institute of Land Policy, 2003.

The basic premises of the *Nuevo Usme* scheme are the following:

- Direct subsidies for poor people are not the best alternative since they tend to raise the price of land and facilitate transfer of resources to owners of the land.

¹¹⁶ Information based on Alcaldia Mayor et al. *Operación Urbanística Nuevo Usme*, 2003 (Bogotá).

- Handling of valorization resulting from public investment and the award of specific urbanistic rights are viable alternatives to expropriation or acquisition of land for collective and social purposes.
- Scaled-up planning and management can facilitate equitable distribution of costs and benefits.
- Making available urbanized land avoids future regularization exercises at higher prices.

8.224 The areas of intervention are the domain of Partial Plans (*Planos Parciais*) an obligatory and complementary normative instrument to the plans covering territorial ordering for purposes of special urbanistic schemes and macro-projects. The Partial Plans substitute plot-by-plot urbanization and facilitate execution of urbanization projects by stages.

8.225 Current Colombian legislation determines that the commercial value of the land for purposes of acquisition by public authorities cannot include the incremental value generated by the Partial Plan. The principle of equitable distribution of costs and benefits of urbanization is applied through the re-parceling of private land and the division and proportional redistribution of infrastructural costs and urbanization rights among the owners involved, clearly inspired by the Spanish model.

8.226 Recovering public investment infrastructure and urbanization costs is secured in the form of urbanized land at prices that are compatible with the production of popular housing. Furthermore, the municipal authorities are able to recover between 30% and 50% of the incremental value of the land resulting from changes in the classification of land from rural to urban land and by authorization for land to be used for more profitable purposes. Construction rights can also be attributed directly to the beneficiaries of the popular low-income housing programs (Veríssimo, 2004).

The main principles of the scheme are:

- Control of land prices: reference evaluations are produced by the Property Register Department (*Cadastro Imobiliário*) taking account of the urbanistic norms applied before the project was announced.
- Previous urbanistic improvements: the same price applies to all the land included that in the re-parceling area whether earmarked for environmental protection, public spaces, amenities or for plots reserved for future construction.
- Partial capture of land value arising from the development of the project: costs of projected infrastructure and the land necessary for its implementation are paid on the basis of *Outorga onerosa de direitos construtivos* (selling of building rights) in areas previously defined in the project.
- Control of illegal urbanization: all the owners involved within the project are fully identified; development of the project is accompanied by permanent monitoring of the land parcels; administrative expropriation is resorted to whenever necessary.

8.227 In specific terms, the Bogotá scheme involves 936 hectares of gross area, with the project divided into four Partial Plans of around 200 hectares each. The average value of existing plots according to a reference evaluation carried out is in the region of \$4,400 Colombian pesos per square meter (around US\$1.70 in 2003).

Urbanization according to the current norms should permit the net utilization of around 601 hectares, or 64% of the available gross area. The project involves 17% of the land being earmarked for the arterial and intermediate road network, 10% for public amenities, 12% for green areas and recreation and 17% for environmental protection areas - with 44% of the useful area being subdivided. Of these, 74.5 hectares are reserved for Special Social Interest Housing (VIS) and 176.5 hectares for High Priority Housing (VIP) in the form of urbanized plots.

Calculations made of the scheme put the final value of the already urbanized lands at around \$11,841 pesos per square meter (US\$4.55).

8.228 By way of comparison, it has been calculated that if the scheme were not carried out, the tendency would be for illegal land subdivision to take place - with occupation of almost 70% of the total gross area or approximately 655 hectares. Families would pay for this land around US\$20 per square meter (for plots of roughly 72 square metres) and the public authorities would need to invest in improvements for the informal

settlements at a cost of almost three times more than the public investments anticipated in the execution of the scheme.

Final Considerations and Recommendations

Some Policies and Strategies for Financing Basic Urban Infrastructure in Brazil

8.229 Brazilian cities are increasingly burdened by the demands of municipal autonomy. They face unrelenting pressure in one particular area: housing and basic infrastructure shortages. With limited access to traditional sources of financing, city administrations are therefore now having to give priority to identifying endogenous social and economically sustainable alternatives to defray the costs of investment in basic urban infrastructure and improvements.

8.230 One of these alternatives is to capture the incremental value of private land - past, present and future - produced by the generally beneficial effects of urbanization. These benefits have over the years been only partially and imperfectly captured by the standard property tax (IPTU) - the traditional way of collecting revenue, which will presumably continue for the foreseeable future.

8.231 The recrudescence of the idea of value capture as a *duty* of municipal administrations - set forth in the new City Statute (determining the social function of urban property as established in the 1988 Constitution) - does more than highlight the subject of land valorization management: it returns it to the mainstream of the urban policy agenda and endows it with social legitimacy.

8.232 The generation of municipal master plans following the 1988 Constitution led to the widespread formation of the Municipal Urban Development Funds directed exclusively towards social urbanization programs with resources originating from urban land value capture, particularly through the *Outorga onerosa do direito de construir*. This confirms the overwhelming redistributive approach in the context of national and local land valorization policies.

8.233 This important step forward however calls for further action. We are aware that large metropolitan conglomerations capture much more land and property revenue than that actually reaching the Urban Development Funds. Moreover, since land value increments generated by public and private investments are so generalized and diffused, many different models are available and could be tapped to recover, and subsequently apply, these value increments - money, land for public uses, equipments, provision of services etc.

8.234 Many of these models are old and well-tried practices that, because hitherto they have not been acknowledged as value capture instruments, have generally failed to receive appropriate attention in administrative and accounting terms. An analytical inventory of such models/practices would be extremely useful for assessing (i) the financial potential of land value capture in urban environments and (ii) how effective these models would be in a variety of situations, including in the context of economic and social control.

8.235 In the large cities, where the problem of distribution of income and urbanization benefits is most critical, it would appear to be justifiable to collect the *Contribuição de Melhoria* (CM), as has been done directly or indirectly in medium-sized or small cities, providing collection applies to all cases. Bearing in mind however the need for this instrument to be effective and efficient, providing a link between the CM and existing IPTU systems is recommended. It is worth mentioning at this point that despite being relatively modern and sophisticated, IPTU management systems in the majority of large Brazilian cities suffer from a permanent backlog of properties awaiting registration. This in turn leads to strenuous efforts to update the property registers in neighborhoods which are assumed to be capable of producing the highest revenues. In these circumstances, the CM principle could be applied in something like "Priority Zones for Reregistering and Assessment for IPTU Purposes" delimited as specific areas likely to be affected most by new public works. Some of the advantages of this system would be: (1) to avoid the negative impact of introducing a new tax; (2) to create a positive impact by showing willingness to refine the system through fair distribution of urbanization benefits and drawbacks; (3) to ensure that charging for a public work reflects effective land valorization in all cases; (4) to enable cases of land *devaluation*

to be detected and dealt with by the system; and (5) to introduce a special assessment component to identify possible *overvaluations* arising from public works or other relevant government activities.

8.236 Finally, in the context of urban land valorization, little attention has been paid to the public revenue potential directly arising from grants of access to public land and property for a variety of uses: building gas stations, affixing advertisements to outdoor billboards and public transport, continuation of non-essential service networks, developing urban publicly owned real estate etc. Such revenues could be justified under the rubric "extraordinary valorization of urban land resulting from the effects of urbanization". They would provide a supplementary, 'redistributable' source of money for the Urban Municipal Development Funds to finance social urbanization programs.

Urban Land Value Capture and Financing Programs for Low Income Populations

8.237 Given the relatively low interest in land value capture by Brazilian public sector management and its resulting low profile in terms of share of resource volumes (and compared with the basic infrastructure accumulated deficit), the land value capture mechanism has to be considered as no more than a complementary source of funds for programs targeting the urbanization and regularization of precarious and informal settlements.

8.238 On the other hand, if land capture policies were to be integrated into infrastructure and social urbanization programs they would inevitably gain prominence in two respects: firstly, from the point of view of *redistribution* of urban revenues and, secondly, their potential role in promoting the *self-sustainability* of urbanization, property titling and urban regularization programs.

8.239 Brazilian metropolitan areas already possess a sound tradition of urbanization programs focused on precarious and informal settlements and partially financed by Urban Development Funds. The weak points of these arrangements are : (i) the low levels of funds captured by the UDFs and (ii) the ingrained and widespread political practice of not recovering costs by simply failing to register urbanized or regularized settlements for IPTU.

8.240 These serious drawbacks can be seen most clearly in the fact that the most expensive social program (slum urbanization) is the one that should produce the highest levels of property valorization, but which in reality presents the lowest prospects for recovering costs. This phenomenon applies to certain 'consolidated' slums in the central areas of cities. While not interdependent from the legal point of view, land regularization and IPTU share very close political affinity – one of the reasons why IPTU is not generally charged in slums that have benefited from streets, drainage, basic infrastructure and urban amenities.

8.241 Investment in land regularisation in consolidated slums probably holds out the best potential for the cities and Brazil as a whole for securing financial returns in the housing policy area over the short term. Basically, land regularization should enable a huge stock of property-related capital to enter the formal market, while at the same time providing an increased flow of revenue arising from the payment of municipal and state taxes (regardless of special "social" discounts on the bills), with all this of course eventually reflected in the country's GDP.

Progressive Urbanization and the CM (Betterment Levy): Alternatives for Reducing costs with Social Housing Programs

8.242 Obtaining a cost recovery margin from public investments in urban infrastructure through regularization processes requires a distinction to be made in the universe of informal settlements. Distinctions shall be made for example between slums and informal subdivisions (*loteamentos*), originated respectively from unplanned land occupations and from the regular division of larger parcels.

8.243 Many "mixed" cases also exist in the form of large tracts of land that contain both ordinary plots as well as plots that have been "spontaneously" occupied. This mixed situation obviously calls for a mixed approach. Different costs of urban regularization are involved in providing services in a regular -although informal-subdivision, with a planned street layout, well-defined plots etc, and, conversely, the cost of urbanizing slums that are often located in places unsuited for urbanization, possibly in risk areas, with no clearly defined boundaries between one property and the next, with alleyways, external stairways etc.

8.244 Recovering costs from property in the process of being regularized and from newly-parceled land (*'parcelamentos'*) are also two entirely different propositions. While for the latter case a wider and more comprehensive policy can be designed, in the former the approach has to be on a case-by-case basis, subject to compliance with certain general rules.

8.245 Using the *Contribuição de Melhoria* to cover the cost of dated and localised public investments could also provide the basis for progressively urbanised parcelling system. However, this system would need to be transparent and generic so that the purchaser would know that he would only need to pay for services at the time when these were in fact provided. In other words, he would not have to pay in advance the developer (*'loteador'*) for these benefits. This solution conforms to the idea that everyone should pay something. In reality, in more up-market subdivisions people would be paying the developer of the plots directly for services that had been carried out by him in advance of sale.

8.246 In the case of establishing urban infrastructure in existing informal settlements, the use of the CM device could come up against the "intergenerational" question ie: rich *versus* the poor (in which the rich were reckoned to have obtained infrastructure free of charge), particularly regarding basic provision of water and sewage, major street layout etc.

8.247 In the case of local infrastructure to be paid for on the basis of individual consumer contributions, such as water supply, sewage/wastewater and electricity, the cost could be included in the monthly bills as is already customary, with hardship cases being catered for as appropriate.

8.248 Where local infrastructure cannot be charged for on the above individualised basis, such as costs involved in surfacing or public lighting in neighborhood streets, scope exists for charging the CM - or better still for using other similar instruments such as communal (*'participative'*) street paving or a fee levied for improving public amenities given that, at least in the formal private land divisions over the last 25 years, these items have been normally paid for by the purchasers of serviced lots. An important question is to know whether the purchasers of informal lots without infrastructure have paid (or not) at least a portion of the cost in the form of a premium imposed by the illegal developers for anticipated infrastructure provision by the public authorities. This situation has certainly arisen in the past in Latin America (Iracheta and Smolka, 2000).

8.249 A further possible problem also needs to be taken into account: families might not have sufficient cash flow to pay the costs. If this were the case, perhaps the ideal instrument, at least in theory, would not be the deferred CM but a *land gain tax* based upon the difference between the purchase price and sale price - a kind of "generating factor" in the event of the property appreciating. This instrument exists in Brazilian law, with a formal regulatory framework. However, in practice, the land gain tax involves the application of a series of exemptions which effectively rule it out for the purposes proposed here, and a new approach would be called for. In the final analysis, the main problem is how to avoid, with the use of this mechanism, encouraging the perpetuation of informality and the usual Latin American practice of under-declaration (of property values etc. for tax purposes).

8.250 In all cases, one must keep in mind that although valorization derived from the provision of scarce services in new settlements is normally higher than the cost of effecting the services, pointing to the viability of self-sustainable financing, the same would not necessarily occur in the case of subsequent and curative regularization of informal settlements, since the costs involved in such later interventions are normally much higher than those applying at the time the settlements are established.

8.251 In the case of land regularization (property titles supplied/security of tenure etc.), perceived valorization appears to be more dependent on special circumstances (eg: values increasing or decreasing proportionate to the risk of eviction). In these cases, the most highly recommended system would probably be to recoup the eventual valorization of the property through payment of the property tax, which should be set obligatorily at federal level in order to avoid municipal authorities applying their own solutions.

Production of Urbanized Lots Based Upon Public Land Management

8.252 Access by poorer people to urbanised land can be bolstered by generating projects based on the State intervening in the variables that generate land valorization. Examples are official expropriation of rural land at reasonable prices, re-parcelling large areas of land while taking due account of the redistribution of land valorization and, finally, calculating occupancy rates and the degree of development (construction) potential subject to the *outorga onerosa*, as the basis of 'consortiated actions' involving land owners, construction companies and public service operators.

8.253 The integrated application of these instruments could be executed through the use of the Real Estate Consortiae (*Consórcios Imobiliários*) and the Urban Consortiated Operations (*Operações Urbanas Consorciadas*) - both described in the City Statute - within the 'Special Social Interest Areas' (or Zones) (ZEIS/AEIS). This last mechanism has been employed throughout Brazil in 'regularization' initiatives and in this case would provide a degree of legal/planning support for urban improvement operations in the same way as the Colombian Partial Plans (*Planos Parciais*).

8.254 The application of this model in the urban periphery of our cities would benefit especially from 'expropriation based on rural land prices'. In this particular model, the differential represented by the value of the land before and after the project represents one of the main financing components. Two questions nevertheless require supplementary analysis: (a) the inexistence in Brazilian legislation of measures that explicitly guarantee the annulment of the "valorization expectation" in expropriations carried out with a social purpose; and (b) the potential contribution of this type of project to *urban sprawl*, which could occasion additional costs for the establishment and operation of public service transport networks and other facilities.

Some Recommendations:

Programs:

8.255 As regards *housing policy*: To integrate land and housing policies and to give priority to providing urbanized plots on a scale that reflects the overall objective to secure lower prices for poorer people. The urbanised plots should be put on sale in the 'formal' market at the same price as non-urbanized plots in the 'informal' market.

8.256 To apply the concept of '*progressive urbanization*' and to use the entire range of options employed by the Property Consortiae and similar instruments. To create and apply *expropriation* mechanisms at rural land cost and/or in line with price control policies. To seek levels of physical concentration and centrality that favour the formation of external economies, markets and land valorization.

8.257 To encourage partial *land value capture* by the owners of urbanized and regularized plots in low-income programs as a way of increasing family capitalization and the insertion, over the medium to long-term, of the properties into the formal property market. To amortize the costs of social urbanization programs with mechanisms such as partial recovery and formal registration, and to charge IPTU.

8.258 To maintain in the large cities wide-ranging *program portfolios* that cover improvements and official regularization of informal settlements: urbanization and consolidation of slums, urbanization and regularization of informal settlements, land regularization and award of title, recovery and regularization of inner-city slum tenements.

8.259 To promote a conclusive *research study* on the legal, administrative, economic and social obstacles in the way of land and property regularization of informal settlements involved in urbanization programs. Based upon the results of this investigation, to estimate the potentially beneficial effects of the facilitating measures contained in the legislation that will substitute Law 6766 and its applicability regarding insertion of the stock of

benefited housing units into the formal market. Would land regularization provide a viable and beneficial defense against the potential resistance detected in the course of development of urbanization programs?

8.260 To study measures for encouraging outsourced private sector firms (*concessionárias*) to share the cost of the installation of basic public service networks.

Revenue Sources for Urban Development Funds (FMDU)

To increase the funds flowing into the FMDUs with a variety of resources procured from land valorization in the city central areas, such as:

a. Portions of the IPTU earmarked to land valorization;

b. Public revenues arising from the allocation (*cessão onerosa*) of public land and facilities for gas stations, billboards, advertisements on street furniture and public transport, rights of way for non-essential service networks, etc.

8.261 To begin systematic application of the *CM* as described in the Brazilian Federal Constitution, in the City Statute and in the Master Plan as a *tax on valorization* with the aim of constructing an efficient and socially just system for permitting participation in the execution of infrastructure work and urban improvements with the intention of producing real benefits and in which the effort involved in recovering the costs obviously outweighs the disadvantages. To enhance effectiveness, the systematic application of the *Contribuição de Melhoria* should be technically linked to the IPTU management system.

Human and Material Resources:

8.262 The urban management instruments set forth in the City Statute definitely emphasize *land valorization management* as an inherent part of urban administration. Land valorization modalities can no longer continue to be regarded as an activity solely aimed at inspecting and enforcing developers' and others' compliance with standards. Furthermore, special attention must be paid to the technical and material training of the staffs of public organisations particularly in the fiscal, control and urban planning areas.

Studies:

To draw up a countrywide inventory of the *modalities* used for land value capture in large and medium-sized Brazilian cities. To include the incidence and the portion of the land valorization component in the IPTU aliquot, together with its respective value.

To carry out specific research on the practical *utilization of the CM* and similar mechanisms in Brazilian cities.

To carry out a countrywide survey on the *capture of public revenue* through awarding rights to public areas for commercial purposes and calculating the respective amounts flowing back to municipal coffers. To undertake research on value increments produced by changes of use from rural to urban purposes, focused on small and medium-sized cities.

To undertake research on a national scale on the performance of *valorization and property dynamics* in settlements benefited by urbanization programs, urbanistic regularization and the award of property titles. To make this modality obligatory in all the programs funded with resources provided by national and international development agencies.

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9. Urban Land Use Regulations in Brazilian Cities Impacts on Urban Land Markets and Access of Low Income People to Land and Housing

by
Paulo C. Avila¹¹⁷:

Summary

9.1 One of most distinguished features of the social inequalities present in the Brazilian society is the population that lives in informal settlements characterized by low standards of urban environment and housing conditions. Accordingly the Demographic Census of 2000, housing deficit in the Brazilian urban areas, understood as the increment in housing stock necessary to replace precarious shelters and to provide housing for families who cohabit a same space or occupy an improvised place, is about 4.1 million units. In addition, about 12 millions of the Brazilian permanent urban households have infrastructure inadequacies and about 2.2 millions of them have titling problems (Fundação João Pinheiro, 2005). It is important to note that most of the Brazilian housing deficit and inadequacies are within metropolitan areas, mainly in that located in the Southeast Region, but is also significant in the South and the Northeast, mainly in relative terms.

9.2 Housing issues has been largely studied in Brazil under their several aspects, including the phenomena of informality and its social costs and the mechanisms that reproduce urban poverty blocking poor people access to serviced land and housing. Also has been produced important works holding on the importance of slum upgrading as a strategy to reduce urban poverty and on the evaluation of the results achieved by official programs of urban land titling and regularization of irregular settlements. As such, while the several aspects of housing demand has been object of investigation and have produced several works, not many studies have been produced regarding the side of housing supply and the aspects that affect it. For example, several articles have argued that urban legislation in used by cities in Brazil has to be reformulated since it has no produced the results expected. In addition, many of them have argued that the rigid patterns enforced by legislation can be responsible for increasing informality, since poor people are unable to follow most of patterns set by urban rules.

9.3 Nevertheless, despite the recognition that a very restrictive urban legislation can hinder housing production, little attention has been paid upon the economic effects from urban planning controls and land use regulations on urban land markets and housing supply. In general terms, the economic magnitude of these effects is underestimated and not much quantified, mainly when prevail approaches that exalt only the benefits and advantages from adopting specific spatial patterns for urban development, even knowing that the enforced patterns respond only to the expectations of a small part of the population.

9.4 This work is intended to estimate some effects on urban development and land prices that can be produced by specific land development constraints. The paper starts by discussing the main rationales for adopting urban development controls, followed by a short presentation of location and land use theory. The work also identified the main urban regulations in used in Brazil and points out some facts about Brazilian cities. Using a database from the residential land prices of the metropolitan areas of Brasilia, Curitiba and Recife, is provided some estimation of the economic magnitude of the effects on land markets from land use regulation. Finally, the paper presents some implications upon public policy for improving urban land management.

¹¹⁷ This paper was produced in a joint research work between the World Bank and the Lincoln Institute of Land Policy aimed at assessing the impact of regularization policies and legal controls on urban land markets and access to the poor to land. The author would like to recognize the useful comments and criticisms from the colleagues who participated in this project including David E. Dowall, Mila Freire, Martim Smolka, Fernanda Furtado and Edesio Fernandes. I also would like to thank Bernardo Mueller for his comments on the regressions' results. These colleagues bear no responsibility for remaining shortcomings and findings, interpretations and conclusions expressed herein are entirely of the author's responsibility and do not represent necessarily the views of the sponsors of the project.

9.5 Market interactions are responsible in shaping cities and public intervention can affect prices and misallocating land. Zoning ordinances, for example, the most used urban development control, can restrain housing supply when impede land to be developed or redeveloped at the level in which supply is responsiveness to demand. High housing demand not responded by housing supply, increases housing prices which, in turn, increases land prices. As a result, groups that cannot afford high prices are excluded from the formal markets generating a demand that is solved by the informal market. Moreover, in contexts where housing supply is constrained and housing prices are high, land developed informally also has its prices increased, encouraging the production of more informality.

9.6 Real estate markets are driven by supply and demand factors which determine land use, densities distribution and land prices across city. Section 2 discusses location and land prices formation under the light of the largely used theoretical approach proposed by Alonso-Muth-Mills (AMM). These authors combine several elements of micro-economic theory in a spatial arrangement characterized by central polarization where land rent in urban areas is formed as function of the city center. Thus, along market interactions, where supply and demand are critical elements in pricing the land, the city is shaped determining urban land uses.

9.7 Basically, under the assumptions of the AMM model, land is allocated for the highest bidder who trades-off the maximization of land consumption and the minimization of transportation costs in all urban locations. As the city center offers the greatest advantages in terms of transportation savings, land in central areas is more attractive for households and firms. Thus, land prices are high in central areas because the demand is higher in central locations.

9.8 The AMM model, based on bargain is useful to explain several mechanisms of rational choice in urban areas, but is not unanimous among urban researchers. In fact, the process of rational choice is influenced by several aspects and not only by the amount of land consumed and transportation costs. In more complex contexts like in large metropolitan areas, for example, the existence of sub-centers can reproduce at a minor scale the strength of the main center in polarizing occupation in its surroundings establishing land rent. In addition, other variables can affect the demand for different urban locations as neighborhood composition, housing preferences, quality of urban environment and controls on land use, for example.

9.9 In turn, public intervention historically reinforced the advantages of the central areas in Brazilian cities, while peripheral areas were kept out of the attention from public authorities. Improvements in quality of urban areas achieved by zoning controls increased housing demand since they generate exclusive urban features that were valued by city dwellers. Minimum plot size, limitations on construction bulk area and population densities restrained housing supply in central areas, increasing housing and land prices. Land prices are high because housing prices are high and regulation can play a critical role in constraining housing supply.

9.10 As a result, the formal markets in Brazil were driven to the central areas where the high income groups had their housing demand responded. On the other hand, the low income groups, forsaken by urban policies and formal markets, had two possible choices: informal land occupancy close to the central areas, usually in risky areas; or settlements located at peripheral areas produced irregularly or illegally by clandestine developers. In order to illustrate this context Sections 3 and 4 present an overview of land use control instruments commonly in used in Brazilian cities and some stylized facts that characterize the urban spatial structures produced along time. Section 4 shows especially the spatial distribution of households according to the average wages of the person responsible for the households, a proxy for poor households.

9.11 The urban spatial structure of Brazilian cities, here understood as the spatial distribution of population, households or firms, presents general similarities, despite the diversity of their historical contexts. Broadly, Brazilian cities fit well in the standard AMM model of urban location, presenting a decreasing density pattern as distance increases from the city center. The outcomes show that, except for Brasilia, this pattern is well robust, even in cities that are core of large metropolitan areas like São Paulo and Rio de Janeiro that have a more decentralized distribution of households.

9.12 This feature is recognized also in cities with strong geographic constraints that determine a sprawled pattern of growing like Salvador and Recife, for example. Brasilia, differently, presents a pattern of households distribution in which densities are greater about 20-kilometer far from the city center. This pattern is attributed for the strong constraints over urban development in the central areas that push people, especially the poorest, toward the fringes of the urban area.

9.13 The decreasing density pattern from city center is inverted when it is controlled by the income of the person in charge of the household. This finding contradicts the expectation of the AMM model, since it argues that rich families live in suburbs in order to consume more land where land is cheaper. All Brazilian cities, including Brasilia, presented large concentration of poor households at peripheral areas comparatively with the inner city. This pattern is robust especially for the extremes of the income bands. In other words, poorest households are more intensively placed far from central areas, while richest households are more centralized.

9.14 Here it is important to say that the total of poor households in Brazilian cities represented by households whose person in charge earn up to 5 minimum salaries is greater than 50% of the total. In the poorest cities this amount reaches more than 70% like in Belém, Fortaleza, Recife and Salvador. Moreover, the average distance per household to the city center decreases monotonically in all cities studied as income increase. While the medium distance of poorest families is about 8.4 kilometers in majority of the cities but the large cities of São Paulo and Rio de Janeiro and the sprawled city of Brasilia, the mean distance of the richest ones is about 4.7 kilometer per household.

9.15 As the majority of employment opportunities in Brazilian cities are located within central areas, practically reproducing a monocentric city pattern, poorest people settled at Brazilian cities' peripheries have to bear the lack of urban services and high transportation costs as well. Hence how urban development and land use controls can affected the formation of this pattern, in other words, land use regulations did play any role in set poor households aside the central areas?

9.16 Since public intervention in Brazilian cities was historically driven to the central areas, controls on urban development can have affected land prices and, as a result household's distribution by income. Section 5 discusses this possibility by evaluating some aspects of land prices in Brasilia, Curitiba and Recife's metropolitan areas. In order to accomplish that were used a database with residential land prices in those three cities in two moments: 2000-2001 and 2002-2003. The databases bring land prices and information regarding infrastructure provision, titling and plot size.

