

WDP290

June 1995

290



World Bank Discussion Papers

---

# Decentralizing Infrastructure

## Advantages and Limitations

---

Edited by  
Antonio Estache

## Recent World Bank Discussion Papers

- No. 222 *Macroeconomic Management in China: Proceedings of a Conference in Dalian, June 1993.* Edited by Peter Harrold, E. C. Hwa, and Lou Jiwei
- No. 223 *The Development of the Private Sector in a Small Economy in Transition: The Case of Mongolia.* Hongjoo Hahn
- No. 224 *Toward an Environmental Strategy for Asia.* Carter Brandon and Ramesh Ramankutty
- No. 225 "Fortress Europe" and Other Myths about Trade: Policies toward Merchandise Imports in the EC and Other Major Industrial Economies (and What They Mean for Developing Countries). Jean Baneth
- No. 226 *Mongolia: Financing Education during Economic Transition.* Kin Bing Wu
- No. 227 *Cities without Land Markets: Lessons of the Failed Socialist Experiment.* Alain Bertaud and Bertrand Renaud
- No. 228 *Portfolio Investment in Developing Countries.* Edited by Stijn Claessens and Sudarshan Gooptu
- No. 229 *An Assessment of Vulnerable Groups in Mongolia: Strategies for Social Policy Planning.* Caroline Harper
- No. 230 *Raising the Productivity of Women Farmers in Sub-Saharan Africa.* Katrine Saito
- No. 231 *Agricultural Extension in Africa.* Aruna Bagchee
- No. 232 *Telecommunications Sector Reform in Asia: Toward a New Pragmatism.* Peter L. Smith and Gregory Staple
- No. 233 *Land Reform and Farm Restructuring in Russia.* Karen Brooks and Zvi Lerman
- No. 234 *Population Growth, Shifting Cultivation, and Unsustainable Agricultural Development: A Case Study in Madagascar.* Andrew Keck, Narendra P. Sharma, and Gershon Feder
- No. 235 *The Design and Administration of Intergovernmental Transfers: Fiscal Decentralization in Latin America.* Donald R. Winkler
- No. 236 *Public and Private Agricultural Extension: Beyond Traditional Frontiers.* Dina L. Umali and Lisa Schwartz
- No. 237 *Indonesian Experience with Financial Sector Reform.* Donald P. Hanna
- No. 238 *Pesticide Policies in Developing Countries: Do They Encourage Excessive Use?* Jumanah Farah
- No. 239 *Intergovernmental Fiscal Relations in Indonesia: Issues and Reform Options.* Anwar Shah and Zia Qureshi
- No. 240 *Managing Redundancy in Overexploited Fisheries.* Joshua John
- No. 241 *Institutional Change and the Public Sector in Transitional Economies.* Salvatore Schiavo-Campo
- No. 242 *Africa Can Compete!: Export Opportunities and Challenges for Garments and Home Products in the U.S. Market.* Tyler Biggs, Gail R. Moody, Jan-Hendrik van Leeuwen, and E. Diane White
- No. 243 *Liberalizing Trade in Services.* Bernard Hoekman and Pierre Sauvé
- No. 244 *Women in Higher Education: Progress, Constraints, and Promising Initiatives.* K. Subbarao, Laura Raney, Halil Dundar, and Jennifer Haworth
- No. 245 *What We Know About Acquisition of Adult Literacy: Is There Hope?* Helen Abadzi
- No. 246 *Formulating a National Strategy on Information Technology: A Case Study of India.* Nagy Hanna
- No. 247 *Improving the Transfer and Use of Agricultural Information: A Guide to Information Technology.* Willem Zijp
- No. 248 *Outreach and Sustainability of Six Rural Finance Institutions in Sub-Saharan Africa.* Marc Gurgand, Glenn Pederson, and Jacob Yaron
- No. 249 *Population and Income Change: Recent Evidence.* Allen C. Kelley and Robert M. Schmidt
- No. 250 *Submission and Evaluation of Proposals for Private Power Generation Projects in Developing Countries.* Edited by Peter A. Cordukes
- No. 251 *Supply and Demand for Finance of Small Enterprises in Ghana.* Ernest Aryeetey, Amoah Baah-Nuakoh, Tamara Duggleby, Hemamala Hettige, and William F. Steel
- No. 252 *Projectizing the Governance Approach to Civil Service Reform: An Environment Assessment for Preparing a Sectoral Adjustment Loan in the Gambia.* Rogerio F. Pinto with assistance from Angelous J. Mrope
- No. 253 *Small Firms Informally Financed: Studies from Bangladesh.* Edited by Reazul Islam, J. D. Von Pischke, and J. M. de Waard
- No. 254 *Indicators for Monitoring Poverty Reduction.* Soniya Carvalho and Howard White
- No. 255 *Violence Against Women: The Hidden Health Burden.* Lori L. Heise with Jacqueline Pitanguy and Adrienne Germain