9.17 For calculations through OLS regressions, was specified a dependent dummy variable that would capture unobserved urban features present in areas that were strongly regulated along time. It is assumed that the special urban features present in these areas are supposed to be correlated with controls on urban development. As such, the dummy variable can be interpreted as a *proxy* for regulation. The outcomes point that areas where regulation was more intense along time respond strongly by increasing residential land prices in Curitiba and Recife. In Brasilia, where land use is strongly regulated overall city, infrastructure seems to affect land prices more intensively than regulation. One of the reasons for this is that prices of serviced land and land without infrastructure within the Federal District are high overall city. Nonetheless, prices of serviced land are almost 3 times higher than land without infrastructure.

9.18 Infrastructure was also significant in affecting positively residential land prices along the three metropolitan areas, mainly in Curitiba. In Recife, where inadequacies in provision of infrastructure are greater than in the other cities, the effects of infrastructure on land prices were smaller than regulation. Title had no significance on land prices overall urban areas in Brasilia and Curitiba, while in Recife title increased positively residential land prices. These results indicate that in Brasilia, where virtually all residential plots are titled, and Curitiba, the guarantee on land tenure is secondary in land prices. In Recife, title affects less intensively than regulation and infrastructure.

9.19 Plot size also is statistically significant in all cities and affects negatively land prices, that is, small plot prices per sq mt is higher than large plot prices per sq mt. Plot size presented the smallest influence on residential

land prices. The effects on residential land prices of infrastructure and title combined were not statistically significant in any of the cities.

9.20 In order to evaluate the extension of the influence of these variables overall urban area were calculated through *Probit* regressions, the marginal effects of plots located at central areas, infrastructure, title, infrastructure and title, and plot size as distance from the city center changes. The results indicate that in all three cities land located at central areas increased strongly the likelihood of residential land prices is above the mean. In Brasilia and Curitiba this probability is about 100% at the central areas, while in Recife it is rated below 70%. In Recife, the presence of ZEIS across overall urban area and the low per capita income can make general land prices lower than in the other cities, where there are more people that can afford high land prices.

9.21 Nevertheless, in Recife the influence of the areas that were more controlled along time maintained the likelihood of land prices are above the mean until great distances, more than 50 kilometers from the central areas, while this influence in Brasilia and Curitiba is null after 25 or 28 kilometer far from the city center. Likelihood of land is priced above the mean due to infrastructure provision is kept beyond 40 kilometers in Brasilia and Recife, while in Curitiba it is null from 30 kilometer. These findings reflect some aspects of urban structure of Curitiba, which is a more compact city, while Brasilia and Recife are more sprawled. However, the fact is that specific features that are present within different urban areas affect land prices along the entire city and are not restricted only within the areas where they are related to.

9.22 Regulations also are pointed as responsible for increasing costs of infrastructure provision by generating large land consumption in urban developments. Excessive enforced design parameters and subdivision layouts, donation of excessive areas for public use, limits on densities or high patterns of roads dimensioning increase infrastructure provision since they imply in long extension of infrastructure networks to service few households. Under some specific market conditions the production of developments with infrastructure can not be feasible, mainly when is taken into account the opportunity cost involved in abandoning the idea of producing informal plots, here understood as plots without infrastructure and title.

9.23 Section 6 evaluates how urban design standards set by land use ordinances increase land consumption and hamper urbanized land and housing production. The statement of minimum parameters for developing land can affect differently economic feasibility of production of serviced and titled land in formal markets. Excessive enforcements in urban development increase land consumption that, in turn, increases costs of infrastructure provision. Relaxing urban standards is able to improve land development by permitting more units to be produced with less land. This cause cost of urbanization to decrease with the amount of units serviced.

9.24 However, loosening regulation parameters is not enough to improve urbanized land production by itself. Depending upon market conditions, land owner or developer opportunity cost from giving up of producing informal plots, is not offset by formal production earnings. In some cities, even informal plots being priced below serviced plots, revenues achieved from selling urbanized land is not able to surpass the costs involved in infrastructure and title provision and the expected profit from selling informal land. This becomes more critical if were considered the cost of capital and red tape costs derived from administrative proceedings for approving and registering plots.

9.25 Simple cash-flow assessment by calculating economic feasibility through indicators like net present value and internal rate of return show that developers are not encouraged in producing formal serviced land, even if regulations were relaxed. If the same is calculated for housing construction the results indicate that the feasibility with relaxed parameters is improved, mainly in internal rate of return. Nonetheless, net present value still indicates that business should be abandoned. This result is derived mainly from the cost of capital that hinders any investment at the interest rate of present days.

9.26 The outcomes presented are important to indicate that alternative policies which associate public and private sectors in cooperative partnerships can be viable to improve urbanized land developments and housing production for low income sectors. Section 7 concludes the paper and indicates some implications for public policies.

9.27 Deregulation on land markets can play an important role in improving the production of serviced land and housing; however, the role of public intervention can not be simply neglected since it is necessary in regulating some expectations of the market. Nevertheless, it is necessary that public intervention on urban development take in account aspects like the costs and not only the benefits of intervention. In addition, the rationale of intervention has to answer questions like why intervene in land markets, how to intervene, who will receive the benefits and who will pay the bill from intervention.

Reasons for Controlling Urban Land Markets

9.28 Most planners justify the use of instruments to control urban land development based on the expected benefits of public interest, social welfare, maintenance of urban quality of life and environmental equilibrium over private interests. Generally, urban regulatory schemes are created under specific conditions of social and spatial development without any guarantees these conditions remain the same in the long run. In very dynamic and complex contexts, with fast changes, urban regulations can become obsolete rapidly and illegalities can arise from rules that are broken, especially in situations where the legal framework prevent the adoption of changes to accompany cities' needs without slow and costly legislative changes.

9.29 In addition, the costs and side effects produced by prescriptions over urban development in the long run are historically underrated and the negative effects of miscalculated regulations are treated usually as new problems solved by new urban ordinances. As such, many regulatory tools commonly applied to guide the production of urban spaces can be counterproductive, affecting negatively urban land markets, especially in societies full of social inequalities.

9.30 As emphasized by several scholars, land use regulations are neither good nor bad *per se* (Bertaud and Malpezzi, 2001), and what counts are the effects produced by land use controls under specific urban contexts and market conditions. Hence in the adoption of urban regulations not only the objectives should be clearly established, but also it is important to know their direct and indirect effects and who will pay the bill for their adoption.

9.31 In economic development, urban land is supposed to play an important role since it is a decisive factor of production of housing, commercial and industrial spaces. World Development Indicators showed that in 2004 the economic activities located in urban areas like industries, retail and services were responsible for more than 96% of the world's GDP. In low income countries this proportion reached 72.5%, while in high income countries it was about 98%. In Latin America and Caribbean the participation of these activities in the regional GDP reached 93.2%.

9.32 In addition, the importance of land as a production factor becomes more critical if it were considered that real estate and its associated infrastructure represent the majority of tangible capital in all countries (Malpezzi, 1999). Thus, the effects of intervention on land markets are not trivial, and the misallocation of land for urban activities due to controls badly prescript imposes costs for the entire city. The results of planning controls on cities are not so easily realized in the short run and their effects, most of time, are only detected when they are stamped in the city. Further, since urban development involves building and infrastructure, the correction of the negative effects from regulation can be very costly to be implemented.

9.33 Public intervention in urban land markets in order to manage urban development is justified on the grounds that the private sector, operating under market conditions, cannot produce an efficient or equitable urban land allocation. Indeed, this is especially true if we consider that in societies plenty of inequalities there are groups that are excluded from market interactions. Further, without government intervention critical public facilities such as parks, open spaces, major infrastructure and urban services, which the private sector cannot profitably produce and sell, will not be provided (Dowall and Clark, 1996).

9.34 Hence, there are, at least, two basic reasons for intervention on urban markets: to promote efficiency and to promote equity in land allocation. Market failures can make free private markets to fail in allocating resources efficiently, situation that is possible in the presence of externalities, that is, the impacts imposed upon groups or

person outside any transaction. The benefits reached by private markets when externalities are present do not maximize benefits for the entire society, justifying public intervention in order to protect the collective interest.

9.35 There is a comprehensive literature on urban economics analyzing externalities in urban environment that affect land market. Externalities in urban areas may be positive, in case of agglomeration economies of scale, which is an important outcome of the aggregated production of the city. Agglomerative economies can increase land value since they can increase productivity by a sector and the entire city. Externalities can also be negative, in case of traffic jams, air pollution, industrial effluents, and criminality, for example. Urban areas that experience a process of increasing densities over the capacity of public services can produce diseconomies of scale that trigger processes that debase urban environment. Some urban land use controls that internalize the costs of externalities can be useful to deal with negative effects of urban growth, preventing hazardous effects upon urban productivity and land markets functioning.

9.36 On the other hand, public intervention in real estate markets often is driven by redistributive objectives to improve social welfare, not necessarily to improve efficiency in land allocation. Public policies formulated with this approach are intended to protect or compensate specific social groups from the effects of private land allocation, especially regarding access to public services and affordable housing. Nevertheless, redistributive policies that misunderstood the role of market forces, or are dissociated from a comprehensive approach that includes social, legal and economic aspects generally tend to be ineffective in the long run.

9.37 There are a large range of instruments used by government to intervene in real estate markets that can be grouped, basically, in enforcement of property rights, land and property taxation, subsidies, direct public provision and land use and planning controls (Malpezzi, 1999). Planning controls are normally the most adopted instruments worldwide and among them the definition of urban area boundaries, zoning, density limits, and physical and design parameters such as minimum plot size, maximum plot area occupied, setbacks, height and bulk building limits, and mandatory reservation of development area for public spaces, are the most common.

9.38 *Zoning*, that is, the division of a municipality territory in different districts or zones where other urban and physical controls are differently applied is the most common instrument used in urban planning. Planners argue that zoning is essential to assure efficient land allocation among the different uses needed by a community, providing not only adequate space for each use, but also preventing incompatible uses to be located near one another. In addition, density controls generally included in zoning is pointed as fundamental to help public authorities in dimensioning public services such as sewage, roads, public schools, health services and transportation.

9.39 Although the arguments for zoning are valid, other outcomes beyond its manifested intention have been produced. One of them is the increase of land and housing prices in high regulated areas. The maintenance of desirable urban characteristics enforced by zoning restrictions to development creates exclusiveness, increasing housing prices. Glaeser and Gyourko (2002) found that the majority of homes in United States are priced near or below to construct costs of new housing units but, in highly regulated urban areas, zoning restrictions appear to have increased housing prices. In addition, zoning regulations can be exclusionary intentionally, mainly in high income urban areas.

9.40 Pendall (2000) tested five land use controls, exclusive large-lot zoning, building permit caps, building permit moratoria, adequate public facilities ordinances and urban growth boundaries, and their connections to the racial composition of the communities that use them in the 25 largest U.S. metropolitan areas. The study found that low-density-only zoning can impose constraints on housing supply, attached dwellings, rental dwellings and shelter affordability, all four pointed as conditions to promote racial inclusion. Building permit caps were also associated with lowered proportions of Black and Hispanic residents in those areas. Nevertheless, the other controls tested presented limited effects on either housing types or racial distribution.

9.41 The effects of urban planning ordinances in real estate markets have been evaluated in several aspects, but there is little literature analyzing costs and benefits across a range of markets. Bertaud and Malpezzi (2001) present a straightforward cost-benefit framework for analyzing land use and related regulations on housing

markets, and present an application of the method to Malaysia. They argued that standards for land use are often established on the basis of an abstract minimum "need" for each service or facility. Even though each of them may seem reasonable when taken isolated, in practice, their cumulated effects, especially the unintended ones, may result in costly distortions in type and location of housing (Bertaud and Malpezzi, 2001).

9.42 Bertaud and Renaud (1997) investigated the effects of centralized and commanded decisions of land allocation in cities without markets. They studied the case of socialist cities and found that administrative-commanded system in land allocation is not able to take into account the value of a particular land site and its opportunity cost, as demand for land changes over time. Without price signals to reveal the opportunity cost of land in alternate uses, public allocation simply responds to land demand pressure by developing more land at the periphery instead of redeveloping well-located areas with obsolete land uses. The result is the production of fragmented cities where the more dense residential areas are located in the periphery separated by old industrial belts from the central areas where majority of jobs are concentrated. The spatial structure resultant increases the median distance per person to the central areas, increasing commuting costs and other operational costs of urban area.

9.43 In development countries, Dowall and Clark (1996) argue that there is too much government intervention in the wrong places and not enough in the right places, indicating that the establishment of an agenda for reforming urban land policies in those countries is urgent. They describe that the presence of public authorities in fast-growing third world cities is desirable mainly on land titling and registration, financing infrastructure and promoting inner-city redevelopment. In addition, they suggest that the solution to effective and productive urban management does not lie in putting away government intervention, but in finding a proper balance between public and private sector. However, the regulations generally adopted by cities in developing countries have resulted in adverse impacts on social welfare and economic productivity (Dowall and Clark, 1996).

The Classical Urban Economics Approach and the Form of the City

9.44 The pattern of residential and firm's location within cities is related with market land values, which respond to productive value of land and by demand and supply factors. Land is used as input of several productive processes whose outcomes produce a flow of income. As such, market value of land equals the present value of the flow of rental income of land outputs provided when land is allocated for different uses, considering the expected benefits in future. For example, the price of land allocated for residential use is the capitalized rental income of housing production, considering the present value of the future rental income flow at a mean interest rate that stimulate producer to build houses.

9.45 Residential use is predominant in urban areas covering more than 70% of developed land in cities. Thus, the elements that affect demand and housing supply are very important in pricing land, since it is the main input in real estate production markets. In fact, as the demand for housing increases builders demand more land to build more houses, causing the increase of land prices. Similarly, if more people can afford housing prices land prices increase, since the large demand for housing generates a large demand for land (O'Sullivan, 2000). The price of land is high because the demand for housing is high.

9.46 Land prices tend to reflect the productive value of land if land supply is responsive to demand and tend to be priced upward when land supply is constrained and cannot effectively respond to demand pressure (Serra et. al, 2003). The constraints for land supply can be resulted from restrictive land use regulations, inadequacies in infrastructure provision for land development, unclear property ownership and titling records, and the actions of landowners to drive up land prices by withholding land from the market.

9.47 Here is convenient to state that the term "price" is used in its generic assumption, representing the amount of money the occupant of land pays or would pay to the landowner for the right to use a unit of land for a given period of time. Hence, market land value will correspond to the highest price that a bidder is willing to pay, regarding the maximum and better use that can be developed in land, even in future. It is easy to realize that the

rent on the most productive land is based on its advantage over the least productive land, and this advantage equals the value of the difference in the productivity of land (Alonso, 1964).

9.48 While the rental income generated from agricultural land depends on its fertility and distance from the consumption centers, rent from urban land has a more complex articulation. From the initial approaches of David Ricardo and J. H. von Thünen to explain agricultural land rent, Alonso (1964), Muth (1969) and Mills (1972) developed a theoretical approach to explain location and urban land uses by using models that combine micro-economics elements as demand, production function, externalities, crescent returns and scale economies in a spatial arrangement characterized by central polarization.

9.49 In such spatial arrangement the basic elements are transportation costs and the differential formation of land prices as function of the distance from the city center. The city center is the core of urban area and is assumed to concentrate all job opportunities and all exportation facilities of the entire urban area, attracting families and firms to the central locations. Since the advantages offered by inner cities in terms of commuting and transportation savings are not reproducible across urban area, demand and supply factors establish that land price in central areas will be higher than at the fringes of the city. The rent of urban land hence is related with the advantages offered by different locations in saving commuting and transportation costs, *ceteris paribus*, in contrast with more distant sites.

9.50 Hence, the several urban uses bid for city locations balancing land consumption with commuting costs by distance to the city center and use of land will be assigned to the highest bidder in each case. In addition, high land prices trigger mechanisms of substitution of land for non-land inputs in housing and commercial spaces production, resulting in higher densities. In other words, the high land prices cause a decrease in land consumption per unit of built area by constructing vertical structures at the more demanded urban areas. Thus, the spatial structure resultant is characterized by decreasing densities from central areas towards peripheral areas where land prices are lower. In general terms, under the AMM model assumptions the pattern of households and firms location is determined by the trade-off between the maximization of land consumption and the minimization of transport or commuting costs.

9.51 The standard AMM theoretical model assumes some simplifications to study the spatial structure of the monocentric city and its pattern of land use location and land price formation. Some scholars as Richardson (1978), however, point that the simplifications assumed by the model are, themselves, enough to detach its inadequacies to characterize modern and more complex urban structures such the ones composed by several sub-centers. Although this fact is true, even in large metropolitan areas where the distribution of households and jobs are decentralized, the decreasing pattern of population density and land prices towards outskirts is still very robust in cities worldwide (Bertaud and Malpezzi, 2003).

9.52 The importance of this model is that the monocentric city was truly the dominant urban form until the 20th Century, that is, the history of the cities are, in short, the history of monocentric city. In addition, several cities around the world are still monocentric and for a comprehensive understanding of the transition of the cities from the monocentric pattern to the big polycentric metropolitan areas we should understand the forces that shape the monocentric city (O'Sullivan, 2000). Obviously, not only the variables detached in the monocentric city model influence location choice decision in more complex urban contexts, but also the existence of subcentres, effects from neighborhood composition, negative externalities as traffic jams, air pollution, criminality, quality of urban services, legal constraints and others can play a critical role in location choices.

9.53 An extension of the AMM model is to explain why high income families live in peripheral areas while the poor live in central areas of the city, at least in American cities. Few budget restrictions allow rich people to consume more land in periphery, where land prices are low, and use more efficient transportation modes. On the other hand, poor people will prefer living in central areas, occupying small housing units since budget restrictions do not permit them to consume large quantity of land and bear high commuting costs. This argument assumes that income-elasticity of demand for land is greater than income-elasticity of commuting costs, that is, consumption of land is more sensible to an increase in income than marginal commuting costs.

9.54 LeRoy and Sonstelie (1983), and Gin and Sonstelie (1992) suggest that the income-elasticity for consuming more space is not greater than income-elasticity of marginal commuting costs. If marginal cost of commuting time increases as income increases, the central areas will be more attractive since they imply in lower time consumption in commuting. Hence, the location pattern of different groups second their income depends on which of both income-elasticity is greater with an income increase (LeRoy e Sonstelie, 1983).

9.55 Glaeser *et al.* (2000) found that while income-elasticity of total spending on housing may be greater than one, the income-elasticity of demand for land is below 1. In addition, transportation modes perform an important role in the residential location pattern. Poor people use public transportation that is slow and inexpensive – low monetary costs and high marginal costs due commuting time. Rich people, on the other hand, utilize cars that are fast but are expensive – high monetary costs and low marginal costs due commuting time.

9.56 Thus, high income families only suburbanize if commuting time economy from using more efficient transportation modes is greater than material costs (fixed and variable) associated with them. If the latter were greater than opportunity costs associated to commuting time, high income families will use the same transportation mode that is used by poor and live in central areas (LeRoy e Sonstelie, 1983).

9.57 Although land prices and transportation costs are determinants in location of economic activities and households, other variables also can influence location choice. Quality and presence of infrastructure and urban services being exogenous can explain central localization for high income families in cities in developing countries, for example, since the lack of infrastructure imposes additional costs that exceed the advantages from living at the peripheral areas, that is, large consumption of land at low prices associated with the use of car.

9.58 Another reason to rich groups be attracted to central areas is the marginal valorization of urban amenities like green areas, parks, squares; historical buildings, monuments and high aesthetic and cultural urban features that are valorized by some groups.

9.59 Endogenous factors present where high income people live is also another reason to maintain these areas more attractive for the high income groups, also attracting better commercial and services firms. This endogeneity can be achieved by rigid zoning ordinances that restrain production of affordable housing for low income groups within these areas. In addition, the social composition of neighborhood crystallized in time creates features that are hard to change. Rich neighborhoods attract rich people and, because of that, housing in these areas is expensive. In the same way, poor areas that have improved their urban conditions by urbanization and upgrade programs remain marked as poor location, and thus, have kept land prices low.

9.60 Even though the AMM model based on bargain between land costs and commuting costs is useful to explain several mechanisms of rational choice in urban areas, it is not unanimous among scholars. Richardson (1978), for example, argues that the minimization of commuting costs to foresee location pattern is only applied to very poor or very rich people. Empirical evidences indicate that the preference of very rich people to suburbanize, in the case of United States and England, simply happen because of personal preferences that could be explained by good housing conditions, distance from poor, low densities, new houses, better quality of environment and natural amenities. Commuting costs would have a secondary role because in suburbs many families have not to trade-off land costs and commuting costs, since jobs are decentralized as well (Richardson, 1978).

9.61 Moreover, house prices can vary greatly within same area, due to differences in types and quality, real estate sales strategies and different conditions of supply and demand in the short run. In addition, the value of a location also be influenced by opportunity costs which can be affected by land use controls and other planning constrains (Richardson, 1978).

9.62 However, in spite of the simplifications assumed by the monocentric city model it has been useful to analyze some features of urban form and to explain some mechanism of location choice but, as cities become more complex, the model's explanatory strength goes weak and new theoretical approaches become necessary.

Brazilian Cities Regulation Framework an Overview

9.63 The growing of Brazilian cities occurred under an ambiguous environment, in which the central areas was target of public intervention in providing infrastructure and spatial improvements, while the peripheral areas grew under the absence of public care and under permissive market conditions. In fact, the Brazilian practice in urban planning is quite recent, and the experience is, in many ways, related more with technical concerns of spatial features of the city than managing urban and regional development as a whole.

9.64 Basically, physical planning in Brazil has been guided by master plans based on the traditional paradigm of "survey-analysis-evaluation-plan-implement", evolved from developed country models that were themselves based on technocratic, time-consuming and rigid procedures (Dowall and Clark, 1996). The Brazilian master plans tend to emphasize zoning ordinances, under a static approach, with generic guidelines that call for further definitions and regulations. In addition, the legal framework produced historically in Brazilian cities has been driven more at accommodating and legitimating trends of urban occupation ex-post than planning effectively urban growth ex-ante.

9.65 This approach, many times, give opportunity to produce ordinances aimed to preserve the valorized central areas from degradation and property devaluation caused in many cases by low income people occupation in high density buildings. An example of casuistical motivation for regulation was a 1957 municipal law in São Paulo that established a built floor-area coefficient between 4 and 6 with relation the plot area. That law also regulated the minimum plot area per residential unit built of 35 square meters and net residential density to 600 inhabitants per hectare. The result was the construction of new buildings with large apartments that were out of reach from low income people, who used to occupy small residential units in buildings located in the central areas.

9.66 Even the introduction of approaches during the 20th Century that considered urban planning as a multidisciplinary matter, joining urban development to overall regional development was not effective. The ideas derived from the functionalist city paradigms became predominant in academic circles and public spheres, since the practice of urban intervention was commanded basically by professionals formed under these ideas. The rationalism and more extensively the urbanism, its higher order discipline, consolidate a discretionary and technocratic practice mostly emphasized on physical and aesthetic aspects of the city.

9.67 During the military regime a reasonable organized structure to deal with urban planning in Brazil at a national level was created in 1964, when the SERFHAU (Serviço Federal de Habitação e Urbanismo) was founded, later renamed to CNDU (Conselho Nacional de Desenvolvimento Urbano). The conception adopted by SERFHAU for urban planning was associated with the idea that urban development and the economic development were connected and hence urban planning was part of the economic development as a whole. The cities and the metropolitan areas hence were seen as instruments of economic growth and concerns such as poles of economic development, city primacy, optimal city size, cities network among others were of special interest.

9.68 The SERFHAU was the most enduring and fertile experience in planning in Brazil, developing a wide range of plans for several Brazilian cities, even though many of them were not implemented. Maybe, the partial success accomplished was because the local authorities which did not share the same vision of the role of cities in economic development. As pointed by Alan Evans the usual position of city planners is that economic growth is not their concern, since they are concerned with physical development, not economic development (Evans, 2002). As such, side effects of spatial intervention and costs regarding regulation have no relevance to them.

9.69 In 1979 was passed the Federal Law 6,766 that established the basic legislation at national level for developing, approving and registering urban land subdivisions in Brazil. This law and the changes introduced by the Federal Law 9,785 in 1999 state that urban developments are only allowed within delimited urban zones (boundaries) or zones of urban expansion defined according to the city master plan or another specific municipal law. In addition, the law stated that urban developments must accomplish a set of parameters that would be defined by local authorities, in order to have approved land subdivision for urban purposes.

9.70 Among these parameters are a minimum plot size of 125 m², with a minimum frontage of 5 m, and a compulsory donation of 35% of development area for public uses and open spaces. The latter was changed by Federal Law 9,785/99 that transferred the responsibility in determining the ratio of public spaces to the municipalities. Local authorities also are responsible for defining urban design parameters such as allowed land use, plot dimensions, streets dimensioning, public facilities, minimum plot areas and density limits. On the other hand, the Federal Law admitted that the parameters enforced by the law could be dismissed in case of developments produced for low income people.

9.71 The Federal Law also states the achievement of several conditions for plots registering and titling such as the presentation of property titles of the land where the development is being implemented, including the previous 20 years of title registries; different types of certificates involving up historic records of 10 years, and other documents. Further, the law require that the developer implement at least the road system, the drainage facilities and have demarcated the lots boundaries before development registration. Alternatively, he/she could present a schedule of the development construction works that should take no more than 4 years. The construction schedule should be approved by local authorities, along with the warranties for construction.

9.72 In 2001 was passed the Federal Law number 10,257, also known as Statute of the City, that introduces a new set of regulatory instruments to be used by the Union, states and municipalities in urban development. One of the reasons detached to introduce this law was the recognition that the usual planning practice in Brazil was preferably oriented for the median and high income demands and hence to the logic of market investments.

9.73 In fact, the regulatory framework normally used to control urban development has not been effective in dealing with issues related with poor access to land and housing, for example. The instruments introduced by the Statute of the City for public intervention, that do not substitute the former ones at all, intend to adopt a notion of governance that takes in account the dynamic of urban development recognizing that a multiplicity of agents, with different interests, are responsible for the production of the city. As such, the role of government should be set on managing urban markets considering conflicts as part of urban production process. In addition, it states that the public sector has to assume the responsibility in dealing with urban poverty, and includes the participation of private sectors as a necessary step for establishing urban policies.

9.74 However, even though the regulatory instruments presented by the Statute of the City represent a change in dealing with urban development, by adopting an approach that includes adaptability and flexibility in their logic, it is particularly contradictory when bind the instruments application to zoning designations set by master plans. As such, adoption of discretionary parameters as usual can be hard to prevent.

9.75 The instruments brought together by the Statute of the City are not totally new and most of them have been used by several Brazilian municipalities since the 90's and early. Among them can be mentioned, for example, progressive land taxes in time, sale of extra construction rights by the government, transfer of construction rights, expropriation for social or cultural purposes, enforcement of construction rights and other instruments assigned for regularization of informal settlements. As such, classification of some urban areas as Special Zones of Social Interest (*Zonas Especiais de Interesse Social, ZEIS*) is used by cities such as Recife, Belo Horizonte, Porto Alegre and Belém. In these zones are predicted actions to assure the regularization of informal settlements, land tenure and production of new affordable houses for poor population.