*(Continued on the inside back cover)*

**290**



World Bank Discussion Papers

---

# Decentralizing Infrastructure

## Advantages and Limitations

---

Edited by  
Antonio Estache

The World Bank  
Washington, D.C.

Copyright © 1995  
The International Bank for Reconstruction  
and Development/THE WORLD BANK  
1818 H Street, N.W.  
Washington, D.C. 20433, U.S.A.

All rights reserved  
Manufactured in the United States of America  
First printing June 1995

Discussion Papers present results of country analysis or research that are circulated to encourage discussion and comment within the development community. To present these results with the least possible delay, the typescript of this paper has not been prepared in accordance with the procedures appropriate to formal printed texts, and the World Bank accepts no responsibility for errors. Some sources cited in this paper may be informal documents that are not readily available.

The findings, interpretations, and conclusions expressed in this paper are entirely those of the author(s) and should not be attributed in any manner to the World Bank, to its affiliated organizations, or to members of its Board of Executive Directors or the countries they represent. The World Bank does not guarantee the accuracy of the data included in this publication and accepts no responsibility whatsoever for any consequence of their use. The boundaries, colors, denominations, and other information shown on any map in this volume do not imply on the part of the World Bank Group any judgment on the legal status of any territory or the endorsement or acceptance of such boundaries.

The material in this publication is copyrighted. Requests for permission to reproduce portions of it should be sent to the Office of the Publisher at the address shown in the copyright notice above. The World Bank encourages dissemination of its work and will normally give permission promptly and, when the reproduction is for noncommercial purposes, without asking a fee. Permission to copy portions for classroom use is granted through the Copyright Clearance Center, Inc., Suite 910, 222 Rosewood Drive, Danvers, Massachusetts 01923, U.S.A.

The complete backlist of publications from the World Bank is shown in the annual *Index of Publications*, which contains an alphabetical title list (with full ordering information) and indexes of subjects, authors, and countries and regions. The latest edition is available free of charge from the Distribution Unit, Office of the Publisher, The World Bank, 1818 H Street, N.W., Washington, D.C. 20433, U.S.A., or from Publications, The World Bank, 66, avenue d'Iéna, 75116 Paris, France.

ISSN: 0259-210X

Antonio Estache is senior public finance economist in the Infrastructure Operations Division (Country Department I) of the World Bank's Latin American and the Caribbean Regional Office.

**Library of Congress Cataloging-in-Publication Data**

Decentralizing infrastructure : advantages and limitations / edited by

Antonio Estache.

p. cm.—(World Bank discussion papers ; 290)

Includes bibliographical references (p. ).

ISBN 0-8213-3335-6

1. Infrastructure (Economics)—Finance. 2. Decentralization in government. 3. Expenditures, Government. I. Estache, Antonio.