9.76 Public intervention upon urban markets in Brazilian cities has been traditionally conducted by using urban planning and land use controls, even though other instruments has been used recently. These instruments can be grouped basically in planning, fiscal, legal and administrative categories. Chart 9.1 shows the most common instruments in each category defined by the urban legislative framework (master plans and specific land use legislation) of 10 Brazilian cities which are among the main cities in the country¹¹⁸. Planning controls are the most instruments used and master plans and zoning are the most important. Master plans converted in municipal laws normally bring the main zoning definitions, including the urban boundaries, general land uses, and guidelines for

¹¹⁸ Belém, Fortaleza, Recife, Salvador, Belo Horizonte, Rio de Janeiro, São Paulo, Curitiba, Porto Alegre and Brasília.

urban policies as infrastructure provision and transportation services. Master plans are complemented by specific land use laws that detail most of zoning ordinances and design parameters.

Chart 9.1 Common Instruments of Urban Policy used in Brazilian Cities

Category	Regulation instruments
Planning	<ul style="list-style-type: none"> Master Plans Urban boundaries Zoning Land use and occupancy laws Construction codes Plans of urbanization of informal settlements Sectorial programs of infrastructure provision and transportation
Fiscal	<ul style="list-style-type: none"> Progressive property taxes Improvement contributions Other public fees and taxation Fiscal incentives and taxes waive for specific developments
Legal	<ul style="list-style-type: none"> Compulsory land development and build construction Preemption right Transfers of construction rights Surface right Expropriation for social or cultural purposes Purchase of additional construction rights from government Collective land tenure
Administrative	<ul style="list-style-type: none"> Concession of rights of use Partnerships with public and private sectors Urban development funds Special zones of social interest for regularization and titling purposes

9.77 Chart 9.2 shows the basic urban parameters defined by master plans and specific land use legislation in the 10 Brazilian cities. Usually, the design parameters are not the same across urban area and change according to the different zoning specifications for land use and occupancy. In urban contexts more complex as São Paulo, for example, the value of some designations can involve different conditions that imply in great variation in parameters value not only among different zones, but also within a same zone. For example, setbacks can assume several measures depending on the plot size, the frontage of lot and the building height within a same zone.

9.78 Division of urban area in restricted exclusive zones is very commonly used, not only in industrial zones, where residential and industrial land uses can be incompatible, but also in exclusive residential areas. A strictly division of the city in exclusive land use zones can generate large operational costs, mainly in transportation and commuting costs. Brasilia, for example, that follows the paradigms of the functionalist city model has its urban land uses defined in exclusive sectors, what implies in great use of vehicles and an inefficient public transportation system.

Chart 9.2 Main Planning and Land use Regulation Standards in used in Brazilian Cities

City	Master plan year	Year of the law in use	Exclusionary land use zoning	Minimum plot size (m ²)	Minimum plot frontage (m)	Minimum plot size in ZEIS ¹ (m ²)	Minimum plot frontage in ZEIS (m)	Minimum public area ratio	Basic coefficient ²	Setbacks (front, sides and back)	Minimum lot area per unit ³ (m ²)	Maximum occupation ratio	Density limit (inh/ha)	Road width (m)	Sidewalk width (m)
Belém	1994	1999	Yes	125	5	90	6	35%	starting from 1	variable	-	70%	-	6	1.5
Fortaleza	1992	1996	Yes	125	5	50	flexible	-	starting from 2	3/1.5/3m	100 to 200	40 to 60%	variable	7	2
Recife	1991	1997	Yes	-	-	40	flexible	-	variable	5/-/1.5m	-	30 to 80%	-	3.5	-
Salvador	2004	1984	Yes	125	5	125	flexible	35%	starting from 1	2/-/2m	10m ² /inha ^b	-	-	6	1.5
Rio de Janeiro	1992	variable	Yes	-	-	-	flexible	35%	starting from 1	variable	variable	-	-	-	-
São Paulo	2002	2004	Yes	variable	variable	flexible	5	variable	starting from 1	variable	62.5 or 40	variable	variable	7	2.5
Belo Horizonte	1996	1996	Yes	125	5	40	flexible	35%	starting from 1	3/1.5/1.5m	10 - 90	20 and 50%	-	15	-
Curitiba	2004	2000	Yes	330	11	-	flexible	35%	starting from 0,4	variable	-	30 - 100%	-	-	-
Porto Alegre	1999	1999	Yes	150	5	125	5	35 - 50%	starting from 0.5	variable	75	-	140 - 525	7	2.75
Brasilia	1997	variable	Yes	125	-	112.5	7.5	35%	variable	variable	-	variable	-	7	2

1) In Brasilia the concept of ZEIS is not adopted, although there are many areas where were implemented low income housing programs by local government.

2) It is an index that represents how many times the built area corresponds to the lot area.

3) Also called Ideal Fraction or Plot Ratio.

9.79 Other designations largely used in Brazilian cities are minimum plot size, generally established in 125 square meters, minimum plot frontage (5 mt), enforcement of land donation for green spaces and public facilities of about 35%, setbacks (front, sides and back), maximum ratio of surface occupancy and roads dimensioning standards. An index that represents a fraction of plot area for each housing unit produced is also used as well as a construction coefficient that limits the total built-up area per plot. Moreover, limits on building height, limits over population or housing density with relation to the infrastructure capacity, and minimum ratio of natural or permeable surface within plots due to environmental purposes are quite used.

9.80 Construction coefficient, in some cases also called utilization coefficient or construction index, indicates how many times the total built floor area corresponds to the plot area. When construction coefficient is established in 1 for purposes of selling extra construction rights it is called 'basic coefficient' and represents the total building area that developer has the right to construct without extra payments. If developer wishes to construct above it he/she must acquire extra construction rights from public authorities by paying for that. Even though not much usual, 'basic coefficient' can be set above 1, like in zones of high density where it can reach 5.5 or 7.0 as in the central areas of Recife, for example¹¹⁹.

9.81 Many of the zoning constraints mentioned above are justified as necessary public intervention in order to control negative externalities that can emerge from areas where densities reach levels above an optimal point, imposing extra costs to the city. Negative externalities like traffic jams, decrease in air quality, and increase in temperatures, waste accumulation and infrastructure overcharging impose costs that affect the city as a whole.

9.82 The optimal level of density can be defined as the level in which the externalities generated by high densities are offset by the gains of scale allowed by agglomeration. Even though economic interaction can be potentiated in urban agglomerations by reducing distances, negative externalities can hinder productivity and trigger process of urban degradation. Hence, above an optimal point the marginal benefit from an increase in density is lower than the marginal cost produced.

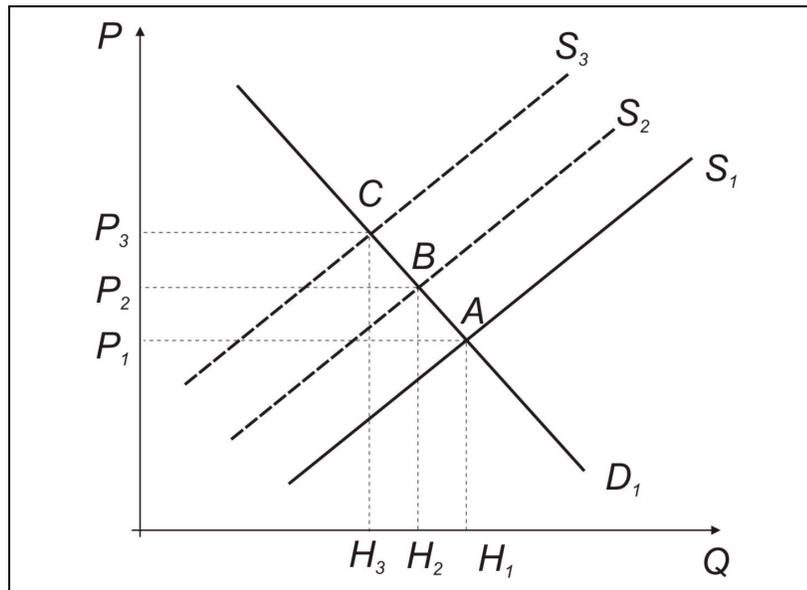
9.83 Avoiding the raise of negative externalities is one of the rationales cited to control urban growth. On the other hand, reducing the potential of construction in high demanded locations yields an effect that is similar of land scarcity¹²⁰, increasing land prices. Land is the main input in real estate production and, due to its nature it is not easily reproducible, what causes the supply of land to be inelastic. As land becomes scarce land prices increase, leading developers to substitute land for other inputs in housing production, building vertical structures that increase densities. Further, construction potential reduction combined with limitation in housing units production per plot area cause housing to be produced at large sizes, even in vertical structures, increasing housing prices that block poor people access to housing produced under these conditions.

9.84 Figure 9.1 shows simple supply and demand curves that illustrate how constraints in housing production affect prices. Suppose that S_1 is the supply curve of total housing space in a not much restrictive urban context to densification, and D_1 the demand curve for housing. At the point A , under equilibrium, the amount of housing space produced is H_1 . If constraints for housing production and densification are imposed, the curve S_1 is shift to S_2 denoting, *ceteris paribus*, a new supply condition with B the new equilibrium point. At this point the amount of housing space produced is H_2 priced at a point above H_1 ($P_2 > P_1$).

¹¹⁹ Recife's master plan is being revised and these coefficients will be defined in 1, with the possibility to reach up to 3, even though local real state developers don't agree with it.

¹²⁰ Not accidentally, one of the prime designations of the mechanism of selling extra construction rights was *solo criado* (created land).

Figure 9.1 Simple supply and demand curves.



9.85 If zoning controls are effective in avoiding negative externalities, the characteristics responsible for the attractiveness of regulated zones are preserved and, consequently, demand and land prices are kept high. As such, regulation is able to affect housing prices not only by reducing housing supply, but also by affecting positively other variables that cause land prices to be high. A new supply curve is represented by S_3 and the new equilibrium point is C. At this point the housing produced is H_3 and the new price per sq mt is P_3 that is greater than P_2 and P_1 .

9.86 This is a simplified model that illustrates possible effects from regulation over housing supply and prices. Even if extra building rights are conceded to developers to produce more housing units to respond to demand, the costs from that will be integrated in final housing prices and the effects pointed above would be still present and the effects on prices could trigger mechanisms of social exclusion. The gains from preventing negative externalities and from selling extra building rights, in turn, could be exceeded by social costs from spatial segregation and operational costs from providing urban services in a sprawled city.

Some Stylized Facts about Brazilian Cities

9.87 Among the several features presented by Brazilian cities there is a remarkable spatial pattern of population distribution in which low income people are located far from the central areas, in opposition to the central location of the high income people. As seen in Section 2, there are many reasons that can be detached to explain location and high land prices at the central areas. A possible one, which certainly is not the unique, is that spatial improvements and land use controls carried out by public intervention preferably at the central areas, while peripheral areas were neglected, reinforced their advantages driving urban formal markets to them. As a result of land high prices, associated with high transportation costs, central areas were occupied by high income groups, while low income population were pushed to the periphery.

9.88 It is possible to measure the pattern of distribution of households across urban areas as function of their distance to the city center. Table 9.1 and Table 9.2, and Figure 9.2, show basic facts about a sample made of 10

Brazilian cities¹²¹ that are cores of large Brazilian metropolitan areas. Note that the results presented are related to the cities, not to the entire metropolitan area.

9.89 The sample presents cities from different Brazilian regions that grew under different contexts. Some of them faced consistent industrialization process and became the core of large metropolitan regions as São Paulo, Rio de Janeiro and Belo Horizonte. São Paulo and Rio de Janeiro are the largest cities in Brazil and are among the largest cities in Latin America. In fact, these cities polarized intense population flows from overall country and experienced fast urbanization processes during the second half of the 20th Century.

9.90 Others also developed important industrial parks; however, the trend of their influence was exerted mainly at a regional level like Porto Alegre, Curitiba, Salvador and Recife. These cities also experienced fast urban growth during the same period. Other cities faced intense urban growth until the end of the century like Belém and Fortaleza and are located in regions where *per capita* income is very low. Finally, Brasília¹²², a city built to be the capital of the country and conceived under the modernist city paradigms. The principles of the modernist city prescribed a city organized in different land use sectors, not mixed, where the use of car would be largely stimulated. As such, the city adopts a very restrictive control on land use in order to preserve its features, since it was assigned as Cultural Heritage of the World by UNESCO.

9.91 The calculations were made by using the households' information from the Demographic Census of 2000 carried out by the Brazilian Bureau of Statistics, IBGE. As such, the distribution of households by income was calculated with respect to the medium wage earned monthly by the person in charge of the household, expressed in terms of Minimum Salary (MS)¹²³. The geographic level of aggregation of the data was the neighborhoods in all cities, with the exception of São Paulo, where was used Districts (96) and Brasília, where the data were gathered in sub-areas, in a total of 56, since the city does not adopts a neighborhood division and the territorial unit, the Administrative Regions, are not suitable for our objectives.

9.92 As seen in Table 9.1, the cities located at North and Northeast regions have the lower GDP *per capita*. Not accidentally, more than 60% of their households are in the band of 3 MS or less of medium earnings of the person in charge of the household. In addition, if were considered the wages up to the band of 5 MS, the proportion of households is above 75% in Belém, Fortaleza and Salvador, and about 72% in Recife, the highest ratios presented in the sample.

9.93 On the other hand, the ratio of households in the superior band, above 20 Minimum Salaries (MS), is below than 5% in those three cities and about 6.6% in Recife, the lowest ratios found. The cities located in the Southeast and South regions presented a proportion smaller than 46% of households within the 3 MS band or less, while the households within the band of 20 MS and above was at least 9%.

9.94 Albeit the highest GDP *per capita*, the amount of households in Brasília¹²⁴ that is within the lowest wage band is proportionally similar of that in cities from the South and Southeast Regions of our sample. However, Brasília and Porto Alegre concentrated about 11.6% of the households within the superior band of wages, the highest ratio found.

9.95 Despite the total of households in Brasília is similar to other cities, like Curitiba or Fortaleza, the distortion of their distribution across city is remarkable. The medium distance of households to the city center for all cities of the sample, except São Paulo, Rio de Janeiro and Brasília, is about 7.4 kilometers. São Paulo and Rio de Janeiro that are in the largest metropolitan areas of the country have average distance of about 13.6 km and 19.1 km, respectively. Brasília, in turn, presents a mean of 19.2 km per household to the city center. Note that,

¹²¹ Belém, Fortaleza, Recife, Salvador, Belo Horizonte, Rio de Janeiro, São Paulo, Curitiba, Porto Alegre e Brasília.

¹²² Even though there are people who admit the use of the name 'Brasília' only to designate the *Plano Piloto*, that is, the area object of the heritage assignment, here Brasília is used to represent the set of urban areas within the Federal District since they form, in fact, a unique city despite its fragmented structure.

¹²³ The monthly minimum salary at the census date was R\$ 151.00 equivalent about USD 83.50.

¹²⁴ In Brasília the presence of the Federal Government and public enterprises whose financial records are registered in local GDP can overestimate this indicator.

while São Paulo and Rio de Janeiro have about 3 and 1.8 million of households, Brasília has only about 0.5 million of households, similar to cities like Curitiba, Fortaleza or Belo Horizonte, for example, that present a average distance to the city center of about 7 km per household.

Table 9.1 Basic Facts about 10 Brazilian Cities in 2000

City	GDP per capita (R\$)	Total permanent households 2000	Households concentration (%) and average distance (km) per household to the city center according to the income of the person in charge of the household					
			up to 3 MS	3 to 5 MS	5 to 10 MS	10 to 15 MS	15 to 20 MS	above 20 MS
Belém	4,287.00							
Households		296,352	62.7%	12.5%	13.4%	4.1%	3.0%	4.3%
Average distance		7.7 km	8.6 km	7.9 km	6.8 km	5.7 km	4.7 km	3.7 km
Fortaleza	4,516.00							
Households		526,079	65.8%	11.1%	11.7%	4.0%	3.0%	4.5%
Average distance		7.9 km	8.6 km	7.9 km	6.8 km	5.8 km	5.3 km	4.8 km
Recife	6,585.00							
Households		376,022	61.4%	10.4%	12.8%	4.9%	3.9%	6.6%
Average distance		6.7 km	6.9 km	6.8 km	6.4 km	6.1 km	5.9 km	5.8 km
Salvador	3,926.00							
Households		651,278	62.8%	12.4%	12.9%	4.3%	3.1%	4.6%
Average distance		8.0 km	8.5 km	7.8 km	7.0 km	6.5 km	6.3 km	6.0 km
Belo Horizonte	7,130.00							
Households		628,442	45.7%	15.0%	18.6%	6.6%	5.2%	8.9%
Average distance		6.9 km	7.9 km	7.6 km	6.5 km	5.4 km	4.8 km	4.0 km
Rio de Janeiro	9,818.00							
Households		1,802,347	42.4%	15.6%	20.8%	7.0%	5.4%	8.8%
Average distance		19.1 km	22.0 km	20.4 km	18.0 km	15.1 km	13.4 km	12.1 km
São Paulo	12,154.00							
Households		2,985,977	40.1%	17.9%	21.0%	6.4%	5.2%	9.4%
Average distance		13.6 km	15.7 km	14.7 km	12.8 km	10.7 km	9.5 km	8.1 km
Curitiba	8,087.00							
Households		471,163	37.0%	18.0%	22.2%	7.4%	6.0%	9.3%
Average distance		7.3 km	8.6 km	8.1 km	6.9 km	5.6 km	4.8 km	4.0 km
Porto Alegre	8,764.00							
Households		440,557	35.8%	15.5%	22.0%	8.3%	6.9%	11.5%
Average distance		7.2 km	8.8 km	7.9 km	6.6 km	5.6 km	5.3 km	4.9 km
Brasília	14,223.00							
Households		547,656	43.4%	13.6%	18.3%	7.2%	5.9%	11.6%
Average distance		19.2 km	23.0 km	22.2 km	19.4 km	15.5 km	12.7 km	9.3 km

Data Source: Census 2000, IBGE.

9.96 In addition, the mean distance to the city center of households in the band of 3 SM or less in Brasília is 23 km, the highest, followed by Rio de Janeiro and São Paulo with 22 and 15.7 km, respectively. In the other cities the average distance of the households of this band is around 8.3 km. Note that the average distance to the city center decreases monotonically as the mean wage of the person in charge of the household increases. As such, the

distance of the poorest households from the city center in Brazilian cities is greater than overall mean distance and, in some cases, more than twice the mean distance of the richest households.

9.97 Overall mean distance of households within the band of 20 SM or above is about 4.7 km. The exceptions are São Paulo and Rio de Janeiro that presented a mean distance of about 8 and 12 km per household, respectively and Brasília that presented an average distance of about 9.3 km. The medium distances presented by Brasília are compared only with São Paulo and Rio de Janeiro, even though the amount of households in it is smaller than in those cities. This is because not only the original conception of the *Plano Piloto*, characterized by a less compact built area intensive in land consumption and preserved by strong land use controls, but mainly for planning policies that produced a fragmented urban structure that abate overall densities.

9.98 The effects of households distribution in these cities also is noted when the gradient of household density is calculated for all the cities and all the salary bands. The gradient is a formalized exponential negative function ($D=D_0 \cdot e^{-Gd}$) that is largely employed to assess the rate in which density varies with distance. The expression is easily calculated using empirical data for densities at the several locations of the city with relation their distance to the city center and taking their logarithms in a linear regression.

9.99 Table 9.2 shows that except for Brasília, overall household density decreases from city center towards the outer limits of the cities. Porto Alegre and Curitiba presented density gradients of -0.187 and -0.151, respectively. This signifies that household density decreases at a rate of 19% per kilometer from the city center in Porto Alegre and 15% in Curitiba. These two cities are the most centralized of the sample. São Paulo and Rio de Janeiro, the largest cities of our sample, are the most decentralized and presented rates of 4.8% and 6.1%, respectively. The distance is a significant regressor at a 95% level in all the 9 cities.

9.100 However, regressions' outcomes for the adjusted-R² lower than 50% show that the variation of the distance explains only partially the variation of the households' density from the city center. In other words, other variables influence the spatial distribution of households across urban areas. Cities that have strong topographic and geographic constrains as Recife, Salvador, Belo Horizonte and Rio de Janeiro, for example, showed low values for the adjusted-R² while the more compact ones presented higher values, like Curitiba, Porto Alegre and Belém. Thus, variables that identify other aspects of the cities could be added to the model to improve its explanatory force. Nevertheless, at this point, our interest is in assessing the effect of distance.

9.101 Brasília, in turn, presents a different pattern of household distribution. The distance is not significant in explaining distribution of households across its urban area. This fact reflects the pattern of urban growth that the city faced since its inauguration in 1960. Land allocation in Brasília is driven not by market forces, but is commanded by a bureaucratic decision system that is unusually facilitated by the public property of the majority of land available for urban development. In addition, the functionalist spatial features of the *Plano Piloto* is preserved by very restrictive land use controls that block the development of the empty spaces and changes in the exclusive land uses prescript by the original plans.

9.102 The high land prices presented by the exclusive residential areas within the *Plano Piloto* can be pointed as a result of this context in which are associated a commanded land allocation and very restrictive land use controls that constrain housing supply within the preserved area. Further, while low densities are maintained within central areas the greatest densities are found far from the city center in settlements produced by the government to absorb city growth, in special that represented by the low income population. Brasília, due to its context, cannot be considered a good example to represent a typical Brazilian pattern of urban growth. However, in spite of its unique spatial characteristics, the Brazilian capital can be useful to study the effects of commanded land allocation and strong land use controls.

9.103 Table 9.2 also shows regression outcomes for the variation of a household concentration index in each wage bands by the distance from the city center. The household concentration index is a ratio between the relative participation of the amount of households in each salary band within each neighborhood and the relative participation of the neighborhood's households in the total of the city. The outcomes show that in all the cities of the sample the proportion of poor households increase with distance, at a rate that varies from 1.9% in Belém to

10.4% in Curitiba per kilometer. Curitiba, Belo Horizonte and Recife were the cities that presented the highest variation rate, that is, the poorest households are more decentralized, with rates about 10%. The variation rate is high in Porto Alegre and Brasilia as well, of about 8% and 7% respectively.

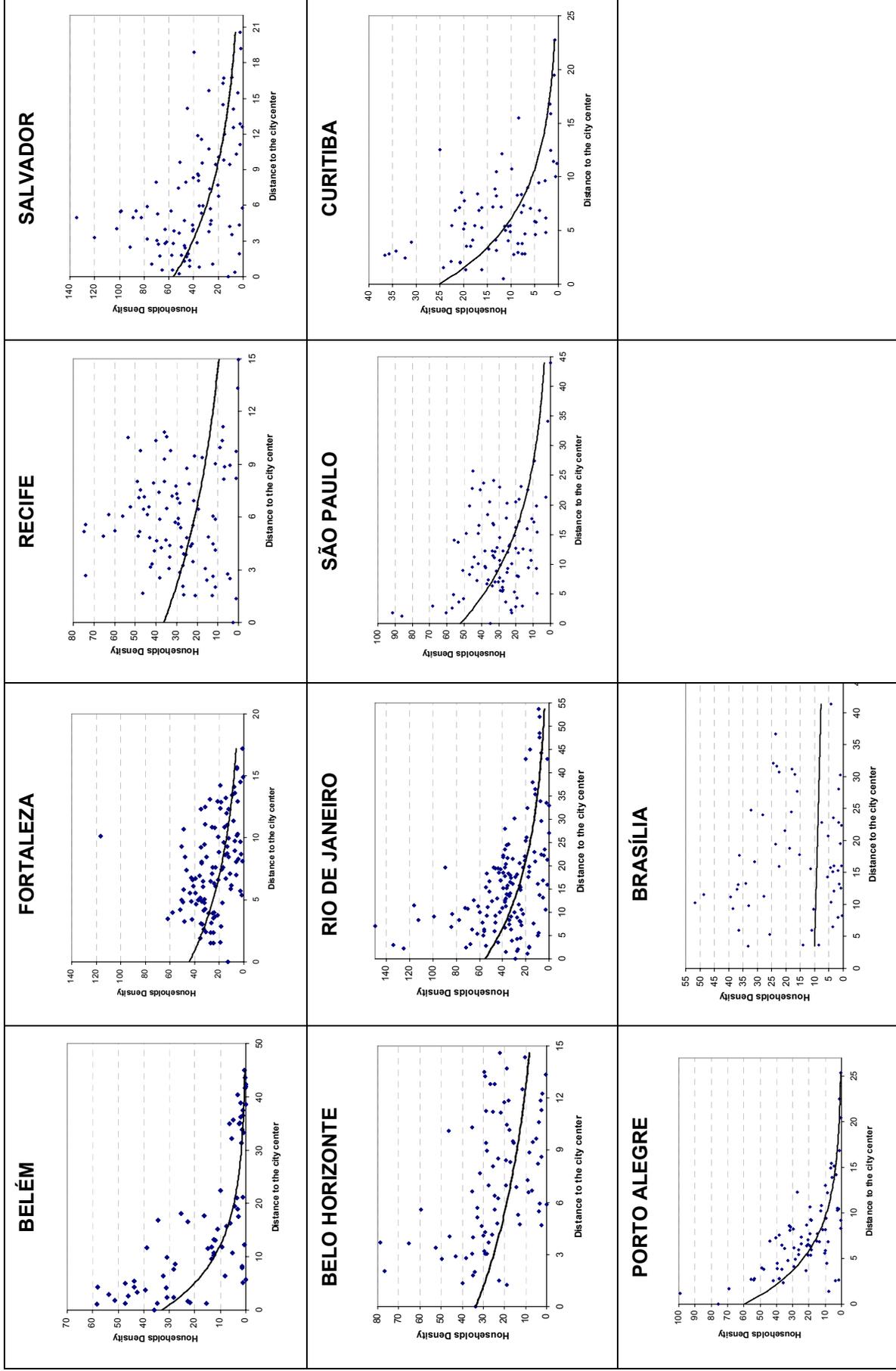
9.104 The distance as a regressor is significant at a 95% level for all cities of the sample. The adjusted-R² showed better results than the regressions for overall density of households' variation. In cities like Curitiba and São Paulo the adjusted-R² reached values near 50%. In others, like Porto Alegre and Brasilia, at least 33% of decentralization of the poorest households is explained by distance. In cities like Recife, Rio de Janeiro and Belo Horizonte the adjusted-R² presented low values, due to the reasons already mentioned. The largest cities of São Paulo and Rio de Janeiro presented low rates of poor household decentralization, maybe because of the extension of their urban areas as well as the existence of poor households near central areas, such as *favelas* and *cortiços*.

Table 9.2 Households Density and Concentration Index Gradients for 10 Brazilian Cities in 2000

City	Households Density		Medium earnings bands of the person in charge of the household (Minimum Salaries)											
	Density Gradient	Adjusted R ²	< 3 MS		3 to 5 MS		5 to 10 MS		10 to 15 MS		15 to 20 MS		above 20 MS	
	Gradient	Adjusted R ²	Gradient	Adjusted R ²	Gradient	Adjusted R ²	Gradient	Adjusted R ²	Gradient	Adjusted R ²	Gradient	Adjusted R ²	Gradient	Adjusted R ²
Belém (Prob [IT] > t])	-0.098 (0.0000)	0.493	0.019 (0.0006)	0.147	-0.005 (0.1824)	0.012	-0.030 (0.0000)	0.278	-0.030 (0.0005)	0.151	-0.030 (0.0037)	0.103	-0.032 (0.0053)	0.094
Fortaleza (Prob [IT] > t])	-0.114 (0.0000)	0.200	0.061 (0.0000)	0.230	-0.012 (0.2223)	0.004	-0.089 (0.0000)	0.258	-0.152 (0.0000)	0.292	-0.185 (0.0000)	0.281	-0.206 (0.0000)	0.227
Recife (Prob [IT] > t])	-0.089 (0.0230)	0.045	0.097 (0.0002)	0.133	0.005 (0.7588)	0.001	-0.066 (0.0072)	0.066	-0.156 (0.0002)	0.128	-0.208 (0.0002)	0.136	-0.264 (0.0001)	0.155
Salvador (Prob [IT] > t])	-0.107 (0.0000)	0.218	0.029 (0.0343)	0.038	-0.018 (0.0176)	0.505	-0.063 (0.0000)	0.210	-0.089 (0.0002)	0.135	-0.107 (0.0005)	0.118	-0.106 (0.0034)	0.082
Belo Horizonte (Prob [IT] > t])	-0.096 (0.0066)	0.079	0.097 (0.0000)	0.236	0.055 (0.0002)	0.153	-0.023 (0.1817)	0.010	-0.120 (0.0001)	0.171	-0.171 (0.0000)	0.215	-0.261 (0.0000)	0.304
Rio de Janeiro (Prob [IT] > t])	-0.048 (0.0000)	0.222	0.019 (0.0000)	0.128	0.007 (0.0062)	0.045	-0.006 (0.0271)	0.027	-0.025 (0.0000)	0.124	-0.036 (0.0000)	0.132	-0.047 (0.0000)	0.119
São Paulo (Prob [IT] > t])	-0.061 (0.0000)	0.285	0.047 (0.0000)	0.473	0.021 (0.0000)	0.161	-0.017 (0.0000)	0.283	-0.066 (0.0000)	0.732	-0.097 (0.0000)	0.682	-0.144 (0.0000)	0.579
Curitiba (Prob [IT] > t])	-0.151 (0.0000)	0.392	0.104 (0.0000)	0.514	0.056 (0.0000)	0.380	-0.043 (0.0000)	0.315	-0.134 (0.0000)	0.670	-0.195 (0.0000)	0.677	-0.275 (0.0000)	0.738
Porto Alegre (Prob [IT] > t])	-0.187 (0.0000)	0.466	0.080 (0.0000)	0.331	0.036 (0.0000)	0.198	-0.020 (0.0797)	0.027	-0.087 (0.0000)	0.324	-0.119 (0.0000)	0.338	-0.140 (0.0000)	0.249
Brasília (Prob [IT] > t])	-0.007 (0.7434)	R ² = 0.002	0.074 (0.0000)	0.353	0.046 (0.0001)	0.235	-0.003 (0.6793)	0.003	-0.037 (0.0033)	0.127	-0.068 (0.0000)	0.244	-0.100 (0.0000)	0.268

Data Source: Census 2000 IBGE.

Figure 9.2 Households Density Gradients for 10 Brazilian cities in 2000



9.105 Note that, with the exception of Recife, cities that have low GDP *per capita* like Belém, Fortaleza and Salvador presented the lowest rates of decentralization of poor households comparatively with cities of the same size. On the other hand, as the mean wage of household chief increases the households became more and more centralized. In the band of 20 minimum salaries and above, the pace of concentration towards central areas is very high in all cities, exceeding the decentralization of poorest households.

9.106 Some results for high income household centralization are among the more consistent of the calculations and in cities like São Paulo and Curitiba the adjusted-R² reaches 67% in some cases (band salaries above 10 minimum salaries). In cities like Belo Horizonte, Brasilia and Porto Alegre the adjusted-R² was about 25% or above in the highest wage band. However, in cities like Rio de Janeiro, Salvador, Fortaleza and Recife the adjustment is weak and the distance has not much force to explain rich households' concentration at the central areas. This can be caused by the constraints imposed by the site or the attractiveness of coastal locations for the richest families. However, the results presented are robust, mainly in the extreme bands, that is, in the poorest and richest bands.

9.107 Despite the attractiveness that central areas have normally and the role of public investments in provide better services at the central areas the role of commuting costs should not be neglected in impeding the suburbanization of the medium and high income groups in Brazil. Certainly, fixed and variable material costs in having cars surpass the economy in nonmaterial commuting costs relative to time in Brazil. The marginal costs from moving to suburbs are very high comparatively with marginal gains and accordingly so, these groups do not suburbanize.

9.108 The use of cars did not encourage the suburbanization of medium and high income families in Brazilian cities, even when cars became affordable for everyone. The late improvement of infrastructure and urban services in places marked by poverty and the operation of more efficient transportation modes were not able to change trends historically stamped in city. While high income groups were impelled to centralize by formal markets, which preferred the more profitable areas, the lack of affordable housing at the central areas for low income population made them to solve their housing demands at the periphery through irregular developments and self-construction.

9.109 Informality is still crescent in Brazil and the amount of people living in slums and illegal developments, produced mainly in land neglected by formal markets is increasing. Despite land in risky areas or allocated for ecological purposes are not priced by formal markets, since they are not legally available for development, they have a value considering their location within urban structure. The opportunity cost of not allocate them for urban development is lower than the benefits generated overall city in allocating them for other uses. Nevertheless, this opportunity cost can be high for people excluded from formal markets, since housing is a basic need. Hence, undeveloped land in serviced areas or near job opportunities, given to ecological uses, for example, is attractive for very poor people and become a target of informal occupancy.

Urban Development Controls and Effects on Land Prices

9.110 Distance to the city center used as unique regressor to explain the variation in spatial distribution of households is not very efficient, even though it is significant. Hence, models that use other variables in their specification should be more efficient in explaining housing location patterns and land prices. Considering the objectives of this paper we are interested in describing the effects that land use regulations exert on land prices. Considering the lack of extensive surveys on land markets in Brazil and the lack of available data that combines land prices with other variables, we take advantage from the existence of a database used previously in a study conducted by Serra and Dowall (2003) about land prices in three Brazilian cities, to produce new calculations.

9.111 The database is compounded of residential land prices gathered through a systematic survey with real estate brokers covering several types of residential plots in several geographic zones of the metropolitan areas of Brasilia, Curitiba and Recife. They bring residential land prices by distance from the city center and information if plots are legally titled; have access to infrastructure, identified by the existence of paved roads, and if plot is under

or over 500 square meters in size. The database brings land prices collected in 2001 and 2003 for Brasília and Recife's metropolitan areas and in 2000 and 2002 for the metropolitan area of Curitiba.

9.112 The choice of these three cities is justified because of their pace of fast urban growth and, considering their different contexts and conditions of growth, the different responses to poor access to land and housing. In addition, they are cities located in different geographic regions of Brazil and where planning policies differed so as to be able to evaluate how different regulations affect land markets (Serra *et. al.*, 2003).

9.113 Differently from the former calculations the database is referred to the metropolitan area of the three cities. The database includes the areas of each city limited by the commuting distance, defined as the distance in which a family could look for housing in the next ten years. In Recife, the data area covered 2,742 km², including a total population of 3.2 million people in fourteen municipalities. The Brasilia database covered, besides the Federal District, five other municipalities¹²⁵ with a population of 2.4 million people in 2000 and an area of 7,619.2 km². The Brasilia's database does not include land prices within 10-kilometer radius from the city center since special features of *Plano Piloto* cause prices to be very high, which could distort the results. The area covered by Curitiba's database was composed of thirteen municipalities within an area of about 2,082 km² and a population of 2.6 million people in 2000 (Serra *et. al.*, 2003).

9.114 Brasilia was inaugurated in 1960 and, since then, counts with a very controlled land market commanded by the government. As already mentioned, the government has the ownership of majority of the land for urban development and the city grew according to the guidelines established by the several plans produced during the city existence. Along the commanded land allocation land use in the inner city is very restrictively regulated since it was listed as an urban site of great interest due to its spatial conception.

9.115 The public property of land allowed the implementation of several public housing programs directed to poor population originating several urban areas settled far from the central areas separated by large empty areas¹²⁶. Even though these programs have improved poor access to land and housing for the poor, one of the main objectives of them was to avoid the undeveloped land of the central areas become targets of irregular occupancy. Thus, the restraints on land markets in association with planning policies that guided housing programs yield a spatial structure in which population densities are greater in peripheral areas than in central areas.

9.116 Curitiba, the capital of the state of Paraná is the core of an important metropolitan area of the South Region, having a large concentration of industries. Its first zoning legislation is dated from 1953, as a consequence of an urban plan developed ten years before (*Plano Agache*) that established several urban growth and land use guidelines. In 1966 was passed the Master Plan of the city that had among its aims, push urban growth out from the city center by limiting its growth and encouraging business occupancy along the main arterial roads. Curitiba is worldwide known by its public transportation system and land use planning associated with the mobility and accessibility allowed by transportation.

9.117 But, even counting with a robust urban planning legislation Curitiba was not prepared to deal with the fast urbanization caused by its economic growth, which generated the sprawling of peripheral areas by informal settlements. Since then, local authorities have implemented some regularization and urban improvement programs that aim to integrate irregular settlements to the legal city, regularizing, upgrading spaces and providing infrastructure. In addition, some programs are designed to assist residents relocated from hazardous areas both psychologically and technically (Serra *et. al.*, 2003).

9.118 Recife, one of the main urban centers of the Northeast Region concentrates within its metropolitan area a large number of industries and firms. Nonetheless, the city has one of the highest rates of poverty in Brazil, with

¹²⁵ The municipalities considered are Águas Lindas, Santo Antônio do Descoberto, Novo Gama, Valparaíso and Cidade Ocidental, all in the state of Goiás.

¹²⁶ The largest urban concentration of the Federal District with 43% of the overall population is formed by the urban areas of Taguatinga, created in 1958, and Ceilandia, Samambaia and Recanto das Emas created from 1971 to 1993 and situated about 30 km from the Plano Piloto that has less than 10% of the population (Census data, IBGE 2000).

many of its residents living in inadequate areas with the lack of infrastructure and under inappropriate housing conditions. For example, within the metropolitan area about 55% of households presented infrastructure inadequacies according to the Census of 2000. From this amount, about 34% were in the band of 3 minimum salaries or less of the earnings of the person in charge of household.

9.119 The history of urban growth in Recife is, in part, the history of occupancy of inadequate areas by the poor people. Since early days poor people built their shelters on the hills that surround the city, while central areas were occupied preferably by the richest people. The built of *mocambos*, a kind of shanty, was prohibited in central areas and during the 1940's they were removed from the inner city. The city has a significant set of urban renovation plans elaborated during the first half of 20th century by renowned city planners who traced the guidelines of urban growth that was followed by several administrations.

9.120 Recife has a solid tradition in designing instruments for popular housing and urban land tenure. The Social League Against Mocambos¹²⁷ (*Liga Social Contra os Mocambos*), for example, was created in the end of the thirties to built popular shelter for poor people that lived in degraded housing units, mainly in the central areas. The city also initiated an innovative and pioneering experience in 1987 aimed to regularize informal settlements named Plan of Regularization of Special Zones of Social Interest (*Plano de Regularização de Zonas Especiais de Interesse Social, PREZEIS*). This plan is responsible in giving low income occupants of irregular areas security of tenure, the right to receive infrastructure and urban services access and allows them to participate in decision-making at the neighborhood and city levels (Serra *et. al.*, 2003).

9.121 Despite the different contexts of urban growing of these cities some effects produced are similar, like the pattern of spatial distribution of high and low income households. The urban structure produced under their particular contexts reflects, among other factors, planning priorities adopted and the effects produced on urban land markets in time.

9.122 The database available do not allow a strict evaluation of the effects of intervention on land markets since they have not a detailed register of land use controls adopted within each urban zone. In addition, the database also does not cover different moments in order to follow the changes on land use controls in time. The two moments available for 2000-2001 and 2002-2003 are too close to permit such analysis. Nevertheless, alternative calculations could be made to extensively analyze how urban characteristics impressed in the spatial structure affect land prices in a static approach. Thus, in the lack of detailed database, the results reported here must be considered exploratory and indicative for more studies.

9.123 For assessing these effects were made linear regression calculations (OLS) by taking the log-land price of residential land prices as dependent variable and distance from the city center, existence of legal title (dummy), existence of infrastructure (dummy for paved roads) and plot size (1 if it is over 500 square meters in size) as independent variables. The regressions also include a dummy variable that estimates the combined effect on residential land prices of legally titled plot and infrastructure. In addition, an independent dummy variable was included to represent, by hypothesis, the urban features that are prevailing within a reliable distance-radius from the city center which affect positively land prices in overall urban area.

9.124 This variable is a proxy to estimate the effects on land prices from unobserved variables present within central areas that are associated with land use controls along city development. This notion is grounded in the fact that historically central areas has been more regulated than others, which has produced specific conditions that affect land prices¹²⁸. Controls over urban development are extensively adopted to prevent central areas from excessive densification that result in negative externalities like infrastructure overcharging, for example. Thus, it is assumed that a wide range of special features present within central areas are being preserved or created by

¹²⁷ Mocambo is a kind of shanty that precedes the *favelas* (slums).

¹²⁸ In this model regulation is considered as exogenous and spatial features that increase land prices are determined *ex-post* land use controls adoption. On the other hand, in some cases land use controls can be considered endogenous being adopted to keep urban qualities determined *ex-ante*. Regulations within Brasilia's central areas can be considered endogenous, while in Curitiba and Recife can be considered exogenous.

regulation, and hence, they can be correlated. In maintaining these characteristics by using zoning ordinances and land use controls, the attractiveness of these areas are kept high increasing land prices that, eventually, exclude low income segments from these areas.

9.125 The cut measure of distance to define the proxy for regulation was set based on the study conducted by Serra and Dowall (2003) that reports the dynamics of real estate development in the three cities. They quote that urban development and changes in population concentration in Recife and Curitiba occurred beyond 10 kilometers from the city center between 1991 and 2000. In 2000 44% of the total metropolitan population in Recife and 58.5% of total population in Curitiba lived within this radius. In Brasília less than 50% of the metropolitan population was located within 10 to 25 kilometer from central areas. In addition, population changes in Brasilia occurred outside a 20 kilometers radius from the central areas.

9.126 Hence, we established the cut distance radius for the dummy variable in 10 kilometer for Recife and Curitiba, and 20 kilometer for Brasilia, considering that the sprawling pattern of population change in these cities can be caused, among other factors, by planning restrictions on development in areas adjacent to the city center or redevelopment within them, forcing residential growth to the peripheral areas.

9.127 **Error! Reference source not found.** shows the results of the log-land price linear regressions using the database of the three cities for residential land prices. In order to do not discharge available information the regression's calculations considered all variables except distance, the quantitative variable which was changed by the central dummy variable. The outcomes for the regressions show that overall adjustments are good in predicting land prices, with except for Brasilia that presented low adjusted-R², mainly in 2001. Note that in 2001 only the central dummy variable was significant for residential land prices in Brasilia. Because of that, the adjustment of the regression was too low, since the adjusted-R² was only about 2.4%, and the outcomes for 2001 are not much consistent. A possible explanation is that land prices in Brasilia are too high overall city, not only within the central areas.

Table 9.3 Linear Regression Results for Log-Land Prices for Residential Plots

	BRASÍLIA		CURITIBA		RECIFE	
	2001	2003	2000	2003	2001	2003
Sample size	176	181	1926	1.926	2.504	2.504
Adjusted R²	0.0244	0.359	0.574	0.572	0.450	0.461
Constant	4.1312	2.9360	2.6472	2.5686	3.0527	2.8952
<i>t-stat.</i>	15.529	6.346	54.443	52.572	85.958	83.107
<i>(p-value)</i>	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Regulation proxy	0.4836	1.4029	1.6114	1.6162	1.0216	1.0270
<i>t-stat.</i>	2.368	8.430	42.757	42.905	35.083	35.986
<i>(p-value)</i>	(0.0190)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Infrastructure	0.3468	1.5032	0.8953	0.8830	0.6134	0.6131
<i>t-stat.</i>	1.099	3.017	16.697	16.380	14.961	15.240
<i>(p-value)</i>	(0.2733)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Title	0.3286	0.3937	0.0719	0.0720	0.1910	0.1905
<i>t-stat.</i>	0.953	0.817	1.321	1.322	4.467	4.512
<i>(p-value)</i>	(0.3420)	(0.4149)	(0.1864)	(0.1862)	(0.0000)	(0.0000)
Infrastructure and title	-0.5899	-0.5199	-0.0364	-0.0346	0.0125	0.0065
<i>t-stat.</i>	-1.470	-0.993	-0.480	-0.455	0.216	0.114
<i>(p-value)</i>	(0.1434)	(0.3223)	(0.6313)	(0.6489)	(0.8291)	(0.0000)
Plot size	0.1867	-0.9779	-0.4431	-0.4234	-0.0562	-0.0548
<i>t-stat.</i>	0.887	-4.152	-10.414	-9.923	-1.948	-1.931
<i>(p-value)</i>	(0.3762)	(0.0001)	(0.0000)	(0.0000)	(0.0515)	(0.0535)

9.128 The values of the constant in the model predicts land price of a plot without legal titling, without infrastructure, less than 500 sq mt and located outside the radius defined for the regulation proxy variable. In Brasilia a plot with these characteristics and outside the 20-kilometer radius was priced about R\$ 18.84 per sq mt in 2003. In Curitiba, a plot with the same features was R\$ 13.04 per sq mt while in Recife it was about R\$ 18.09 both outside the 10-kilometer perimeter. Note that the predicted price per sq mt in Brasilia is higher than in Curitiba and Recife at a distance that is two times larger than in these cities.

9.129 Title and infrastructure associated was not significant in regressions. In addition, in Brasilia (2003) and Curitiba (2000 and 2002) the presence of legal title by itself also was no significant at a level of 95%. This fact can reflect the power of other variables in increasing land prices, overwhelming the effects of titling since tenure land is not the greatest problem in the context of these metropolitan areas. On the other hand, in Recife, due to the context of poverty and irregularity, the variable for plots legally titled were significant in 2001 and 2003, increasing land prices about 19% overall city. These results show that variation on land prices in formal and informal markets are not very affected by legal tenure of land.

9.130 Data from the *Deficit Habitacional no Brasil* (2005) show that in Brasilia and in the 5 municipalities considered in this study, the total of inadequacy in housing tenure in 2000 was about 2.1%, while in Curitiba metropolitan area was 7.2%. In Recife's metropolitan area in 2000, households with titling inadequacies were about 10.6%. In addition, while in Recife and Curitiba title inadequacies affected more intensively households with 3 minimum salaries of maximum familiar median income, presenting respectively 66% and 45% of the households without titles, in Brasilia this problem affected especially the households with familiar median income above 5 minimum salaries.

9.131 All other variables coefficients had the expected signal and show significant influences over land prices. Infrastructure increases significantly residential land prices. In Brasilia, albeit the largely covering in water and sanitation facilities, provision of infrastructure adds almost 350% in land prices, even in plots outside the 20-kilometer radius around the city center. Plots located outside the Federal District, where infrastructure and title

problems are more intense are priced at very low values. In Curitiba provision of infrastructure increases land prices about 143% while in Recife adds 84% in residential land prices.

9.132 In fact, the lack of infrastructure provision is the major inadequacy that affects urban households. Data from the *Deficit Habitacional no Brasil* (2005) show that about 21% of urban households in Brasilia and those 5 municipalities, presented at least one problem related with infrastructure provision, while in the Curitiba's metropolitan area this problem affected about 15.2% of overall households. In Recife's metropolitan area about 55% of the households presented infrastructure problems in 2000. In all these cities the lack of infrastructure provision in absolute terms was more intense within their respective municipalities. Nevertheless, in proportional terms infrastructure inadequacies affected more than 60% of the households within other metropolitan municipalities. In addition, infrastructure inadequacies affected especially the households with median familiar income up to 3 minimum salaries.

9.133 The results for plot size also had the expected signal and were significant at a 95% level. That is, large size plots were priced in 2000-2001 and 2002-2003 below small plots per square meter. In Brasilia, large plots were priced about 37% below small plots, while in Curitiba and Recife's metropolitan areas they were, respectively, 65% and 95% cheaper than plots with less than 500 sq mts. One possible reason for that is the low price of land at the fringes of urban areas inducing large land consumption per plot, or the existence of land with rural use.

9.134 The proxy dummy variable for regulation was significant in all cities and in both moments 2000-2001 and 2002-2003 added high values in land prices by the simple fact if plot is located within the radius specified for the variable definition. In Brasilia in 2003, for instance, a plot without title and infrastructure and under 500 sq mt in size located within the 20-km radius from the city center was priced about 300% above an equivalent plot placed outside that perimeter. In Curitiba, the amount added in land prices located within the 10-kilometer radius was about 400%, while in Recife it was about 179% in both in 2000-2001 and 2002-2003. Once more, value added in Brasilia's land price is too high comparatively to Curitiba and Recife, since the effect is calculated for a radius distance of two times larger than in Brasilia.

9.135 These results are robust to demonstrate that unobserved urban features present in central areas that can be correlated to planning controls affect land prices positively. In order to assess how these variables affect individually residential land prices across urban areas were calculated the marginal effects of each one of them on the likelihood of residential land prices is over a median land price value through *Probit* regressions. In the model specification was included the quantitative variable for the distance from the city center to calculate how marginal effects act over land prices as distance changes. The median land prices were calculated from the database used in the former regressions. In Brasilia (2003) overall mean plot prices was 143.57 reais per square meter, while in Curitiba (2002) it was 71.13 reais and in Recife (2003), 70.69 reais.

9.136 Table 9.4 shows the results from the *Probit Model* regressions. The model is highly predictive for the three cities, about 79% for Recife and over 80% for Brasilia and Curitiba. Title was no significant for Brasilia and Curitiba, as well as the dummy for infrastructure and title combined in the three cities. As distance from the city center increase, the probability of plots are priced over the average price is decreased about 18% in Brasilia and 16% in Curitiba, which demonstrate how concentrated within central areas are land priced above mean in these cities. On the other hand, in Recife, an increase in distance by 1 kilometer from central areas increase the chance of land is priced above average only by 2%.

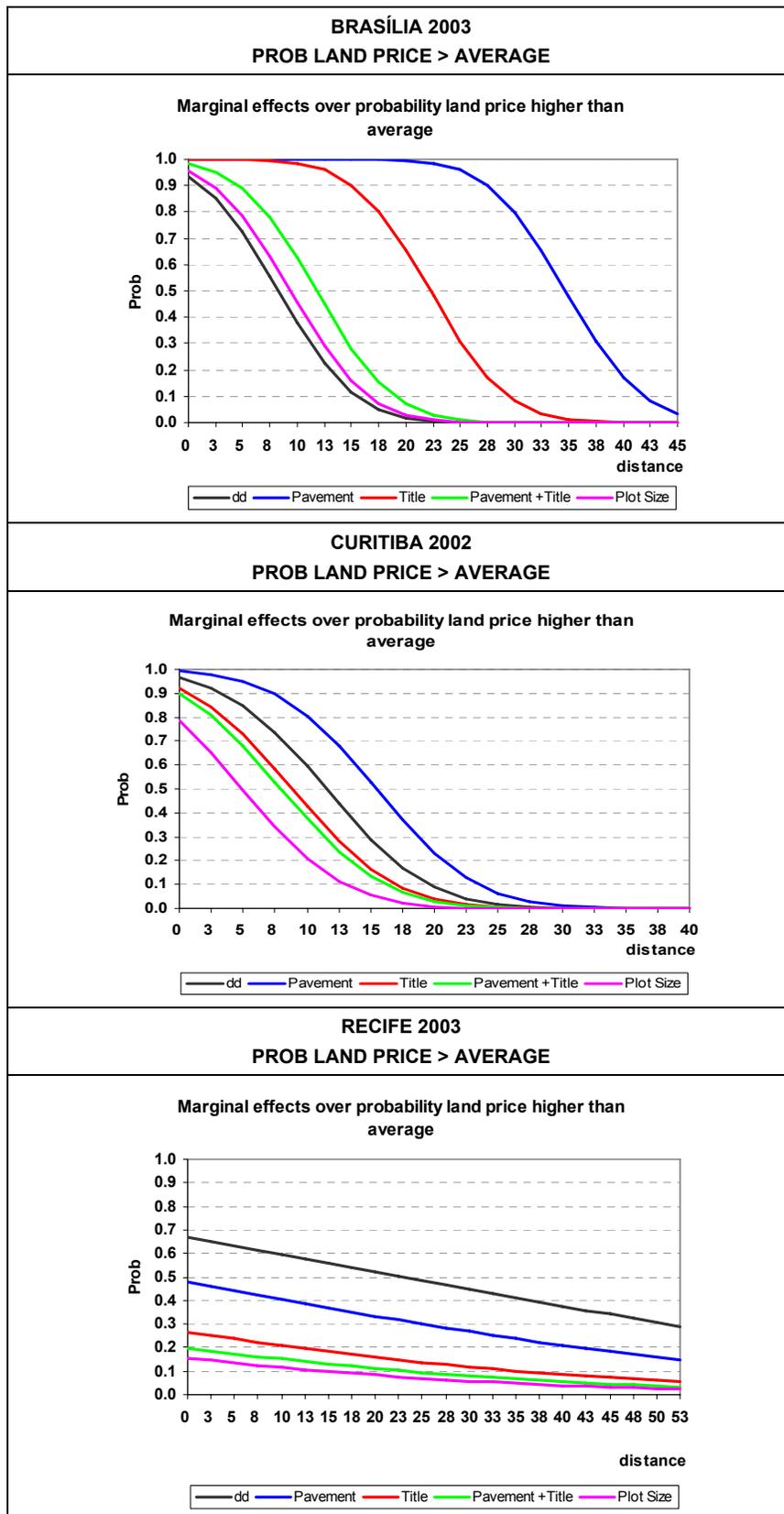
9.137 Residential land prices in Recife can be more balanced overall urban area and land priced over mean is not so concentrated as in Brasilia or Curitiba. While there are several factors that can affect land prices across urban area, per capita income may be one variable to explain lower land prices in Recife. In addition, presence of the Special Zones of Social Interest (ZEIS) can perform an important role in regulating land prices. At present days, there are 66 areas recognized as ZEIS in Recife, in all of the six political-administrative regions (RPA) of the city, corresponding of about 6% of municipality's surface.