II. Series.

HC79.C3D39 1995

350.86—dc20

95-20117

CIP

## Contents

<b>Foreword .....</b>	<b>v</b>
<b>Abstract .....</b>	<b>vii</b>
<b>Contributors .....</b>	<b>viii</b>
<b>Introduction .....</b>	<b>1</b>
<i>Antonio Estache</i>	
<b>1. Decentralization, Politics and Public Service .....</b>	<b>5</b>
<i>Bill Dillinger</i>	
Explaining Decentralization .....	5
Establishing a Framework .....	7
Defining Responsibilities: Drawing the Hard Budget Constraint .....	9
Reforming Intergovernmental Finance .....	11
Balancing Regulation with Political Accountability .....	18
Synchronizing the Elements of Reform .....	20
Bibliography .....	21
<b>2. Decentralizing Infrastructure: For Good or for Ill? .....</b>	<b>22</b>
<i>Richard M. Bird</i>	
The Many Faces of Decentralization .....	26
Infrastructure for Whom? .....	34
Guidelines for Policy Design .....	40
Conclusion .....	47
References .....	49
<b>3. Regulating Infrastructure: Perspectives on Decentralization.....</b>	<b>52</b>
<i>Warrick Smith and Ben Shin</i>	
Regulating Infrastructure: Key Tasks and Challenges .....	52
Assigning Regulators Responsibilities .....	53
Striking a Balance .....	56
Confronting Constrained Regulatory Capacity .....	57
Strengthening Regulatory Capacity .....	60
Conclusions .....	61
Bibliography .....	62

<b>4. Does Decentralization Increase Public Infrastructure Expenditure? .....</b>	<b>63</b>
<i>Antonio Estache and Sarbajit Sinha</i>	
Checking Facts: What is the Data and What Does It Say? .....	64
A Survey of Studies on the Effects of Decentralization on Total Public Expenditures.....	67
An Econometric Analysis of Total and Subnational Infrastructure Expenditures .....	68
Policy Conclusions.....	75
Data Appendix.....	76
Bibliography .....	79
<b>5. Does Decentralization Improve Infrastructure Performance? .....</b>	<b>81</b>
<i>Frannie Humplick and Antonio Estache</i>	
Methodology .....	82
The Impact of Decentralization on the Performance of Roads .....	83
The Impact of Decentralization on the Performance of the Electricity Sector .....	88
The Impact of Decentralization on the Performance of the Water Supply .....	93
Summary of Findings and Policy Conclusions.....	95
References .....	97
<b>6. The Decentralization of Public Services: Lessons from the Theory of the Firm .....</b>	<b>98</b>
<i>Jacques Crémer, Antonio Estache and Paul Seabright</i>	
The Received Wisdom on Decentralization .....	99
A Simple Contract Model of Decentralization .....	102
Contract Theory with Imperfections in Bargaining .....	106
What is a Jurisdiction and Where Should Its Boundaries Lie?.....	111
Some Applications.....	113
Concluding Remarks.....	116
References .....	118

## Foreword

Responsibility for infrastructure provision is increasingly being decentralized to subnational governments in all parts of the industrialized and developing world. Decentralization is now common in road management, in power generation and distribution and in the provision of water and sanitation services.

*The World Development Report 1994* which focused on infrastructure, explains the growing local and regional government involvement in infrastructure:

- Technological developments are reducing the importance of economies of scale and easing efficient service provision within smaller market areas.
- It is often easier for subnational governments to identify local preferences for technology or service quality.
- Voters tend to prefer decentralized solutions when these make it easier to hold the decisionmakers accountable.
- Voters can compare the price and quality performance of decentralized infrastructure services across provinces to increase competition in the sector.

But decentralization does not guarantee that the quality of infrastructure services will improve. Performance depends on the incentives facing decisionmakers and incentives depend on the financial, institutional and political support to the decentralization efforts. Moreover, average improvements do not necessarily imply universal improvements. The quality of road or water service may worsen in some communities because governments trade-off cross subsidies on a standard service with gains from the differentiation of the services. Many of the poorer communities, for example, may lack the skills to take advantage of the choices made available by decentralization.