Table 9.4 Probit regression results for land prices likelihood above mean

	BRASÍLIA 2003	CURITIBA 2002	RECIFE 2003
Mean land Price	R\$143.57	R\$71.13	R\$ 70.69
Sample size	181	1.926	2.504
Adjusted measure	81.2%	84.3%	78.8%
Predicted 0	69	788	992
Predicted 1	78	836	981
Constant	3.2079	1.3148	-0.8887
<i>t-stat.</i>	2.560	6.939	-7.732
(<i>p-value</i>)	(0.0105)	(0.0000)	(0.0000)
Distance	-0.1795	-0.1591	-0.0187
<i>t-stat.</i>	-5.876	-13.707	-4.065
(<i>p-value</i>)	(0.0000)	(0.0000)	(0.0000)
Regulation proxy	-1.7187	0.5120	1.3235
<i>t-stat.</i>	-3.064	4.279	16.103
(<i>p-value</i>)	(0.0022)	(0.0000)	(0.0000)
Infrastructure	3.0166	1.1392	0.8316
<i>t-stat.</i>	2.695	9.645	9.908
(<i>p-value</i>)	(0.0070)	(0.0000)	(0.0000)
Title	0.7845	0.0972	0.2653
<i>t-stat.</i>	0.717	1.017	3.095
(<i>p-value</i>)	(0.4736)	(0.3090)	(0.0020)
Infrastructure and title	-1.0947	-0.0447	0.0429
<i>t-stat.</i>	-0.946	-0.275	0.363
(<i>p-value</i>)	(0.3444)	(0.7835)	(0.7167)
Plot size	-1.5196	-0.5291	-0.1216
<i>t-stat.</i>	-4.233	-6.347	-2.057
(<i>p-value</i>)	(0.0000)	(0.0000)	(0.0397)

9.138 The estimated coefficients from *Probit Model* do not show directly the variation on likelihood of land is priced above the average value due to a change in the independent variables. This effect is better estimated by calculating the marginal effects of each variable individually over this probability as distance changes. Figure 9.3 shows the plots of marginal effects of the independent variables for the three cities with distance from the city center. As previously mentioned, infrastructure and title combined is not significant at 95% in all cities as well as title is not significant in Brasilia and Curitiba. Note that the likelihood of land prices is higher than the mean decreases with distance in all cities.

Figure 9.3 Marginal effects over high land prices likelihood in 2003.



9.139 Infrastructure and regulation had the largest marginal effects in increasing probability of land prices are above the mean as distance decreases from the city center in Curitiba and Recife. In Brasilia, infrastructure had the greatest marginal effect, overwhelming land located at the central areas and plot size influences. Influence from infrastructure is great, even at large distances, until 45 kilometers from the city center, which is the limit between the Federal District and other municipalities, where the lack of infrastructure is troublesome. On the other hand, the role of the central unobserved features in affecting likelihood of land is priced above mean seems highly concentrated within the 20-kilometers radius in Brasilia.

9.140 Inside Federal District, virtually all urban areas are strongly regulated and, consequently differences in prices due to different locations are not so distinguished due to regulation. Land prices overall city is high, reflecting other factors as, for example, the high income *per capita* or the fact that the city is the national capital. Nonetheless, prices of serviced land and land without infrastructure present great difference inside the Federal District. Serviced land is priced almost 3 times above land without infrastructure, even though median land price of plots without infrastructure in Brasilia is higher than land without infrastructure in Curitiba and Recife comparatively. As such, serviced plots effects surpass the influence of other variables in Brasilia.

9.141 Plot size had positive impact, but not as strong as the other variables. The influence of large plots in increasing the likelihood on prices are above mean is crescent as the city center is closer, from about 20-kilometer in Brasilia and Curitiba. In Recife, the increase on this probability is very low, less than 20% at the city center. Probably the fact that large plots are scarce near to the central areas makes them to be more valorized than small plots in those areas.

9.142 Recife presents interesting results. Even though the influence of the central dummy variable and infrastructure are positive and crescent towards central areas, the maximum likelihood of residential land is priced above mean is less than 70% at the city center. In Brasilia and Curitiba this likelihood is very close to 100%, highly affected by those variables. In Recife, central plots had the strongest marginal effect over this chance, while in the other cities infrastructure affected more intensively land prices as plots are closer to the city center.

9.143 Note that, while in Curitiba the increase on land prices are above the mean is crescent from 30 kilometers towards inner city, reaching 100% at the city center, in Recife this chance is maintained beyond 50 kilometers, even though at a very low level. Further, prices of plots located at the central areas can affect land be priced above average about 30% at 50-kilometers from the central areas, while in Curitiba this possibility is null at the same distance.

9.144 This result is striking and not easily explained depending on more studies. Probably, a combination of overall low income of its population, urban structure conditions and public policies of ZEIS can affect land market operation. Firstly, the conditions in affording housing prices can control land prices, since the latter reflects housing demand factors. Secondly, in spite of the largest number of households in Recife's metropolitan area, the constraints imposed by geographical conditions produced a more sprawled urban structure comparatively to Curitiba, where distribution of poor and rich households is more balanced (see Table 9.1 and Table 9.2).

9.145 Finally, public programs on regularization of informal settlements (PREZEIS) can improve access to land for poor people nearby central areas reducing distortions on land prices due to exclusiveness produced in these areas by planning controls. These programs, pursuing to guarantee tenure rights, can affect land markets by increasing the supply of land that can be traded in formal markets.

Can Land Controls Loosening Improve Formal Urbanized Land Production?

9.146 In the previous section was found that residential land prices overall urban areas are affected by infrastructure provision, plot size, title (only in Recife) and land located at the central areas where planning controls are supposed to be correlated with unobserved features that increase land prices. Land use and design parameters enforced by urban legislation along time, especially in the central areas of the cities analyzed, may have limited responsiveness of housing supply to demand increasing housing and land prices. Consequently, due

to the irreproducibility of the advantages of some urban locations, especially in a context in which public investments neglect peripheral areas, inner cities are preferably occupied by high income segments of the population, while poor people solve their housing demands in informal settlements or in precarious areas at the peripheries.

9.147 Urban legislation in Brazil establishes several standards and requirements for producing urban developments that are aimed to achieve an ideal pattern of urban space. On the other hand, the same legislation allows relax the parameters in order to facilitate the production of affordable housing and serviced land for low income population. Further, titling and urbanization programs of informal settlements also relax urban standards as a necessary step for regularization.

9.148 Deregulation of planning ordinances is suitable to remedy critical situations crystallized in space and, barely have been heard that relaxing these ordinances have encouraged formal market to produce serviced land and affordable housing for low income population. Housing demands of these groups are left to public sector to solve that acts only when critical situations are installed. However, costs for urbanizing and regularizing informal settlements are pointed as being higher comparatively with costs of providing urbanized land as a preventive policy. While the costs per household in urbanizing programs is from US\$ 50 to US\$ 70 per sq mt, the costs of urbanized land by private developers is about US\$ 25 per sq mt, including the profit (Smolka, 2003).

9.149 There are a large range of factors that hinder formal production of urbanized land and affordable housing for low income families ahead of the obvious drift of developers for the more profitable market segments and budget limitations of poor people. One of these factors is the role that planning controls play in increasing production costs in formal markets.

9.150 From the findings of previous sections and using the database available for residential land prices for Brasilia, Curitiba and Recife, were made some simulations to calculate economic feasibility of a project that, hypothetically, is aimed to produce 100 urban plots according to the parameters established by the urban legislation currently in force in these three cities.

9.151 Cities in Brazil often adopt minimum standards based on the Federal Law number 6,766 that rules land subdivision and registration proceedings for urban developments. The minimum plot size generally adopted is 125 sq mt with minimum plot frontage of 5 m. Another standard adopted is a compulsory donation of land for public use like green spaces, squares, roads and public facilities. This amount was defined in 35% at least by the Federal Law 6,766, but it was changed and left to municipal authorities to decide this amount according to specific parameters. However, the majority of Brazilian cities still assume 35% as minimum.

9.152 Many cities also set several parameters in roads dimensioning. In fact the dimension of roads depends on several factors as hierarchical category, population density, immediate land use, design patterns and others that imply different consumption of space. Normally, local roads, which access directly residential plots are sized at 7 mt in width for vehicles, and sidewalks between 1.5-2 mt. In areas of social interest these standards are relaxed and are admitted 5 mt for roads width and 1 mt for sidewalks, in general. The surface used for roads is included into the public area requirements.

9.153 Given these parameters it is possible trivially calculate the amount of land required for develop 100 plots. Table 9.5 show the results from data described above considered in four contexts: enforcing standards and relaxing standards to build a single family unit per plot (columns 1 and 2) and to build 2 housing units per plot (columns 3 and 4), in other words, increasing density twice. Restriction on density increasing is the effect of several controls adopted, like floor area ratio (FAR) limits, maximum construction coefficients, minimum rate of plot surface per housing unit or, explicit density limits. The data rows of the table show the parameters considered in both enforced and loosened situations and outcomes are shown in the results rows of the table.

9.154 Column 1 shows that under basic standards, there is an increase of 53.8% in land consumption per plot produced or a single family unit house, with relation the useful land required per plot. Relaxing these parameters the increase of land consumption is reduced to 43%. In the first situation is produced 100 plots consuming near one hectare of land, while under loosened standards are used only 0.43 ha.

Table 9.5 Land Consumption in Urban Development under Different Standards

		1	2	3	4
Specifications		Basic standards	Relaxed standards	Basic standards	Relaxed standards
Basic data	Plot units developed	100	100	100	100
	Minimum plot size (sq mt)	125.0	60.0	125.0	60.0
	Minimum lot frontage (mt)	5.0	5.0	5.0	5.0
	Road width (mt)	7.0	5.0	7.0	6.0
	Sidewalk width (mt)	2.0	1.0	2.0	1.5
	Total spaces for public use (%)	35.00%	30.00%	35.00%	30.00%
	Total housing units per plot	1	1	2	2
	Total housing produced	100	100	200	200
	Land area required for plots (sq mt)	12,500	6,000	12,500	6,000
	Land area for roads and sidewalks (sq mt)	2,295	1,530	2,385	1,988
Results	Total land area required for development (sq mt)	19,230.8	8,571.4	19,230.8	8,571.4
	Land area required for public use (sq mt)	6,730.8	2,571.4	6,730.8	2,571.4
	Ratio of land for public use	35.00%	30.00%	35.00%	30.00%
	Ratio of land for roads	11.9%	17.9%	12.4%	23.2%
	Total consumption of land per housing unit (sq mt)	192.3	85.7	96.2	42.9
	Increase in land consumption per housing produced due to land use standards	53.8%	42.9%	-23.1%	-28.6%
		<i>Source: Author's calculation</i>			

9.155 Considering that a housing unit under popular standards is about 60 sq mt, when plots are produced with an area larger than that, the amount of land added is appropriated by few plots. The extra private land added is useful to get better life conditions by improving ventilation or insolation, for example. However, alternative designs could utilize less land for housing unit without loss in quality of life, but improving land allocation. For instance, in order to produce 100 plots of 85 sq mt under relaxed standards the amount of land added per plot is also about 43% over useful plot area, and the development will have only 0.6 ha.

9.156 When density is doubled the amount of land consumed per housing unit under enforced parameters is reduced in 23.1%, indicating a more efficient land allocation in housing production. Relaxing the standards in column 4 land area consumption per house unit produced decreases about 28.6% with relation the housing area. Overall reduction of land consumption by building 2-households per plot under the relaxed standards is about 78%with relation the original standards.

9.157 This trivial exercise shows that the jointly effects of land use controls over land consumption should be not neglected, even though the individual effects can be apparently unimportant in face of the benefits expected from design standards adoption. These benefits, like the improvement of quality of life should be considered in a comprehensive approach of the city, since the costs of that are shared for everyone.

9.158 Based in these findings, were formulated a model to evaluate the economic feasibility of producing urbanized land and affordable housing under different design parameters situations. Since land regulation affects markets differently depending on market conditions, were analyzed economic flow of costs and revenues to produce urbanized plots and housing in Brasilia, Curitiba and Recife in four different situations. The situations considered enforced and loosened parameters in producing and selling only urbanized land and in producing and selling urbanized land and housing at popular pattern.

9.159 Calculations considered a production of 100 plots by changing only design parameters, as showed in columns 1 and 4 of Table 9.5, maintaining all other possible variables constant (*ceteris paribus*). In addition, in loosened contexts the time to approve projects and to construct infrastructure were also changed. Projects are approved during the first year and the infrastructure can be provided progressively in a period of 8 years.

9.160 In the economic flux of formal process of urban development the initial investment was considered as the amount of revenue that land owner would receive if land were used to produce informal plots¹²⁹. In other words, is considered the opportunity cost of land owner in using land to produce irregularity or to produce urbanized and registered plots. In latter, developer would acquire land from owner paying at least the expected amount that land would rent if plots were traded in informal market. In addition, informal developer does not allocate enough land for public use, neither for roads nor for other uses like green spaces or squares. As such, the amount of plots produced by informality is larger than in formal market, even under relaxed parameters.

9.161 Thus, while formal developer produces 100 plots under enforced parameters, informal developer produces 140 plots of same size, that is, an increase of 40% above formal production. When parameters are relaxed, increase in informal production is only of 25%, that is, informal developer gets only 25 more plots than formal developer, since land enforced for public use is reduced.

9.162 Prices used in calculations are from the residential land prices database of Brasilia, Curitiba and Recife in 2003, at locations further than 10 kilometer in Curitiba and Recife and ahead of 20 kilometer in Brasilia, as discussed in the previous section. At this distance was taken the mean price per square meter of land with and without infrastructure and title. Here the interest is in knowing economic feasibility in producing regular land at the distances where those cities are experiencing transformation.

9.163 Prices per sq mt of plots without title and infrastructure, considered as informal, are lower than serviced and titled plots at the same location. In Brasília, the mean price per sq mt of plots without title and infrastructure is equivalent to 65% of serviced and titled plots, while in Curitiba and Recife these prices are, respectively, 59% and 61% of land prices of plots with title and infrastructure. These prices are considered too high, since there is no investment made by the informal developer that would justify the profit achieved.

9.164 Production process is considered within a discrete time period that involves the time required to acquire land, the initial time; the time necessary to approve projects, to develop land and build houses and to sell the units produced. The time zero starts in 2003 when developer decides to produce formal housing and acquire land from land owner. The final time is 2013, when developer has sold all plots and housing.

9.165 The time necessary to approve the projects was defined in two years. However, this process can take much more time. In Rio de Janeiro this time can reach 4 years and in Brasilia it can take more than 5 years. Developer must accomplish several steps to approve projects. First, urban design projects have to be approved by local authorities. Secondly, infrastructure projects have to be approved in each one of the several companies that are in charge of electricity, sanitation and drainage facilities provision.

9.166 In addition, projects have to be licensed by environmental authorities to be authorized. About three stages are necessary to achieve environmental approval. Firstly is required a previous license that is followed by an installation license, when is required the elaboration of detailed environmental studies and reports on environmental impacts resulted from the development. Finally is conceded an operation license, when the development is allowed to be implemented. In short, the complete process for environmental approving is costly and time consuming.

9.167 Even though all these proceedings are argued as necessary, time-consuming bureaucracy and obstructive official routine increase costs and risks that jeopardize feasibility of formal production. In addition to the ordinary opportunity costs involved in time-consuming bureaucracy that can be estimated at the market real interest rates over initial investments; changes in construction costs previously calculated, changes in

¹²⁹ Informality is used here to designate plots produced without infrastructure and title.

macroeconomic context and appearance of new enforcements along time can increase risks and uncertainty of business.

9.168 In deciding to initiate a development business sales velocity is a factor that has great impact in decision taking. The impact of sales velocity can be calculated only in some cases, since there is no general pattern to estimate needs of capital in each case. However, considering the market segment that would be attended by small and medium builders and developers, the velocity of sales is critical because business feasibility depends on the cash flow. Great profit margins are in the past and building firms, especially small and medium ones need to keep a strict control on cash-flow. In addition, projects that are not considered highly profitable result in very high loan costs that are impracticable for small and medium builders because of the interest rates.

9.169 The time assumed to build the development is that defined by legislation in a maximum period of 4 years for developer construct roads and infrastructure in order to register the development according to the Federal Law 9,785/1999 that modifies the article 18 of the Federal Law 6,766/1979). Subsequently, from the second period, developer sells the plots during a period of 8 years, considering the time need to receive the value from plots sold to families whose median income is about 3 minimum salaries of 2003 and can compromise only about 25% or 30% of their familiar budget with monthly payments.

9.170 For simplicity, the taxes that occur along the formal process of development construction were considered into a ratio of 25% (BDI) added over construction costs to cover overall builder profit, administration costs and taxes. Construction costs of infrastructure and housing at popular standards per square meter (60 sq mt) were calculated from PINI's construction national survey made monthly in several cities in Brazil and released in *Construção Mercado* (PINI Publishers). Prices were taken in Reais in August, 2003.

9.171 The costs for infrastructure provision were also calculated from PINI's construction national survey taking in account water, sewage, pavement and drainage, and electricity provision. There are few specialized publications dealing with costs for infrastructure provision, although some studies had been conducted about this theme. These studies are dedicated mainly in assessing urbanization costs of slums, which involves additional costs from removing shanties from risky areas, recuperation of degraded areas and others. In addition, costs can vary from several factors such as topography and grid layout. The costs calculated and adopted in this study are very similar to those found in literature¹³⁰.

9.172 Table 9.6 shows the results for the feasibility of a hypothetical builder that would intend to invest in projects of constructing urbanized plots and housing for low income families in Brasilia, Curitiba and Recife under different regulation contexts. In order to evaluate economic feasibility of the different alternatives is used two indicators, Net Present Value (NPV) and Interest Rate of Return (IRR). Basically, NPV shows the value of a cash flow in future discounted back to the present time by a percentage that is the minimum desired rate of return. As such, this percentage is the interest rate that equals the cost of capital in time. Projects can be discarded if NPV from a cash flow is below zero ($NPV < 0$). If NPV is negative, it signifies that the rent yield by the investment is less than the opportunity cost of the capital.

9.173 IRR is based on the same principle and represents the discount rate that results in a null net present value for the cash flow of the investment. The IRR is the true interest yield expected from an investment expressed as a percentage. The investment will be attractive if it is positive, that is, if IRR is above the interest rate of the cost of capital. By comparing investments, the best will be that has the highest IRR.

9.174 In calculation for the Net Present Value (NPV) was adopted the mean interest rate from the difference between the basic interest rate (SELIC) and the inflation (IPCA) from 2003 to 2005. Thus, the discount rate was defined as 11.5% during the period and it is assumed that all costs involved will be constant in the investments flow, along the future moments.

9.175 The results show that there is no feasible business in producing formal urbanized and titled plots facing the profits from informal plots production in any of the three cities, considering the residential land prices with

¹³⁰ For a broad discussion about urbanization costs of slums see ABIKO et al., 2005.

and without infrastructure. Indicators, internal rate of return (IRR) and net present value (NPV), are negative if considered only production and sales of urbanized plots. In addition, there is no pay back for the investments. Although the revenues earned from selling urbanized plots in all cities would be sufficient to cover urbanization and titling costs, they do not cover the opportunity cost involved in abandoning the production of plots without infrastructure and title.

9.176 Several reasons contribute for these results. First of all, and most important, market prices of land without infrastructure is too high, comparatively with urbanized land, becoming informal business very attractive. Once housing demand is high, even land without infrastructure and title reaches high prices in urban land market. Note that the revenues from selling plots without infrastructure and title would be enough to provide both services and a good profit for developer. In other words, the prices of land in informal market embody in advance, the expected rent from future regularization and provision of infrastructure by the government. This rent is appropriated totally by the informal developer without investments.

9.177 Second, the opportunity cost of capital in Brazil, rated at 11.5% per year (real interest rate) can be a potential factor to hinder investments. This rate increases the cost of capital for medium and small developers, for example, in financing construction costs, mainly in long term loans. Because of that, NPV is negative and investment is considered not attractive.

Table 9.6 Feasibility of Urbanized Land and Housing Production

	Brasilia		Curitiba		Recife	
	Basic standards	Relaxed standards	Basic standards	Relaxed standards	Basic standards	Relaxed standards
BASIC DATA						
Plot units developed	100	100	100	100	100	100
Minimum plot size (sq mt)	125	60	125	60	125	60
Ratio of public area (%)	35	30	35	30	35	30
Housing units produced	100	200	100	200	100	200
Total land area required for development (sq mt)	19,230.80	8,571.40	19,230.80	8,571.40	19,230.80	8,571.40
Market land price - with infrastructure and title (R\$/sq mt)	104.93	104.93	41.87	41.87	49.15	49.15
Market land price - without infrastructure and title (R\$/sq mt)	67.97	67.97	24.71	24.71	30.09	30.09
Titling costs (R\$/plot or housing unit)	268.01	268.01	165.38	165.38	121.91	121.91
Urbanization costs (R\$/plot)	3,170.70	1,752.88	3,126.43	1,686.66	3,174.47	1,738.57
Housing construction cost at a popular standard (R\$/unit 60 sq mt)	33,623.99	33,623.99	32,488.49	32,488.49	27,280.51	27,280.51
COSTS						
Initial investment [R\$]	-1,185,645.88	-509,130.98	-431,235.29	-185,177.76	-525,137.19	-225,500.40
(opportunity cost in abandoning informal plots revenues)						
Total urbanization and title costs (R\$)	-343,870.64	-228,889.68	-329,180.32	-201,740.97	-329,639.07	-198,240.58
Total costs (opportunity, urbanization and title production) (R\$)	-1,529,516.52	-738,020.66	-760,415.61	-386,918.73	-854,776.26	-423,740.99
Total housing production costs (R\$)	-3,362,400.00	-6,724,800.00	-3,248,850.00	-6,497,700.01	-2,728,050.01	-5,456,100.00
Total urbanization, title and housing production costs (R\$)	-4,891,916.52	-7,462,820.66	-4,009,265.61	-6,884,618.74	-3,582,826.28	-5,879,840.99
REVENUES						
Urbanized and titled land sales	1,311,801.67	629,664.80	523,536.37	251,297.46	614,382.55	294,903.62
Housing sales	4,202,999.99	8,406,000.00	4,061,062.50	8,122,124.99	3,410,062.49	6,820,125.01
Total revenues from land and housing sales (R\$)	5,514,801.65	9,035,664.80	4,584,598.87	8,373,422.45	4,024,445.04	7,115,028.62
CASH FLOW RESULTS (2003-2013)¹						
Only by selling urbanized plots						
Net present value (NPV)	-847,929.92	-414,826.50	-407,091.24	-205,135.13	-463,453.89	-238,614.28
Internal rate of return (IRR)	-2.50%	-2.40%	-7.20%	-9.60%	-6.10%	-7.80%
Pay back	-	-	-	-	-	-
By selling urbanized plots and housing						
Net present value (NPV)	-1,981,040.91	-2,405,112.39	-1,193,962.79	-2,089,494.16	-1,301,875.44	-1,818,374.75
Internal rate of return (IRR)	5.90%	19.90%	17.50%	32.80%	8.20%	26.90%

Obs: 1 - Discount interest rate (Basic interest rate - inflation): 11.5%.

9.178 Total earnings from selling urbanized land in all cities are not sufficient to cover the costs of providing infrastructure and title, the costs of capital and to make developer gives up from informal land development. Thus, developer is encouraged to produce plots without infrastructure and title.

9.179 Loosening standards does not improve economic feasibility in producing urbanized land in the three cities studied. Under relaxed standards design parameters are changed and time enforced to develop land and provide infrastructure is enlarged at the same time. The NPV increases under relaxed standards since the amount of land necessary to produce the same amount of plots is reduced, decreasing investments. Note that urbanization costs per plot are lower about 45% in relaxed standards situation comparatively to enforced parameters situation. This agrees with experience elsewhere that urbanization costs increase with the size of the area occupied, even the amount of served plots are the same, due to the extension of the infrastructure systems.

9.180 On the other hand, IRR decreases because a problem of scale and market context. The reduction in urbanization costs about 45% do not compensates the ratio between these costs and the revenues earned from selling urbanized plots under relaxed parameters, since the size of plots is reduced (from 125 sq mt to 60 sq mt) and total revenues from plots sales also is reduced. Under the enforced parameters, infrastructure costs is equivalent about 23.8% of the revenues from plots sales, while under relaxed parameters, these costs is about 26.3% of the revenues. Here a loss of scale due to plots size and the revenues earned from plots sales (priced per sq mt) is responsible for the internal rate of return decrease.

9.181 Even under relaxed standards plots at a very small size can be counterproductive. This suggests that there is an optimum relation between plot size, considering its value per square meter, and the costs of providing infrastructures for single family housing typologies, since these costs cannot be priced directly from the number of households serviced¹³¹.

9.182 The effect of enlarging time to construct and register a development can be positive in increasing economic feasibility of urbanized developments. For example, in Recife's market context when enforced time to construct and register developments is changed from 4 to 5 years, maintaining all the other conditions unchanged, the NPV is increased about 8%. Relaxing this time can be an alternative to encourage urbanized and titled land production by formal market, since developers can invest in infrastructure progressively, adjusting investments to the payment capacity of low income dwellers. This allows developer to get rid of high cost of capital investing resources only when necessary and using own revenues from sales in infrastructure provision.

9.183 It is interesting to compare the findings reported above with the results from the cash flows of housing construction at popular patterns. In all cities NPV is negative at a high level, even though the internal rate of return (IRR) is positive. Under the regulated parameters NPV was smaller than under loosened standards due to the same reasons previously reported. The IRR is positive but at a low level indicating that housing production with urbanized land can be more profitable than produce only urbanized land in the context studied.

9.184 However, when parameters are relaxed in order to permit an increase in density, the internal rate of return indicates that housing construction can be highly profitable. Clearly there is a gain of scale and earnings from sales of popular housing compensate total costs at a rate about 33% in Curitiba, 27% in Recife and 20% in Brasilia. In addition, by relaxing parameters, the investments had reduced the pay back time in two years comparatively with that under enforced standards. However, at the discount rate used (11.5% per year) the opportunity cost of capital is too high to encourage developer to produce housing at popular standards, as indicated by the negative net present values in all situations.

9.185 Albeit the simplifications assumed here the model of cash-flow presented is useful to evaluate the expected effects in urbanized land and housing production under different contexts of land use controls. In fact, in some contexts, land use regulations can hinder production of affordable housing for low income population and deregulate urban markets can encourage developers to produce more housing. However, although relaxing land

¹³¹ There are several factors that can affect urbanization costs, as development size, grid layout, topography, density, and others (ABIKO et. al, 2005).

use regulation can be important to reduce urbanization costs, get better scale of housing production, and to enhance land allocation it cannot be taken as sufficient to guarantee, by itself, the enlargement of housing supply and improvement in the conditions of poor people access to urbanized land and housing. Experiences in other countries, has demonstrated that a total liberalization of urban markets can be counterproductive, worsening conditions of poor people access to affordable housing.

Conclusions and General Implications

9.186 Discussion on the limits of urban planning controls and land use regulations on urban land markets is polemic and polarized. In one side there are the ones who defend free urban markets as a way to get informality reduced by improving housing supply and so decreasing housing prices. On the other side there are the ones who defend public intervention in order to guarantee an adequate and sustainable urban development by correcting market failures and preventing diseconomies to arise in urban environment.

9.187 Surely, both are correct, in principle, but in fact not all public policy makers recognize the necessity of increasing and diversifying housing supply for low income segments using formal markets. This is a more effective strategy to deal with poor people access to housing and prevent informal settlements to arise than work on crystallized situation of informality in a reactive way.

9.188 Land use regulations that are excessively demanding, plenty of formalisms, constitute elements that increase costs of infrastructure and housing production. Ordinances regarding roads design, for example, based on the premise of intense use of cars generate extensive land consumption, even in areas where car ownership is low. Although adoption of minimum design standards can improve performance of some spatial features and is important to enforce provision of public spaces, these demands eventually are not accomplished by low income segments pushing them to irregularity, informality and even illegality.

9.189 Limitation on densities also is a critical factor since it hampers housing supply that increases housing and land prices mainly in areas where housing demand is great. Thus, despite its benefits, limitation on densities can distort land prices, constraining affordable housing production. In addition, depending on the specific urban market conditions, constraints on the formally housing production can affect land prices even of plots produced without infrastructure and title, encouraging informal production. In addition, expectations on future regularization make land prices in informal market to increase, rent that is totally appropriated by informal developers.

9.190 Roughly, planners ignore costs of public intervention on real estate markets and side effects are usually examined *ex post*. As a result, during revision of planning legislation and evaluation of the outcomes obtained by public policies on land use is usual to create new enforcements and ordinances to deal with negative effects from previously controls adopted. Systematic adoption of discretionary rules in controlling urban development without a comprehensive cost-benefit analysis has implied in effects that distort urban market operations and increase operational costs of the city.

9.191 Planning controls that neglect opportunity costs of an efficient land allocation can result in constraints on housing supply inducing urban sprawl that, in turn, increase costs of transportation and infrastructure provision, for example. As such, it is important to distinguish the areas where controlling urban development produces more benefits than costs and identify who will pay for that, directly or indirectly.

9.192 Formal production of serviced land also is hindered by the blockages imposed by excessive requirements and bureaucratic proceedings for approving, producing and registering developments. Bureaucracy increases time consuming that, in turn, increases costs of capital and uncertainty on business. Time can affect economic feasibility of real estate formal production, mainly for small and medium construction firms, due to the high costs of capital. In order to improve participation of small and medium firms in urban development it is important to reduce red tape costs and uncertainty by becoming bureaucracy proceedings more efficient and transparent.

9.193 In order to do so it is necessary to break the traditional paradigm of a commanded managing approach to urban development based on a strong public intervention. Less restrictive and a more permissive land use

ordinances can improve formal land development and affordable housing production. In this sense a strategic interaction between the private sector and the government should be searched in order to lead to a committed action between these agents where the results achieved tend to be more effective. In addition, while discretionary and punitive ordinances tend to eliminate private incentives for urban development, tax and fiscal policies may be more effective in managing expectations.

9.194 Associations and partnerships involving public sector, developers and land owners could improve the feasibility for private participation in upgrading and regularization programs, as well as in producing serviced land and housing for low income groups in a preventive way. These associations could be strategically important to discourage the production of informality by the side of supply. At the same time, improvements on credit for low and medium income segments could be useful to incentive housing self-construction, since one of the reasons for the low economic feasibility of popular housing construction is the cost of capital.

9.195 Enlarging the time of infrastructure construction also is important to fit the financial conditions of the market to financial needs of construction. Adjust the construction time to the payment condition of poor people is fundamental to balance cash flows of small firms, avoiding them to get loans at high interest rates. Production of progressive developments, through semi-urbanized plots, for example, could improve the conditions of small firms in participating in urban development under competitive conditions. In addition, production of serviced land in stages seems to be an important strategy to adjust land development to the capacity of payment of low income families.

9.196 Alternative building typologies that allow increase densities is an important step to obtain gains of scale in serviced land and housing production, decreasing overall costs. However, this can be limited by the single family plot 'culture', even among low income groups, and by urban legislation that does not predict some alternative forms of shared property of land. Several intermediate typologies of housing buildings and land subdivision, different from the single family plots that are intensive in land consumption or the vertical condominiums that may overcharge infrastructure systems, are not regulated by the legal framework currently in force.

9.197 It is interesting to mention that the new regulatory set of instruments for intervening on urban markets offered by the City Statute, a Federal Law passed in 2001, seems to be more positive and adjusted to the uncertainty and dynamic of the markets than the former static legislation structured on technocratic approaches. The statute intends to assume the 'urban management' aspect more than 'planning' the shape of the city, that is, urban management is seen as a continuous process and not as a goal itself. Further, the statute offers new possibilities of public and private partnerships in urban development, broadening possibilities in sharing among public and private sectors responsibilities in producing the city.

9.198 Relaxing urban land use ordinances can play an important role in improving the conditions to extent formal housing production for the low income segments, but it is not sufficient. Totally deregulated markets in contexts where are large the income differences and the social inequalities have shown to be counterproductive, since market interactions can contribute to wealthy concentration. In asymmetric contexts the presence of government as a regulatory agent seems to be important to correct market failures and redistributing the costs and the benefits from urban development. In this way, fiscal policies seem to be more effective than discretionary ordinances in controlling urban development and land use.

9.199 Finally, improvements on low income segments access to housing and serviced land should be viewed as a necessary step to reduce poverty. However, programs that pursue to facilitate or improve access of poor people to land and housing should be accompanied by a comprehensive approach that combines concerns on an extensive access to overall urban markets. Producing housing for low income groups by concentrating poverty in locations far from job opportunities, for example, is not effective in the long run since it increases other costs for those who cannot afford them feeding back mechanisms of exclusion. Hence improvements on overall social conditions, like health, educational and employment have to be comprehended along housing policies in order to guarantee their sustainability.

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10. Brazil's Urban Land and Housing Markets How well are they working?

by
David E. Dowall

Acknowledgements

The author would like to thank Pedro Peterson for his research assistance to support the preparation of this paper. Valuable comments and suggestions were provided by Mila Freire, Edesio Fernandes, Paul Avila and Fernanda Furtado and from participants at a World Bank-Lincoln Institute Seminar in Brasilia on March 6, 2006. Greg Ingram and Martim Smolka of the Lincoln Institute provided detailed comments on the paper. Any errors that remain are the responsibility of the author.

Introduction

10.1 This paper uses a macro, national-level perspective to assess urban land and housing market outcomes across Brazil. It is based on available empirical data from IBGE, field studies, the Fundacion Joao Pinhero, and other sources. The paper starts by posing and answering the following questions: What are the characteristics of well-functioning urban land and housing markets? How well are Brazil's urban land and housing markets performing relative to other countries? It then proceeds to provide an assessment of urban land and housing market outcomes in Brazilian cities. The paper concludes by exploring a range of opportunities for enhancing urban land and housing market outcomes.

10.2 This paper is one of four papers prepared under a collaborative World Bank-Lincoln Institute of Land Policy project. The other papers are:

- Paulo C. Avila, "Urban Land Use Regulations in Brazil: Land Market Impacts and Access to Housing."
- Fernanda Furtado and Pedro Jorgensen, "Value Capture in Brasil: Issues and Opportunities."
- Edesio Fernandes, "Legal Aspects of Urban Land Development in Brazil."

10.3 Each paper takes a distinct perspective on the overall topic of urban land policy in Brazil. Paulo Avila's paper reviews the various models of urban land use planning and regulation in Brazilian cities. He then analyzes the effects of planning regulations, titling and infrastructure provision on residential land prices, and the efficiency of residential land subdivision. Avila's paper is one of the few quantitative econometric and financial analyses of urban land and housing markets, building on the previous work of Serra, Dowall, Motta and Donovan [2004]. His analysis indicates that land use planning regulations and infrastructure provision significantly and positively affect urban residential plot prices.

10.4 Fernanda Furtado and Pedro Jorgensen's papers explore the concept of land value capture—the range of tax and policy instruments that can be used to generate public resources to fund public investments to support urban development. These instruments work by assessing fees, taxes and charges on the incremental increase in land values generated by public investments. Furtado and Jorgensen outline eight types of value capture models and illustrate how they might be used to finance, in whole or in part, the costs upgrading informal settlements throughout Brazil.

10.5 Edesio Fernandes' paper presents an historical analysis of land and property legislation in Brazil which provides a thorough understanding of the role of federal legislative actions from the early twentieth century to the significant policy reforms of the past 10 years, culminating in the promulgation of the City Statute [2001]. Fernandes's paper discusses the fundamental issues surrounding informality and lack of secure land tenure in favelas and irregular settlements. He outlines issues and opportunities for reforming land titling and registration systems in Brazil and discusses how these reforms could contribute to the regularization and upgrading of low-income settlements embedded in Brazil's vast system of cities.

10.6 The present paper attempts to make the case for reforming urban land and housing policies in Brazil, by arguing that the historical as well as current performance of Brazil's urban land and housing markets are below their potential. As a consequence, urban land and housing markets are not providing sufficient housing opportunities for low- and middle-income families, and contribute to a growing housing deficit and widespread housing informality [FJP, 2002 and 2005]. The paper attempts to make the case that although dwelling unit production is satisfactory relative to household formation, the provision of infrastructure and urban services is unsatisfactory.

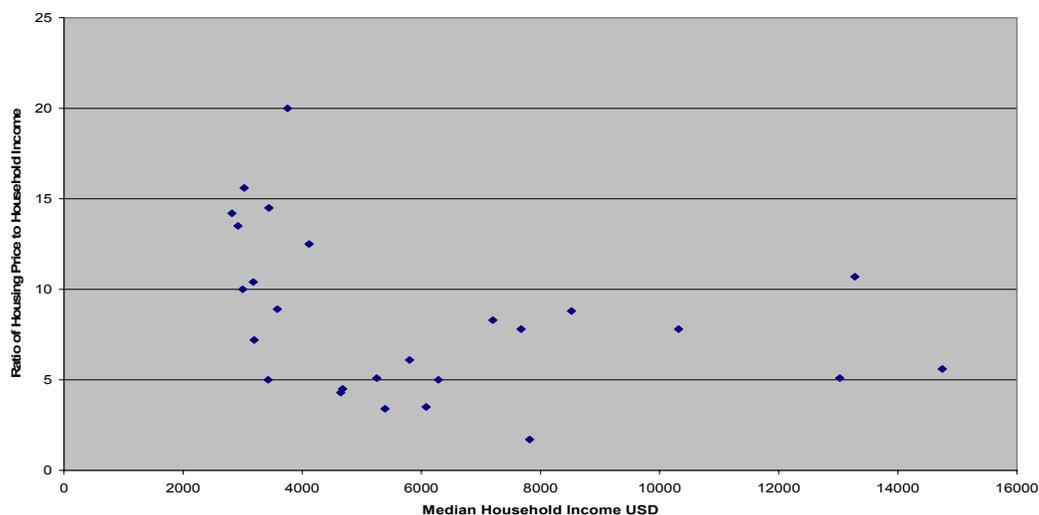
Characteristics of Well-Fnctioning Urban Land and Housing Markets

10.7 Urban land and housing markets should efficiently allocate land and housing resources between suppliers and demanders. Housing supply should reasonably match the housing demands of households in terms of prices, locations and quality attributes. In most market economies, private production (from large merchant builders to self-built housing to informally provided housing in favelas and irregular settlements) is the predominant mode of housing production. Aside from a few countries, such as Singapore, public provision of housing is miniscule relative to overall production. The full range of housing supply, including new as well as existing units should provide households with affordable options for purchase as well as rental. Depending on household incomes and housing prices, the private real estate markets typically produce housing that is affordable to households to the 30th to 40th percentile of the income distribution [Dowall, 1989 and 1990]. Households with lower incomes, typically rent accommodations, share housing with extended families or postpone forming households. Some are fortunate to get housing assistance from government sources.

10.8 Achieving this level of performance requires that housing markets produce housing that is priced between 3 and 6 times total household income. Middle and low-middle income households should be able to afford such units by saving money for down payments and taking out mortgages from housing lenders. Unfortunately, housing supplies are frequently constrained and housing prices are much higher in relation to income. This is due to restrictive land use regulations, complex land titling and registration, lack of investment in basic infrastructure to serve residential development projects and limitations on the availability of construction and borrower financing.

10.9 In middle-income developing countries housing price to income ratios vary considerably. As household incomes rise, the variation of the ratio diminishes as housing and real estate markets mature and broaden their range of housing products (and prices). In cases where formal housing production is constrained, house price to income ratios increase. Figure 10.1 illustrates the relationship between housing price to income ratios and household incomes for a 27 middle income countries.¹³² It is based on tabulations of the World Bank's housing Indicators program. The data were collected in 1998, and are based on data from a sample of large cities in each country [WDR, 2000]. The ratio of median housing prices to median household income ranges from a low of 1.7 for Poland to 20 for Lithuania. Brazil has a ratio of 12.5. This is higher than all Central and Latin American countries included in the data series. Only five countries have higher ratios than Brazil—Panama, Serbia and Montenegro, Latvia, Cote d'Ivoire and Lithuania. On the other hand 11 of the 27 countries have ratios below 6, suggesting good performance.

¹³² Middle income countries, as defined by the World Bank, have per capita Gross National Incomes ranging from \$826 to \$10,065 (in 2004 dollars). This is further divided into low-middle-income (\$826-\$3255) and upper-middle-income (\$3256-\$10,065).

Figure 10.1 Median Housing Prices and Median Household income, Middle income Countries, 1998

Source: World Bank, World Development Report, 2000.

Is there a Brazilian Paradox?

10.10 To motivate the reader, I would like to suggest that Brazil urban housing market suffers from a paradox—housing is expensive relative to income (See Figure 10.1) and it lacks infrastructure services and secure land tenure. The private sector is capable of producing satisfactory numbers of dwelling units, despite the fact that the public sector is not capable of producing enough infrastructure services or planning and approving enough residential subdivisions to support housing development. The result is an urban land and housing market paradox—expensive housing lacking water and sanitation, secure land tenure,¹³³ adequate circulation and common areas for schools and parks. Table 10.1 compares the housing characteristics of Brazilian cities with those in other countries¹³⁴, and lends some credence to the paradox. In Brazilian cities, 93 percent of the housing stock is classified as permanent; this is significantly higher than the comparable rate for low-middle-income countries 86 percent. On the other hand, Brazil does poorly with respect to the percentage of housing units with piped water connections—64 percent versus 74 percent for cities in low-middle-income countries. At the same time, its portion of unauthorized housing units 23 percent is well below levels found in other low-middle-income countries—36 percent. So the overall scorecard for Brazil is again a paradox—both good—a relatively low rate of unauthorized housing and a high portion of permanent structures; and bad—a relatively low level of access to water supply. Compared to other Latin American countries Brazil ranks poorly in terms of providing infrastructure to support residential development [UNECLAC, 2003].¹³⁵

¹³³ According to the World Bank's Doing Business survey, Brazil ranks eighth out of nine countries on ease of property registration [Doing Business Survey, 2005].

¹³⁴ The World Bank classifies Brazil as a low-middle-income country.

¹³⁵ The percentages in Table 10.1 have limitations. They are based on binary definitions of service access and do not reflect poor quality of service, such as water supply limits to 3-4 hours per day.

Table 10.1 How Do Brazilian Cities Compare to Cities in Other Countries (1990s)

Cities in	Percentage of Housing Units that are Permanent Structures	Percentage of Housing Units with Piped Water	Percentage of housing units that are unauthorized	Average per capita GNI, 2004, US\$
Low-income countries	67	56	64	507
Low-middle-income countries	86	74	36	1,686
Brazilian Cities	93	64	23	3,000
Middle-income countries	94	94	20	4,769
Middle-high-income countries	99	99	3	16,046
High income countries	100	100	0	32,112

Source: UNCHS An urbanizing world Global Report on Human Settlements, 1996.

Caveats about the data Used in this Paper

10.11 In Brazil like most other developing countries, housing and urban planning experts constantly discuss the informal housing crisis—slums, shanty towns, squatter settlements and the like. Many settlements take on iconic positions—Cairo’s “City of the Dead”—a squatter settlement encamped on top of one of the city’s largest cemeteries; “Smokey Mountain”—a massive slum located on top of Manila’s main garbage dump; or Mumbai’s Dharavi—“Asia’s biggest slum.” These settlements are horrific manifestations of society’s inability or unwillingness to address the housing needs of low-income residents.

10.12 Urban planners and housing policy professionals and advocates are fully justified in voicing outrage about these terrible conditions. But at the same time they fail to provide any systematic assessment of actual urban land and housing market outcomes in developing country cities. This paper attempts to bridge this gap by providing a quantitative assessment of Brazil’s urban land and housing markets.

10.13 There are a number of important caveats that I need to offer before proceeding. First of all this paper starts by taking an integrated approach to evaluating Brazil’s urban land and housing markets. It looks at the entire spectrum of housing units, both formal and informal; this includes dwelling units located in fully approved housing projects—subdivisions and apartment complexes—as well as favelas, and irregular and illegal settlements. This definition is broad and incorporates a wide range of housing conditions, and has the advantage of allowing one to make a macro-level assessment of overall housing supply and demand. How many total units are produced in Brazil over a year? How many new households are formed each year? How many units need to be replaced due to deterioration, demolitions and change of use? As will be explained below, total housing production of both formal and informal dwelling units is slightly less than new household formation [World Bank, 2002].

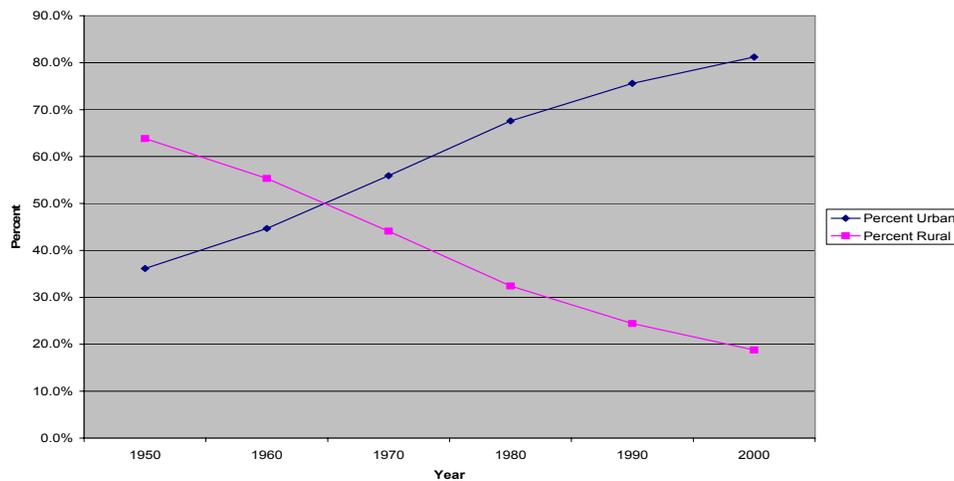
10.14 The second caveat relates to the definition of informality. Our review of the literature on housing informality indicates that it is based on three distinct but interdependent factors—type of land tenure; access to infrastructure; and physical characteristics of settlements and dwelling units. As is commonly the case in many

countries, census data on informal housing stocks is highly inaccurate. Some countries ignore informal housing altogether, others grossly undercount it. Brazil is no exception and data from IBGE are problematic. In order to maintain the empirical mode of analysis, I have chosen to define informal housing based on the most inclusive single measure—access to infrastructure services. This definition allows widespread measurement of stock and flow trends for municipalities and metropolitan regions over time. However, it may understate informality by excluding cases where urban services are available, but where households lack secure and legal land title or that the subdivisions where the housing units are located are poorly planned and executed. With these caveats in mind, the next sections of the paper map out a broad assessment of Brazil's urban land markets.

Performance of Brazil's Urban Land and Housing Markets during the last half of the Twentieth Century

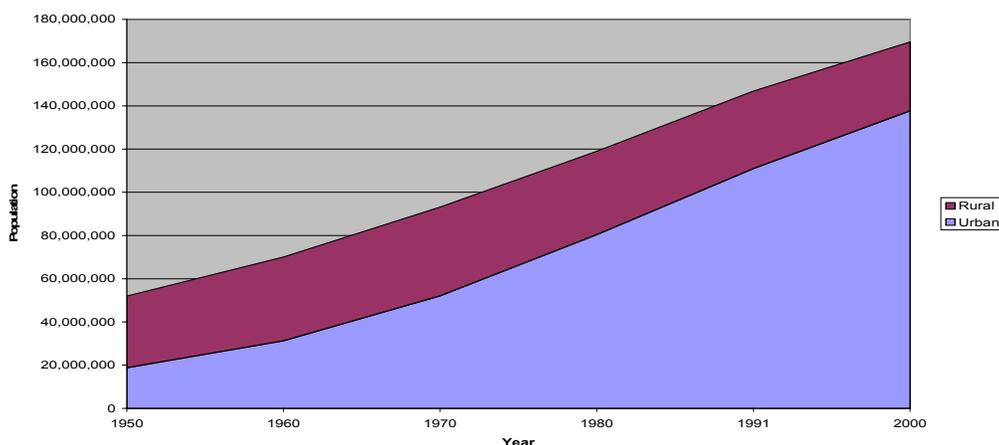
10.15 At the country level, Brazil has undergone a massive shift in the spatial patterns of its population. Between 1950 and 2000, the country added 117,600,000 persons, approximately 2.4 million per year. More dramatically, the spatial structure of the population shifted from being predominately rural to urban. As this section will illustrate, the most challenging period of rapid urbanization has passed. In the 1990s population and household growth slowed as Brazil passed through its urban transition. Using IBGE census data, Figure 10.2 and Figure 10.3 illustrate that in 1950, about 64 percent of Brazil's population was located in rural areas and 36 percent was located in urban areas. By 1980, the pattern was completely reversed—32 percent rural and 68 percent urban. Since then, urban population dominance has increased, and by 2000, approximately 81 percent of the Brazilian population lived in cities, and 19 percent lived in rural areas.

Figure 10.2 Percent Distribution of Urban and Rural Population



Source: IBGE, 2005.

Figure 10.3 Urban and Rural Population Trends in Brazil, 1950-2000



Source: IBGE, 2005.

10.16 In absolute terms the increase in urban population has been enormous. Table 10.2 shows that between 1950 and 2000, the country’s urban population increased by 118,914,548, while at the same time its rural population slightly decreased by -1,314,502. While some of these changes reflect alterations of administrative boundaries and definitions of what constitutes an urban place, they overwhelmingly reflect massive rural to urban migration-- on average, cities in Brazil added 2,378,291 persons per year between 1950 and 2000.

10.17 Rural-urban migration was particularly strong in the 1950s and 1960s, reflecting the country’s emerging economic growth, and social transformation. During the 1970s, 1980s and 1990s, rural-urban migration slowed and as a consequence urban population growth slowed as well. In percentage terms annual urban population growth has ranged from a high of 3.0 percent during the 1950s to a low of 1.4 percent

Table 10.2 Decade-by-Decade Change in Urban and Rural Population

	Population Change			Annual Percent Change		
	Total	Urban	Rural	Total	Urban	Rural
1950-60	18,126,060	12,520,143	5,605,917	3.0%	5.2%	1.6%
1960-70	23,068,580	20,781,950	2,286,630	2.9%	5.2%	0.6%
1970-80	25,863,669	28,351,425	-2,487,756	2.5%	4.4%	-0.6%
1980-91	27,822,769	30,554,581	-2,731,812	2.1%	3.3%	-0.7%
1991-00	22,718,968	26,706,449	-3,987,481	1.4%	2.2%	-1.2%
1950-2000	117,600,046	118,914,548	-1,314,502	2.4%	4.1%	-0.1%

Source: IBGE, 2005.

during the 1990s. This decline in the percentage rate of growth is common throughout Latin America as rural areas depopulate and as overall rates of natural population increase slow. However, in absolute terms, annual urban population growth continued to grow up until the 1990s and will continue to do so in the future, but it will be driven mainly by natural population increase and less by rural-urban migration.

10.18 Rural areas of Brazil have actually been losing population since the 1970s and contain about 10,000,000 fewer persons in 2000 than in 1970. On the other hand urban areas have been increasing rapidly since the 1950s, growing from 18.8 million persons in 1950 to 137.7 million in 2000—more than a sevenfold increase. Annual

urban population growth has ranged from approximately 1.25 million during the 1950s to a peak of 3 million during the 1980s. During the 1990s, the annual rate of growth has slightly declined to 2.7 million persons.

Urbanization of Brazil's 15 largest Metropolitan Regions

10.19 Urbanization trends can be disaggregated to examine population growth in Brazil's fifteen largest metropolitan areas. Table 10.3 presents tabulations of population trends for Brazil's 15 largest metropolitan regions from 1950 to 2000. Over the fifty year period, these cities accounted for a decreasing share of total urban population, falling from 54.8 percent of total urban population in 1950 to 42.8 percent in 2000—indicating a deconcentration of urban population.

10.20 However, despite the declining share, absolute population change has been significant. Table 10.4 presents population increases for the fifteen metropolitan areas by decade from 1950-60 to 1991-2000. Population growth in the 15 metropolitan areas was the greatest during the 1970-80 decade when they added a total of 12.6 million persons. Since then the absolute decadal increases have declined, and during 1991-2000 period stood at 9.2 million. This is consistent with their decreasing share of total urban population, these 15 metropolitan areas accounted for a relatively declining share of country-wide increases in urban population, falling from 52 percent of the total increase during the 1950s to 34.6 percent during the 1990s. What these trends show, is that over the 50 years, urbanization has gradually slowed in Brazil's 15 largest metropolitan areas, This is due to two factors—urban growth is shifting to areas outside the boundaries of the 15 metropolitan areas and that second tier metropolitan areas are accounting for an increasing share of population increase.

Table 10.3 Urban Population Trends in Brazil's 15 Largest Metropolitan Regions, 1950 to 2000

Metropolitan Region	Total Population					
	1950	1960	1970	1980	1991	2000
Belém	268,252	422,648	669,768	1,021,473	1,401,305	1,795,536
Belo Horizonte	565,970	990,055	1,719,490	2,676,352	3,515,542	4,349,425
Brasília		141,742	537,492	1,176,908	1,601,094	2,051,146
Curitiba	333,138	554,515	875,269	1,497,352	2,061,531	2,726,556
Fortaleza	464,507	699,262	1,091,117	1,651,744	2,401,878	2,984,689
Goiânia	82,826	196,596	442,790	827,446	1,230,445	1,639,516
Grande São Luís	119,785	180,747	302,609	498,958	820,137	1,070,688
Grande Vitória	123,281	213,449	410,103	744,744	1,126,638	1,425,587
Maceió	178,705	240,733	357,514	522,173	786,643	989,182
Natal	169,293	245,303	373,754	554,223	826,208	1,043,321
Porto Alegre	842,390	1,263,401	1,751,889	2,468,028	3,230,732	3,718,778
Recife	843,409	1,275,125	1,827,173	2,386,453	2,919,979	3,337,565
Rio de Janeiro	3,178,310	4,869,103	6,891,521	8,772,277	9,814,574	10,894,156
Salvador	463,545	739,799	1,147,821	1,766,724	2,496,521	3,021,572
São Paulo	2,662,776	4,791,245	8,139,705	12,588,745	15,444,941	17,878,703
Total 15 Metros	10,296,187	16,823,723	26,538,015	39,153,600	49,678,168	58,926,420
Total Brazil Urban	18,782,891	31,303,034	52,084,984	80,436,409	110,990,990	137,697,439
15 Metros as a percent or total urban	54.8%	53.7%	51.0%	48.7%	44.8%	42.8%

Source: IBGE, 2005.

Table 10.4 Urban Population Change in the 15 Largest Metropolitan Areas, 1950-60 to 1991 - 2000

Metropolitan Region	Change in Population				
	1950-60	1960-70	1970-80	1980-91	1991-2000
Belém	154,396	247,120	351,705	379,832	394,231
Belo Horizonte	424,085	729,435	956,862	839,190	833,883
Brasília	141,742	395,750	639,416	424,186	450,052
Curitiba	221,377	320,754	622,083	564,179	665,025
Fortaleza	234,755	391,855	560,627	750,134	582,811
Goiânia	113,770	246,194	384,656	402,999	409,071
Grande São Luís	60,962	121,862	196,349	321,179	250,551
Grande Vitória	90,168	196,654	334,641	381,894	298,949
Maceió	62,028	116,781	164,659	264,470	202,539
Natal	76,010	128,451	180,469	271,985	217,113
Porto Alegre	421,011	488,488	716,139	762,704	488,046
Recife	431,716	552,048	559,280	533,526	417,586
Rio de Janeiro	1,690,793	2,022,418	1,880,756	1,042,297	1,079,582
Salvador	276,254	408,022	618,903	729,797	525,051
São Paulo	2,128,469	3,348,460	4,449,040	2,856,196	2,433,762
Total 15 Metros	6,527,536	9,714,292	12,615,585	10,524,568	9,248,252
Total Brazil Urban Population Change	12,520,143	20,781,950	28,351,425	30,554,581	26,706,449
Percent 15 of Total	52.1%	46.7%	44.5%	34.4%	34.6%

Source: IBGE, 2005.

Housing demand and Housing Production in Urban Brazil

10.21 Housing demand is determined by population growth, household formation, income, and requirements to replace old dilapidated housing stock and replace housing units removed from the stock. Housing production trends in Brazilian cities has largely followed trends in urbanization and overall production of formal and informal housing has reasonably paced increases in household growth.

10.22 Table 5 presents trends in housing units by metropolitan region for census years 1970 to 2000 for Brazil's fifteen largest metropolitan areas. During the 30 year period, informal and formal housing stock increased from 5.4 to 16.5 million units—a gross increase of 11.2 million units. On an annual basis this is 373,000 units a year. For all urban areas in Brazil, the total housing stock increased from 10.5 to 38.7 million between 1970 and 2000. This is approximately 940,000 units per year. Overall, this is a remarkable level of residential construction and investment, although, as we will explain below, much of it is produced through informal channels and is not supplied with adequate infrastructure and secure land titling. It is also significant that persons per household declined dramatically over the 30 year period, falling from 5.0 persons per unit to 3.6 persons per unit, a percent decrease of 28 percent.

Table 10.5 Permanent Dwelling Units for 15 Largest Metropolitan Regions and Decade by Decade

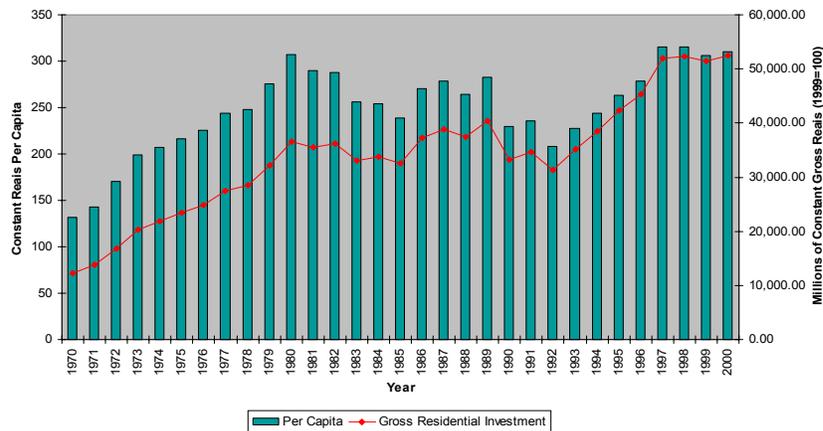
Metropolitan Region	Number of Dwelling Units			
	1970	1980	1991	2000
Belém	105,675	184,364	292,218	419,791
Belo Horizonte	319,386	568,116	858,303	1,189,609
Brasília	99,303	253,950	386,396	556,762
Curitiba	178,338	342,427	543,032	790,982
Fortaleza	188,412	320,663	523,219	731,278
Goiânia	83,514	180,810	312,228	467,227
Grande São Luís	49,228	90,563	167,174	249,682
Grande Vitória	74,579	161,041	279,674	401,091
Maceió	66,028	104,667	176,051	247,536
Natal	65,023	109,867	183,440	260,220
Porto Alegre	380,128	630,867	936,221	1,153,274
Recife	332,871	481,456	678,819	873,407
Rio de Janeiro	1,489,189	2,152,226	2,743,178	3,302,119
Salvador	205,588	353,789	581,080	807,352
São Paulo	1,721,964	2,999,178	4,083,306	5,079,188
Total of the 15 MR	5,359,226	8,933,984	12,744,339	16,529,518
Persons per dwelling unit	5.0	4.4	3.9	3.6
Total Urban	10,501,000	18,364,477	28,532,388	38,678,933
Metropolitan Region	Change in Number of Dwelling Units			
	1970-80	1980-1991	1991-2000	1970-2000
Belém	78,689	107,854	127,573	314,116
Belo Horizonte	248,730	290,187	331,306	870,223
Brasília	154,647	132,446	170,366	457,459
Curitiba	164,089	200,605	247,950	612,644
Fortaleza	132,251	202,556	208,059	542,866
Goiânia	97,296	131,418	154,999	383,713
Grande São Luís	41,335	76,611	82,508	200,454
Grande Vitória	86,462	118,633	121,417	326,512
Maceió	38,639	71,384	71,485	181,508
Natal	44,844	73,573	76,780	195,197
Porto Alegre	250,739	305,354	217,053	773,146
Recife	148,585	197,363	194,588	540,536
Rio de Janeiro	663,037	590,952	558,941	1,812,930
Salvador	148,201	227,291	226,272	601,764
São Paulo	1,277,214	1,084,128	995,882	3,357,224
Total 15 MR	3,574,758	3,810,355	3,785,179	11,170,292
Total Urban	7,863,477	10,167,911	10,146,545	28,177,933

Source IBGE, 2005.

10.23 Regardless of whether these units are located in legal or illegal residential subdivision, or favelas, the increases in housing stock are impressive. They represent significant financial accomplishments of households,

especially for low and moderate income households. Figure 10.4 illustrates country-wide (urban and rural) private gross residential capital outlays and per capita outlays in constant 1999 Reais [IBGE, 2005].¹³⁶ As it shows, spending has been robust and has increased in per capita real terms from R\$ 131.4 in 1970 to R\$ 310.0 in 2000. Despite the ups and downs of the Brazilian economy during the 1980s private investment in housing has increased on a decade-by decade basis. In constant Reais, private residential investment has increased 4.3 times between 1970 and 2000.

Figure 10.4 Private Investment in Housing is Robust and Increasing in Real Terms



Source: Suzigan, W. *A indústria brasileira : origem e desenvolvimento*. São Paulo: Brasiliense, 1986; Abreu, M. P. Verner, D. *Long-term brazilian economic growth 1930-1994*. Paris: OECD, 1997. (Development Centre Studies. Long-term growth series/OCDE); IBGE, *Diretoria de Pesquisas, Departamento de Contas Nacionais*.

10.24 How adequate has this spending been in terms of providing sufficient housing stock for new households? The question can be partially answered by comparing the relationship between housing production and increases in households. Table 10.6 presents estimates of increases in household formation for the 15 major metropolitan regions from 1970 to 2000. Table 10.6 reveals that household formation has been robust in the 15 metropolitan areas. Between 1970 and 2000, these 15 metropolitan regions added approximately 10.6 million households. In total, the number of households in all urban areas of Brazil increased by 27.2 million over the 30 year period—about 900,000 households per year. As pointed out above, a main factor of increased household formation is the reduction in persons per household. With smaller persons per dwelling unit (and by extension persons per household) a falling household size means that the number of households per 1000 population will increase. Its is interesting to note that the 28 percent decline in persons per dwelling unit reflects a flexible response in housing supply to accommodate more households per 1000 of population.¹³⁷

¹³⁶ The figures pertain to fixed capital only and do not include land, operating or maintenance costs.

¹³⁷ If housing supply was tightly constrained, we would expect to see a stable or increasing number of persons per dwelling unit as people delayed household formation, doubled up with other households or extended families.

Table 10.6 Trends in Household formation 15 Largest Metropolitan Regions, 1970 - 2000

Metropolitan Region	Households			
	1970	1980	1991	2000
Belém	128,063	219,200	332,063	477,536
Belo Horizonte	328,774	574,324	833,067	1,156,762
Brasília	102,771	252,555	379,406	545,518
Curitiba	167,355	321,320	488,514	725,148
Fortaleza	208,627	354,452	569,165	793,800
Goiânia	84,663	177,564	291,575	436,041
Grande São Luís	57,860	107,073	194,345	284,757
Grande Vitória	78,414	159,816	266,976	379,145
Maceió	68,358	112,054	186,408	263,080
Natal	71,463	118,932	195,784	277,479
Porto Alegre	334,969	529,620	765,576	989,037
Recife	349,364	512,114	691,938	887,650
Rio de Janeiro	1,317,690	1,882,463	2,325,728	2,897,382
Salvador	219,469	379,125	591,593	803,610
São Paulo	1,556,349	2,701,447	3,659,939	4,754,974
Total 15	5,074,190	8,402,060	11,772,078	15,671,920
Total Urban	17,610,993	25,156,482	37,843,782	44,857,290
Metropolitan Region	Household Change			
	1970-80	1980-91	1991-2000	1970-2000
Belém	91,137	112,863	145,473	349,473
Belo Horizonte	245,550	258,742	323,695	827,988
Brasília	149,784	126,851	166,111	442,747
Curitiba	153,965	167,194	236,633	557,792
Fortaleza	145,825	214,714	224,635	585,174
Goiânia	92,900	114,011	144,467	351,378
Grande São Luís	49,212	87,273	90,412	226,897
Grande Vitória	81,403	107,160	112,170	300,732
Maceió	43,696	74,354	76,672	194,722
Natal	47,468	76,852	81,695	206,016
Porto Alegre	194,651	235,957	223,460	654,067
Recife	162,751	179,824	195,712	538,286
Rio de Janeiro	564,772	443,266	571,653	1,579,691
Salvador	159,657	212,467	212,017	584,141
São Paulo	1,145,098	958,491	1,095,036	3,198,625
Total 15	3,327,870	3,370,018	3,899,842	10,597,730
Total Urban	7,545,489	12,687,300	7,013,508	27,246,297

Source IBGE, 2005.

10.25 Table 10.7 compares the housing stock increases of Table 10.5 with the increases in households presented in Table 10.6. Focusing on the 15 largest metropolitan areas, the 11.2 million housing stock increases between

1970 and 2000 closely tracked the 10.6 million-increase in households. The overall ratio of housing stock increase to household increase for the 15 metropolitan areas is 1.1—suggesting that 1.1 housing units were added to the stock of the 15 metros for every 1 household increase. Closer inspection of the ratio across the metropolitan areas reveals that 10 of the 15 metros are producing relatively more housing units per increase in household. On the other hand, housing markets in the metropolitan regions of Belem, Fortaleza, Grande Sao Luis, Maceio, and Natal are not producing enough units to accommodate new household formation.

Table 10.7 Ratio of Change in Permanent Dwelling Units to Changes in the Number of Households

Metropolitan Region	Change in Permanent Dwelling units/Change in Households			
	1970-80	1980-1991	1991-2000	1970-2000
Belém	0.86	0.96	0.88	0.90
Belo Horizonte	1.01	1.12	1.02	1.05
Brasília	1.03	1.04	1.03	1.03
Curitiba	1.07	1.20	1.05	1.10
Fortaleza	0.91	0.94	0.93	0.93
Goiânia	1.05	1.15	1.07	1.09
Grande São Luís	0.84	0.88	0.91	0.88
Grande Vitória	1.06	1.11	1.08	1.09
Maceió	0.88	0.96	0.93	0.93
Natal	0.94	0.96	0.94	0.95
Porto Alegre	1.29	1.29	0.97	1.18
Recife	0.91	1.10	0.99	1.00
Rio de Janeiro	1.17	1.33	0.98	1.15
Salvador	0.93	1.07	1.07	1.03
São Paulo	1.12	1.13	0.91	1.05
Total 15 MR	1.07	1.13	0.97	1.05
Total Urban	1.04	0.80	1.45	1.03

Source: Tables 10.5 and 10.6.

10.26 These ratios are very impressive, given the fact that they incorporate housing stock demolitions and removals. The net increase in the stock has, with the exception of the 1980s kept pace with strong household formation, driven by both population increases and smaller average household size.

10.27 Our first, level evaluation of Brazil's housing market indicates that there is a strong private (informal and formal) sector and that housing production is substantial. Private Gross Fixed Capital formation in the housing sector has increased by more than 4 fold in constant terms. On a per capita basis, real constant reais investments in housing have increased by about 2.35 times between 1970 and 2000. But as we shall see, most of the housing stock increases are in informal settlements with limited infrastructure services available.

How Large is Brazil's Informal Housing Sector?

10.28 The previous section outlined the overall performance of Brazil's urban land and housing market, looking at both the formal and informal sectors of housing production and consumption. This section explores the role and performance of the informal sector in producing housing in Brazilian cities.

10.29 As noted in the introduction to this paper, defining and systematically exploring informal housing is problematic [Pontual, 2005 and Pontual and Serra, 2005]. In the case of Brazil, there are widely differing estimates of housing informality both in term of the size of the informal housing stock and the rate at which informal housing units are added to the supply of housing.

What defines informality? Informal housing can be defined along three main conceptual lines: security of land tenure; access to infrastructure services; and the physical characteristics of the settlement and the housing structures in it. Informal land subdivisions are a predominant component of informal housing provision. In the Brazilian case there are two types of informal land subdivisions—illegal subdivisions and clandestine subdivisions.

10.30 Illegal subdivisions are produced by a landowner or his agent. The subdivision of the parcel typically is done without government permission (approval of subdivision plan), lack of a legal physical cadastre identifying plots, and incomplete infrastructure provision. Purchasers of such lots will usually build housing over a 2-5 year period and given the lack of legal status will construct housing without obtaining building permits and inspections.

10.31 Clandestine subdivisions refer to settlements that are produced on land not owned by the developer or real estate agent. It is common but not impossible for clandestine subdivisions to be located on government land. Houses in clandestine subdivisions usually do not have secure tenure and usually do not have complete urban infrastructure services.¹³⁸ Favelas are also invasions of land, but the subdivision of the land is typically unorganized—and does not follow a plan. Plots in favelas do not have legal title and nor do they have access to services.

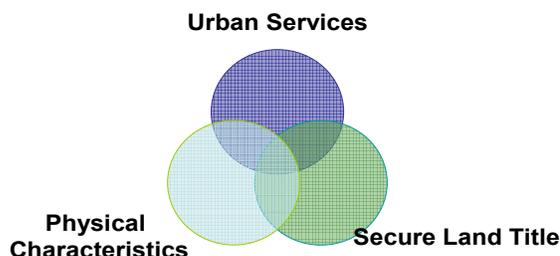
10.32 The physical characteristics of informal settlements vary considerably. In clandestine subdivisions and favelas, housing construction can range from very poor—temporary arrangements to reasonable good conditions—brick walls, concrete floors and tin roofs. Condition varies by the age of the settlement—newer ones are more precarious and more established settlements have better housing conditions. Over time virtually all settlements go through an incremental process of upgrading. Some of this upgrading is self organized and some is based on government programs, where government agencies work with residents of informal settlements to provide secure tenure, make infrastructure investments in water, wastewater collection and treatment, drainage, electricity and solid waste collection. These programs also include assistance to homeowners to make improvements to their houses. Even, in cases where governments do not support or sanction upgrading, community-based efforts are organized to improve conditions through self-help activities. The overall result is that in most metropolitan regions, the stock of informal housing is constantly changing through additions, resettlements and upgrading efforts.

10.33 Figure 10.5 illustrates how the three dimensions of informality can be combined to categorize housing settlements and housing production into formal and informal classifications. Unfortunately, in terms of empirical data, Brazilian statistics on informal housing stock are incomplete and in some cases misleading. Census data from IBGE on housing units combines informal and formal units and does not provide any basis for distinguishing between the two types. The work of the Fundacion Joao Pinheiro [2002 and 2005] also does not shed much light on this matter. While their extensive research on Brazil's housing deficit provides specific tabulations of inadequate housing, over crowding, lack of access to infrastructure, and excessive rental payments these figures cannot be aggregated into overall estimates of informal housing stocks.

10.34 IBGE does however collect information on whether the housing units have access to infrastructure services and on the physical conditions of each dwelling unit, and tabulations of the number of households where the occupant has legal right to the structure, but not the land. But here again, the tabulations cannot be aggregated without the risk of significant double counting [IBGE, 2000].

¹³⁸ For example, some favelas in Rio de Janeiro (such as Favela da Rocinha) have most services, but still lack formal title. Also, as mentioned earlier, classifying settlements as either having or not have infrastructure services is problematic since this binary treatment does not capture the variable quality of infrastructure services.

Figure 10.5 Defining Informal Housing is Complicated



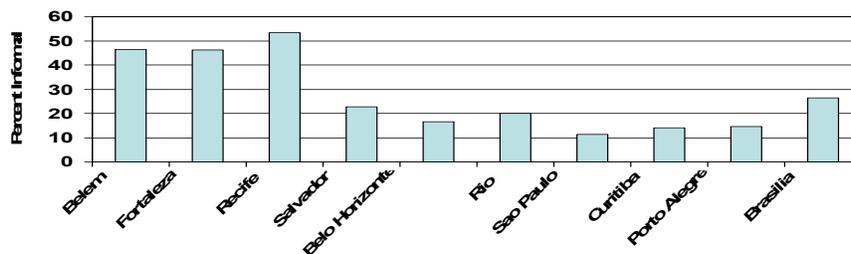
10.35 As Figure 10.5 shows, informality can be limited to lack of infrastructure, lack of secure land title and poor physical conditions of housing and settlement layout. Quite often housing informality occurs with combinations of two or three of the above conditions. Since IBGE does not have data on land tenure, we have only two of the three variables necessary to measure informality.

10.36 Reliance on access to services and physical conditions while foregoing information on land tenure, is likely to undercount the stock of informal dwelling units in Brazil’s urban areas. Unfortunately, we simply do not know how serious the under estimation is. If the incidence of dwelling units with infrastructure, good physical conditions and lack of secure land tenure is low, then the underestimation will be low. On the other hand if there are substantial numbers of units in cities that lack secure land title but have infrastructure and are in good physical condition, then the underestimation will be large.

10.37 Discussions with housing and land tenure experts in Brazil indicate the range of underestimation probably varies from city to city, with it being higher in the North and Northeast, where land titling and registration are less common [conversation with Edesio Fernandes, March 6, 2006]. In addition, many housing experts have noted that the IBGE data on access to infrastructure and physical conditions are inaccurate and that they frequently undercount informal housing. Despite the limitations with IBGE’s data on informal housing, their estimates of housing units with access to infrastructure may provide a useful picture of housing conditions in Brazilian cities and therefore we will use them as a proxy for informal housing.

10.38 Figure 10.6 provides a tabulation of the percent of housing units without urban infrastructure services, by major metropolitan region in Brazil, based on the 2000 census. The figures range from over 10 percent for Sao Paulo to nearly 55 percent for Recife.

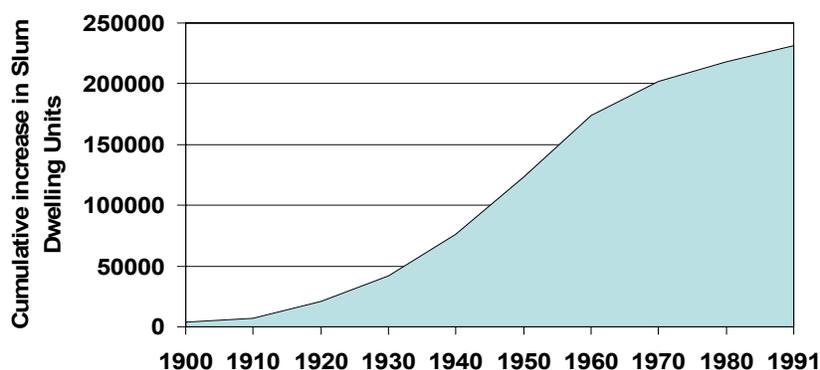
Figure 10.6 Level of Informal Varies Widely Across Brazil, 2000



Source: FJP, 2005.

10.39 Figure 10.7 provides an example of changes in the informal housing stock in Rio de Janeiro. Informal housing increased from virtually zero in 1900 to over 225,000 units in 1991. Since the 1960s, the rate of growth has slowed, but it is still increasing, and overspilling into outlying areas [O'Hare and Barke, 2003]. As a result, the proportion of Rio's housing stock that is located in favelas is declining. In 1970 about 13.5 percent of the housing stock was located in favelas, whereas by 1991 the portion had slightly declined to 12 percent, which is roughly consistent with the percentage indicated in Figure 10.6

Figure 10.7 Number of Favela Dwelling Units in Rio de Janeiro, 1900-1991



Source: Development Planning Unit, *Understanding Slums: Case Studies For The Global Report 2003*.

10.40 Table 10.8 provides an estimate of informal housing stock for both 1991 and 2000 which is based on access to adequate infrastructure. The table enumerates formal and informal housing stock for 1991 and 2000 and it provides estimates of the net flow of formal and informal dwelling units for the 10 largest metropolitan areas in Brazil and other urban areas. The overall portion of informal units has increased from 13 to 23 percent. In some cities, Brasilia, Belem and Recife, the portion of informal units has doubled. In others—Curitiba, Salvador, and Sao Paulo it has remained constant. However, experts familiar with Salvador indicate that the ratio of unserviced informal housing is grossly underestimated. [comment by Ivo Imparato at World Bank Seminar on March 6, 2006].

10.41 These data provide a rough estimate of relative contribution of formal and informal housing production in Brazil's urban areas between 1991 and 2000. The most important result of the tabulations presented in Table 10.8 is that the informal sector accounted for over half—56 percent of the increase in Brazil's urban housing stock between 1991 and 2000. Out of the total 10 million units increase in permanent dwelling units between 1991 and 2000, informal production accounted for 5.6 million units.

10.42 Table 10.8 also suggests that informality is now more prevalent outside the 10 largest metropolitan regions. In 1991, informal housing accounted for 13.7 percent of the total housing stock outside the 10 largest metropolitan areas in Brazil. In 2000, the figure increased to 24.1 percent. By 2000, 22.9 percent of the urban housing stock in Brazil could be classified as informal (lacking access to infrastructure).

10.43 Looking at the net flow of informal housing production between 1991 and 2000, in the 10 largest metropolitan regions, informal unit change accounted for 43.1 percent of the total increase. Put another way, between 1991 and 2000, 4 out over every 10 units developed in the 10 metropolitan areas were without infrastructure access. In Brazil's smaller metropolitan areas and cities, informal production accounted for 63.7 percent of total net housing production. This indicates that informality is growing rapidly in small and medium sized cities—between 1991 and 2000, the portion of housing units lacking infrastructure increased from 14 to 26

percent. In 2000, Brazil's urban housing stock totaled 44.8 million units. Of these, 10.3 million units were informal lacking in access to infrastructure.

Table 10.8 Total Dwelling Units and Those Lacking Adequate Infrastructure

Metropolitan Region	1991	1991	1991	2000	2000	2000	Informal Increase as a % of Total Increase
	Total Permanent Dwellings*	Informal Dwelling Units**	Percent Of Total	Total Permanent Dwellings*	Informal Dwelling Units***	Percent of Total	
Belem	274,186	38,386	14.0%	416,176	193,271	46.4%	109.1%
Fortaleza	479,852	146,355	30.5%	723,197	333,262	46.1%	76.8%
Recife	605,880	181,764	30.0%	859,574	459,352	53.4%	109.4%
Salvador	547,678	124,323	22.7%	796,200	180,904	22.7%	22.8%
Belo Horizonte	822,147	229,379	27.9%	1,295,824	214,114	16.5%	-3.2%
Rio de Janeiro	2,753,543	273,669	9.9%	3,252,659	654,324	20.1%	76.3%
Sao Paulo	3,967,579	273,669	6.9%	4,992,570	571,466	11.4%	29.1%
Curitiba	508,699	72,744	14.3%	776,060	108,938	14.0%	13.5%
Porto Alegre	840,660	81,544	9.7%	1,112,752	162,856	14.6%	29.9%
Brasilia	363,222	6,538	1.8%	777,473	205,787	26.5%	48.1%
Total Metropolitan Regions	11,163,447	1,428,371	12.8%	15,002,485	3,084,274	20.6%	43.1%
Other Metropolitan Regions	23,571,268	3,224,240	13.7%	29,774,255	7,176,802	24.1%	63.7%
Total Urban Brazil	34,734,715	4,652,611	13.4%	44,776,740	10,261,076	22.9%	55.8%

Source: * Census Table 2432;

**Fundação João Pinheiro (FJP), Centro de Estatística e Informações (CEI), Table 10.4, 2002.

***Fundação João Pinheiro (FJP), Centro de Estatística e Informações (CEI).

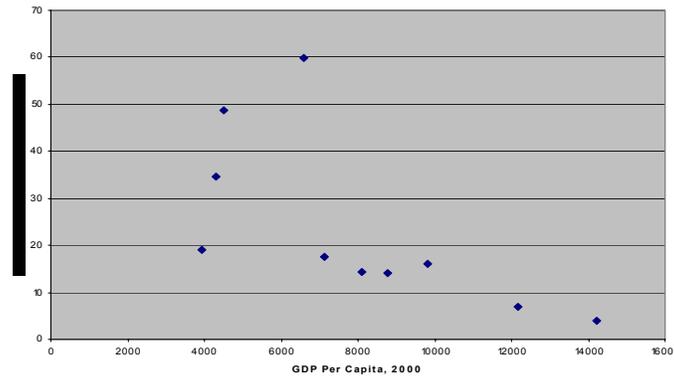
Déficit Habitacional no Brasil – Municípios Selecionados e Microrregiões Geográficas, 2005.

10.44 Compared to other Latin American countries, Brazil ranks poorly in terms of access to infrastructure. According to a survey by the United Nations Economic Commission of Latin America and the Caribbean [2004] it ranked 8th out of 13 in terms of the percent of dwelling units with access to piped water, ranked 11th out of 13 with respect to sewerage collection and treatment connections, and ranked 5th out of 14 with respect to access to electricity.¹³⁹ These are not impressive standings, and they reflect the limited options open to low and medium income households to secure shelter.

10.45 Despite high levels of private investment in residential construction, urban housing production in Brazil is predominantly based on informal housing construction. Based on available data, more than half—56 percent of the housing stock increase between 1991 and 2000 was informally provided (see Table 10.8). This is largely a reflection of the failure of formal urban housing and land markets to generate sufficient supply at affordable prices. However, informality is not simply a manifestation of low incomes. As Figure 10.8 illustrates, levels of informality are not highly correlated with incomes. Informality varies considerably within a narrow range of metropolitan areas with GDPs between Reais 4,000 to 6,000.

¹³⁹ With a per capita GNI of \$3000, Brazil ranks below, Mexico, Argentina, Chile, Uruguay and these countries score higher on infrastructure access. However, some lower income countries such as Honduras and Guatemala, El Salvador, and Nicaragua score higher than Brazil on water and sanitation.

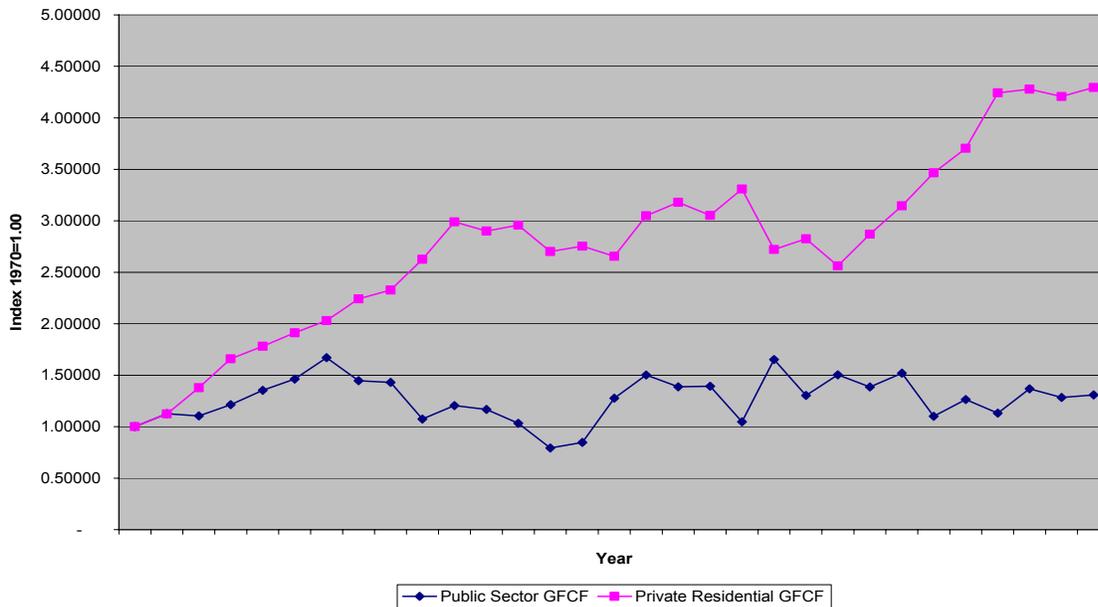
Figure 10.8 Low-Income Does Not Entirely Explain Informality



Source: FJP, 2005.

10.46 The most important obstacles to increased supply are lack of serviced subdivided land. Public infrastructure services are not expanding fast enough to meet housing production and there are over 10 million units that do not have access to adequate infrastructure. Figure 10.9 illustrates that public sector investment in infrastructure has not kept pace with housing production. Public sector gross fixed capital formation has lagged behind. As a consequence, much of Brazil’s housing production is delivered without the support of public infrastructure services.

Figure 10.9 Trends in Public Sector Gross Fixed Capital Formation



Source: Suzigan, W. A indústria brasileira : origem e desenvolvimento. São Paulo: Brasiliense, 1986; Abreu, M. de P. ; Verner, D. Long-term brazilian economic growth 1930-1994. Paris: OECD, 1997. (Development Centre Studies. Long-term growth series/OCDE); IBGE, Diretoria de Pesquisas, Departamento de Contas Nacionais.

10.47 If present trends continue, Brazil's urban housing stock will become increasingly dominated by informal production. While there will be some modest increase in slum upgrading and regularization that will move informal units into the formal category, it is quite likely that the overall proportion of informal urban dwelling units in Brazil will increase over the next several decades. In fact, if the trends in informal and formal housing production that took place between 1991 and 2000 continue, the Brazil's urban informal housing stock can be expected to increase to 35 percent overall, by 2030.

10.48 One of the most significant consequence of urbanization and housing construction is the spatial development of cities. Overtime as cities grow and expand, their spatial structure changes [Angel, et. al., 2005]. Motorization and increasing use of automobiles, is now one of the principal factors driving low density metropolitan development. As the next section illustrates, Brazilian cities are decentralizing and consuming more land per persons added.

The Urban Land use Consequences of Urbanization

10.49 Brazil's rapid urbanization has profoundly shaped the physical development of its cities and metropolitan regions. Since, urban population growth must be supported by urban land, as cities grow, their urban areas (built up areas) increase in size. Table 10.9 provides summary statistics on the built-up areas and population densities for selected Brazilian and Latin American cities. As the table illustrates, gross population densities in Latin American cities range from 35 persons per hectare in Curitiba to a high of 101 persons per hectare in Rio de Janeiro.

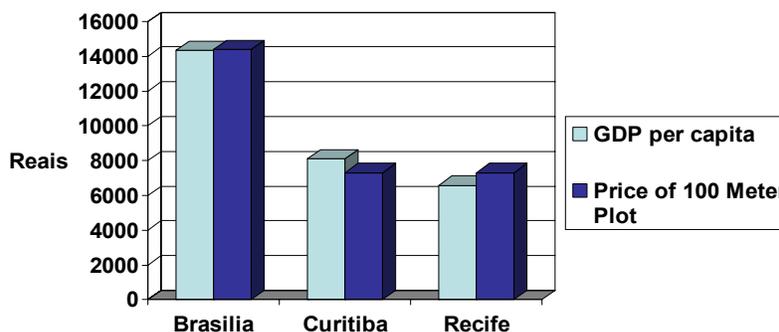
10.50 The urban development challenges posed by increasing urban population growth are substantial. Additional population requires additional housing stock, water supply and wastewater treatment, solid waste collection, schools, health facilities, streets, transport and employment opportunities. All of this requires land to support such development. In fact, the supply of serviced land is one of the principal determinants of urban land market performance. When the supply of serviced land, is limited, urban land prices are typically high relative to income and economic activity. This makes housing and non-residential real estate more expensive. Figure 10 provides a tabulation of land prices relative to GDP per capita in three Brazilian cities Brasilia, Curitiba and Recife. As it illustrates, in all three cities, the price of 100 square meters of serviced residential land roughly equals the per capita GDP of the metropolitan area.

Table 10.9 Population, Urban land Use and Gross Population Density in Latin American Cities

City	Year	Population	Urban Land Use, Hectares	Gross population density/ urbanized hectare	Source
Bogota	1990	5,484,200	158,700	34.6	Brinkhoff, 2003
Brasilia	2000	2,403,000	61,648	39.00	Serra, Dowall, Motta, Donovan 2005
Buenos Aires	1990	7,974,000	115,700	68.9	Alain Bertaud, 20004
Caracas	1990	1,822,465	43,300	42.1	Brinkhoff, 2003
Curitiba	2000	2,594,000	109,629	23.7	Serra, Dowall, Motta, Donovan 2005
Mexico City	1990	8,235,700	149,900	54.9	Brinkhoff, 2003
Recife	2000	3,339,000	37,669	88.6	Serra, Dowall, Motta, Donovan 2005
Rio de Janeiro	1990	5,480,800	54,265	101.0	Alain Bertaud
Santiago	1990	4,518,100	55,700	81.1	Simmonds and Hack, 2000
Sao Paulo	1990	15,416,400	203,800	75.7	Simmonds and Hack, 2000

Sources: <http://alain-bertaud.com/>, Thomas Brinkhoff, <http://www.citypopulation.de/index.html>; M.V. Serra, David E. Dowall, Diana Motta and Michael Donovan, Urban Land Markets and Urban Development: An Examination of Three Brazilian Cities: Brasilia, Curitiba and Recife. Brasilia: IPEA, 2005; and Roger Simmonds and Gary Hack, Global City Regions: Their Emerging Forms, London: Spon, 2000.

Figure 10.10 Residential Land is Expensive Relative to GDP per Capita



Source: Serra, Dowall, Motta and Donovan, 2005.

10.51 Household earning incomes below the GDP average are forced out of the formal market and must seek shelter in informal settlements, and generate overcrowding as households share dwellings. It is no coincidence that informal housing production, despite rigorous enforcement in the center of Brasilia is higher than in Curitiba. In the case of Recife, the very high rates of informality are due to both affordability gaps and limited land for residential development [Serra, Dowall, Mota, Donovan, 2004].

10.52 Recent research on land markets in Brasilia, Curitiba, Recife, and Sao Paulo provides some indication of the relationship between population growth and urban land development. Table 10.10 presents data on these patterns for the four metropolitan areas. Using population and land use data from 1991 and 2000, the table illustrates the clear and direct relationship between population growth and urban land development. Depending on the metropolitan region, each additional 1000 person increase in population requires between 6 and 37 hectares of land to be developed. The amount of land that is needed depends on a range of factors such as the population per household, the density of residential development (houses per hectare), the extent to which new population is accommodated through urban redevelopment of older buildings and the additional demand for urban development that comes from nonresidential uses such as commercial and industrial activities. In the cases of both Recife and Sao Paulo, development is taking place at higher population densities. This is most likely due to denser residential development whether formal or informal. However, over time the overall density of metropolitan areas declines.

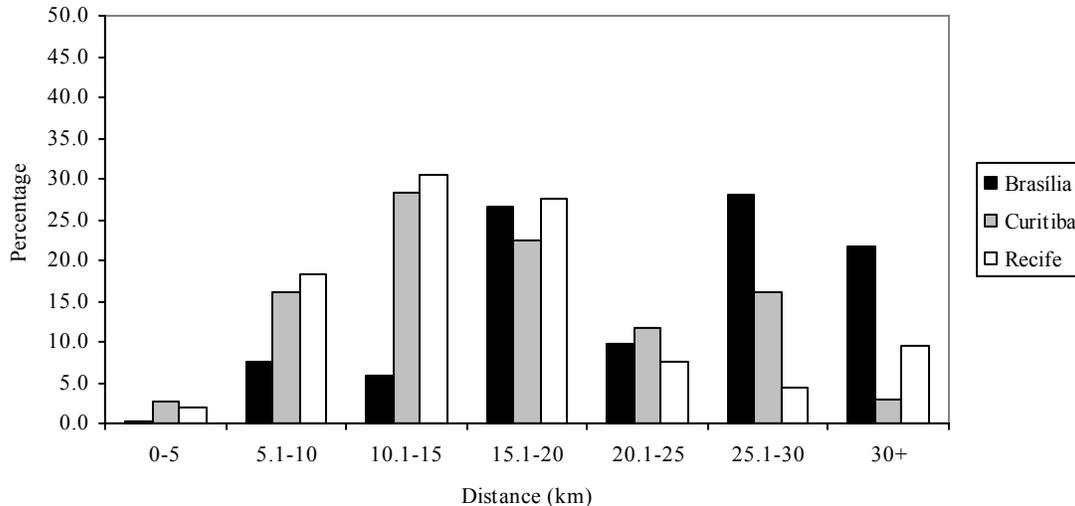
Table 10.10 Trends in Population and Built up Area, Selected Brazilian Cities, 1991 and 2000

Metro Area	1991 Population	2000 Population	1991 Built-up Area hectares	2000 Built-up Area hectares	Change in Population	Change in Built- up Area Hectares	Hectares per 1000 population increase
Brasilia	1,592,000	2,403,000	40,213	61,648	811,000	21,435	26.4
Curitiba	2,051,000	2,594,000	89,659	109,629	543,000	19,970	36.8
Recife	2,917,000	3,339,000	31,559	37,669	422,000	6,110	14.5
Sao Paulo	10,730,000	15,416,000	126,350	155,430	4,686,000	29,076	6.2
Total/ Average	17,290,000	23,752,000	287,781	364,376	6,462,000	76,591	11.9

10.53 In this section, we examine the spatial structure of the three cities—Brasilia, Curitiba and Recife, looking at the distribution of population and the compactness of urban land development. Examination of the spatial distribution of population in the three cities 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.

10.54 Figure 10.11 arrays the spatial distribution of population change for the three cities 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.

**Figure 10.11 Spatial Distribution of Population Change:
Brasília, Curitiba and Recife, 1991 - 2000**



10.55 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.

10.56 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.

10.57 In Recife, the patterns are similar to Curitiba. 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%.

10.58 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 in Brasília suggests that planning restrictions and government ownership of land introduces profound distortions into Brasília's urban land market. Since development is blocked in areas adjacent to the city center, residential growth is forced to the periphery. It is interesting to contrast this with both Curitiba and Recife, where land use regulations are far less stringent.

10.59 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. Compact development is not necessarily high density. In the case of

Curitiba, the city used 37 hectares of land for each additional 1000 persons—this is much more land than in Brasilia, which used 26 hectares.

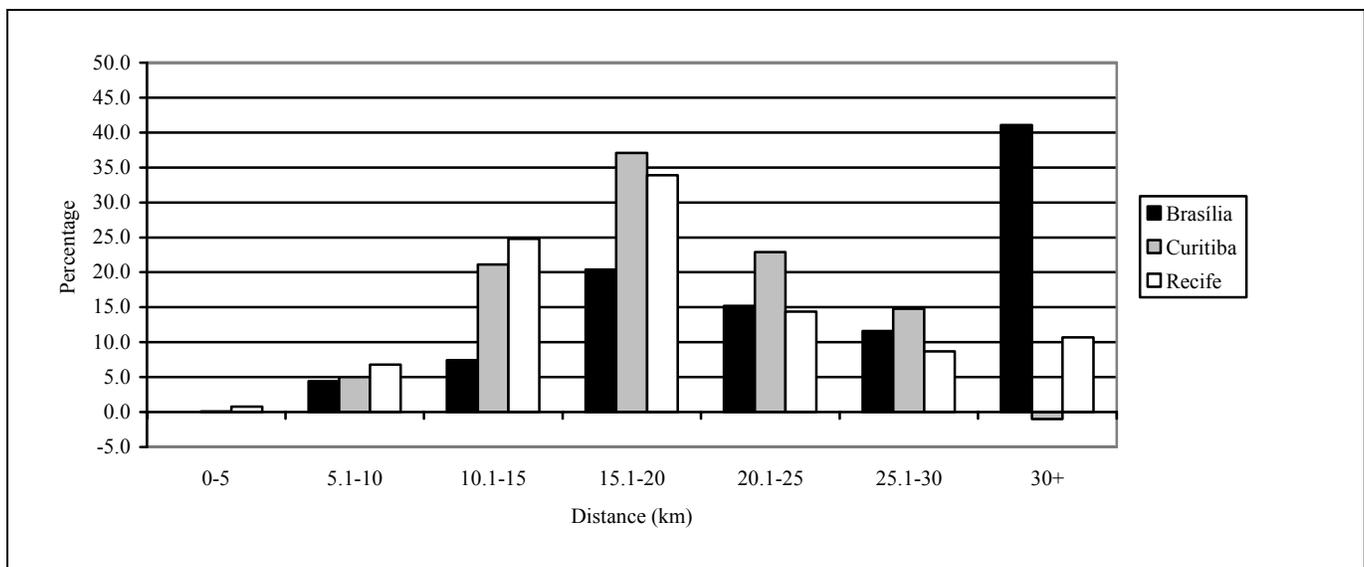
10.60 In Recife, approximately 58% of the increase in population between 1991 and 2000 occurred between 10.1 and 20.1 kilometers from the city center. Like Curitiba, Recife’s growth has been compact, moving out beyond the densely developed core. But unlike them, it is developing at a much higher density—it used about 15 hectares per 1000 increase in the population.

10.61 Figure 10.12 illustrates the change in urban developed land between 1991 and 1997/2000 for the three cities. In the core of Brasilia (within 5 kilometers), less than 10% of the total urban land area is developed.¹⁴⁰ In contrast, over 90% of the land in the core of Curitiba is developed. In Recife, about 80% of its developable core is 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.

10.62 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.

10.63 What are the implications of these alternative forms of urban land development in the three cities? There are three important issues that emerge from this comparison. First, cities that sprawl—such as Brasília— consume more land per person than those that develop compactly. Brasilia 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.

**Figure 10.12 Spatial Distribution of Change in Urban Land Development:
Brasilia, Curitiba and Recife, 1991-1997/2000**



¹⁴⁰ The total area of the core is 7,850 hectares— $\pi \times \text{radius}^2$.

10.64 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 [Bertaud 2001]. 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 [2004] illustrated that cities with restrictive development controls take up more space and have higher commuting costs. Given the fact that distances are approximately twice as great in Brasília than in Curitiba or Recife, there is clearly a compelling case for assessing the welfare implications of the capital's dispersed spatial structure.¹⁴¹

10.65 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.¹⁴²

The experience in Curitiba and Recife is consistent with empirical research on patterns of population density in Latin America and worldwide show that over time, population densities decline. As Ingram points out:

Over time, a universal finding is that metropolitan populations have become more decentralized (population density gradients become flatter)—due to the effects of increases in income (promoting housing consumption) and improvements in transport performance (higher speeds and lower costs relative to incomes). Population growth in large cities usually does not increase the population density of high density areas, but promotes densification of less-developed areas and expansion at the urban fringe [Ingram, 1998 pp. 1021-2].

10.66 Density gradients measure the relationship between population density and distance from the city center. 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.

10.67 Table 10.11 presents the results of separate regression models estimating the population density gradients for a range of Brazilian cities. Intercept data and gradients are presented for two time periods. In all cases, the gradients “flatten out” over time. With the exception of Recife, the intercept population density (the estimated population density in the city center) decreases over time, suggesting that residential occupancy decreases in the center—perhaps signaling conversion to non residential uses or residential population shifts to newer outlying areas. The increase in central city population in Recife, although modest, may suggest that the preservation of high-density favelas in ZEIS areas near the city center is an effective means for preserving residential areas in central cities.

¹⁴¹ In fact, average distance per capita figures for other national capitals, such as Moscow (10.57 km), Paris (10.24 km), and London (12.63 km), are less than half of Brasília's despite the fact that they have larger populations.

¹⁴² See Robert W. Burchell et al. *The Costs of Sprawl*. TCRP REPORT 74. New Brunswick New Jersey: Center for Urban Policy Research, 2000.

10.68 The flattening out of population density gradients, has important implications for urban land management. As cities grow, the amount of land supply needed per person will increase. Therefore, looking toward the future, cities in Brazil will spatially expand, as densities decrease. This increase in urban population will generate considerable demand for urban land and infrastructure services.

10.69 Sprawl also poses a major challenge for metropolitan management and planning institutions. If the population growth of Brazil's largest metropolitan areas is spilling over into outlying municipalities, central city governments like Rio de Janeiro and Sao Paulo are losing their control of spatial development policies and infrastructure investment decisions.

Table 10.11 Population Density Gradients in Selected Brazilian Cities 1991 and 2000

Population Density Gradients in Selected Brazilian Cities, 1991 and 2000				
CITY	YEAR	INTERCEPT (D ₀)*	GRADIENT (g)	Source
Belo Horizonte	1991	122	-0.082	Avila
	2000	113	-0.052	
Curitiba	1991	140	-0.201	Dowall
	2000	124	-0.166	
Fortaleza	1991	206	-0.166	Avila
	2000	171	-0.108	
Porto Alegre	1991	166	-0.187	Avila
	2000	158	-0.168	
Recife	1991	165	-0.076	Dowall
	2000	179	-0.073	
Rio de Janeiro	1991	169	-0.040	Avila
	2000	148	-0.029	
Salvador	1991	219	-0.146	Avila
	2001	198	-0.100	
Sao Paulo	1991	200	-0.073	Avila
	2000	154	-0.049	

* Density is persons per hectare

Source: Dowall, 2004 and Avila, 2005.

Looking Forward: Brazil's Future Urban Housing Needs and Prospects for Reaching them?

10.70 Projections of future urban population growth for Brazil suggest robust growth [UN ECLAC, 2004]. As illustrated in Table 10.12, between 2000 and 2030 Brazil's total population is projected to increase by 65,961,000, reaching 235,505,000. All of this increase will occur in urban areas, as rural hinterlands are expected to continue losing population. Total urban population will increase from 138,000,000 in 2000 to 215,000,000 in 2030 an increase of 77,000,000—this is like adding 7 Rio de Janeiro's over the 30 year period. On an annual basis the increase in urban population will average over 2,500,000 persons per year—almost like adding a Curitiba each year. These are huge numbers that imply massive challenges for city planning and public sector capital investment programming.

Table 10.12 Projections of Brazil's Total, Urban and Rural Population 2000 - 2030

Year	Total	Population	
		Urban	Rural
2000	169,544,443	137,697,439	31,847,004
2005	186,405,000	157,041,000	29,364,000
2010	198,497,000	171,904,000	26,593,000
2015	209,401,000	185,052,000	24,349,000
2020	219,193,000	196,573,000	22,620,000
2025	227,930,000	206,557,000	21,373,000
2030	235,505,000	214,940,000	20,565,000

Year	Total	Annual Percent Change	
		Urban	Rural
2000-05	2.0%	2.8%	-1.6%
2005-10	1.3%	1.9%	-1.9%
2010-15	1.1%	1.5%	-1.7%
2015-20	0.9%	1.2%	-1.4%
2020-25	0.8%	1.0%	-1.1%
2025-30	0.7%	0.8%	-0.8%

Source ECLAC, United Nations 2004

Accommodating Urban Growth: How much Urban Land Supply is Needed?

10.71 We can roughly approximate the urban land supply requirements to accommodate future urban population growth in Brazil. Estimates are based on combinations of Table 10.10 and Table 10.12, using the overall average 11.9 hectares of built up area to support a 1000 person increase in urban population, then the total urban land requirements to accommodate 77 million persons is approximately 916,300 hectares or 9,163 square kilometers. Put another way, accommodating this urban population grow will require a built up area equivalent to 7 Sao Paulos.

10.72 Of course, this estimate is speculative. It may be possible to accommodate the population growth at higher densities, by redeveloping inner city areas with housing, and by increasing the density of suburban development [Dowall and Treffeisen, 1991]. By shifting away from single family dwelling units (in both formal and informal settlements) to mid rise condominiums and more compact low-rise residential development, per capita urban land requirements can be reduced.¹⁴³ For example if the urban land supply requirements per 1000 person could be reduced by about 25 percent only 9 hectares of urban land would be required for each 1000 persons (111 persons per hectare. This would reduce the aggregate land supply requirement to 693,000 hectares—6,930 square kilometers. However, increasing density will make it more difficult for the informal sector to operate since higher density multifamily units will be needed. In order for this approach to work—such housing must be affordable to low and moderate income households. This suggests that the government should concentrate its efforts on providing urban infrastructure to land suitable for development.

¹⁴³ See Burchell, et. al. Ibid.

What can be done to improve Urban Land and Housing Market Outcomes?

10.73 The Government of Brazil, in partnership with local governments, non-governmental organizations and the private sector, could do much to foster increased production of affordable housing. This section outlines what such a strategy might look like.

10.74 First and foremost, the urban land and housing strategy should be multi-faceted and similar to policy models used by public health professionals—it should include both “curative” and “preventive” programs. The curative aspects of the strategy would focus on upgrading and improving housing conditions in informal areas. Preventive strategies should be implemented to reduce the growth of informal areas—this requires opening up more land for residential development, providing public infrastructure and facilities, and creating incentives for the provision of low and moderate income housing. Both approaches are needed. On its own, the curative approach will not succeed. While existing favelas and irregular settlements can be upgraded, this approach does not prevent the formation of new informal settlements—these will continue to expand as long as urban land and housing markets fail to produce affordable housing.

10.75 Effective upgrading programs should include community participation, provide secure land tenure, and give access to critical residential infrastructure—water, wastewater collection and treatment, drainage, electricity, schools and clinics as well as parks and recreation facilities. Large-scale programs such as Sao Paulo’s Guarapiranga project have been largely successful and provide useful models for replication [City of Sao Paulo, 2000]. However, due to their complexity, they are difficult to implement and replicate [Cohen, 1983]. This suggests that more work is needed to design more efficient and simpler procedures as well as generating more professional expertise about upgrading.

10.76 Preventing the continued expansion of informal housing requires that Brazil’s urban land and housing markets start producing more housing and providing more affordable housing that is located within reasonable commuting distances to jobs. If this can be accomplished, then the demand for informal housing should decline as households shift to less expensive formal housing. What would it take to achieve such a result?

10.77 First, cities and metropolitan regions need to better understand how their land and housing markets operate. Urban planners, housing specialists and policy makers need better empirical data on urban land and housing markets—both current demand and supply information on land and housing prices and projections of future housing and urban land requirements to accommodate demographic and economic growth [Dowall and Clarke, 1991].

10.78 Second, these data and projections should be used to prepare master plans for cities and metropolitan regions. The plans should ensure that adequate supplies of serviced urban land are available to support residential demand. This will require pro-poor land use plans and zoning regulations [UN Habitat, 2004]. Lands should be targeted for residential development and tax incentives should be used to encourage owners to bring land to the market for residential development. Governments will need to provide the funding for infrastructure provision so that developers will be encouraged to construct housing.

10.79 Third, massive investments in private infrastructure are needed to foster residential subdivision development. The Government of Brazil and State and local governments need to develop more fiscal resources to finance infrastructure. This can be accomplished through a range of policy interventions including, levying user and beneficiary charges, and implementing value capture programs as outlined by Furtado and Jorgensen [2006].

10.80 Fourth, land subdivision and building regulations should be reviewed to assess their impacts on housing costs. Subdivision standards frequently impose excessive standards on developers—large minimum lot sizes, high land dedication requirements and investments in non-essential infrastructure [Avila, 2006]. Building codes often prove costly and impose too much of a burden on low and moderate income households [Dowall, 1992]. One interesting model is Colombia’s “minimum norms” for low income settlements [Carroll, 1980]. Another possibility is to create a zoning classification that permits the development of sites and services projects—this

would in effect legalize irregular settlements, if they met basic standards for circulation, plot size and layout [UN Habitat, 2004].

10.81 Fifth, the government needs to develop cost effective and replicable models for land titling and registration. These issues and policy reforms are comprehensively outlined by Fernandes [2006].

10.82 Taken together as a package, these five initiatives could foster increased affordable land and housing production. To launch this effort, the central government needs to articulate a policy framework and then to collaborate with local governments to design and implement plans and programs. Over time, the framework as well as specific programs should be evaluated and modifications should be made as necessary.

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