This volume addresses these costs and benefits of decentralization. To some extent the *World Development Report 1994* summarizes these papers, four of which started as background papers for WDR 1994. Their value to decisionmakers lies in the additional details and examples and their value to researchers lies in the new empirical work on the effects of decentralization on the quantity and quality of infrastructure expenditures. The volume also suggests a new conceptual approach to the analysis of decentralization which complements the traditional Tiebout model and Oates's decentralization theorem.

Gregory K. Ingram  
Administrator, Research Advisory Staff



## Abstract

This collection of papers disseminates some of the lessons of the World Bank's experience and research efforts on the linkages between decentralization and infrastructure service delivery. It follows up on *World Development Report 1994*, which focused on infrastructure. It shows that decentralization is not a panacea and unless some demanding requirements are met, performance gains will not materialize. More specifically, the papers provide:

- (i) a summary of the lessons from World Bank experience on decentralization as a way of providing a general context to the importance of infrastructure decentralization;
- (ii) a review of the more institutional aspects and their implications for policy design much more detailed than the space allocated in the 1994 WDR allowed;
- (iii) an empirical assessment of the consequences of decentralization on expenditure levels and on performance in infrastructure and some indications of the possible handles available to policymakers to improve the odds of successful decentralization;
- (iv) a research agenda on decentralization relying more systematically on the recent developments of in the theory of the firm.

## Contributors

*Richard Bird* is a Professor of Economics and Director of the International Center for Tax Studies at the University of Toronto. He has worked throughout Latin America and Eastern Europe on decentralization and fiscal issues as a consultant for several international organizations and published many books and articles on intergovernmental fiscal issues on developed, developing and transitional economies.

*Jacques Cremer* is Director of Research at the Centre National de la Recherche Scientifique (CNRS). He participates in the activities of the Institut d'Economie Industrielle at the Universite des Sciences Sociales in Toulouse. He has published extensively on various aspects of the theory of the firm and on decentralization issues.

*Bill Dillinger* is senior economist in the Latin American Region of the World Bank. He has worked in policy units of the Bank on decentralization and fiscal issues in Latin America, East and South Asia, the Middle East and Africa and is the author of a recent book on decentralization and urban services.

*Antonio Estache* is a senior economist in the Latin American Region of the World Bank. He has worked on decentralization, fiscal issues and infrastructure regulation in Latin America and South Asia and is one of the authors of the World Development Report of 1994 on infrastructure.

*Frannie Humplick* is an economist in the Policy Research Department of the World Bank. She has worked on infrastructure and decentralization in several Latin American and African countries and is the author of several recent articles on the linkages between industry structure, decentralization and performance in the infrastructure sector. She is associate editor of the Journal of Infrastructure Systems.

*Paul Seabright* is Lecturer in Economics at Cambridge University and fellow of the Churchill College. He has worked extensively on South Asia and on the European Economic Community. He is the author of various recent articles on decentralization and regulation in the EEC context and is co-author of a recent book on subsidiarity at the EEC.

*Ben Shin* is a consultant with the World Bank. He is working on regulatory issues in infrastructure at the national and subnational level and is developing a database of the worldwide private infrastructure project market.

*Sarbjit Sinha* is a consultant with the World Bank. He has worked on the World Development Report 1994 on infrastructure and on various aspects of the linkages between foreign direct investment and infrastructure.

*Warrick Smith* is a private sector development specialist at the World Bank. Previously, secretary in the Australian Government working on pro-competitive regulatory reform in infrastructure, he has advised national and provincial governments in Asia, South America and Eastern Europe on how to regulate issues.

## Introduction

*Antonio Estache*

*World Development Report 1994*, which focused on infrastructure, stressed that government, in addition to corporatizing and commercializing its operations, should also become more responsive to users, if it intends to provide infrastructure services effectively. International experts commonly suggest *decentralizing infrastructure provision*: that is assigning responsibility to lower levels of government to achieve better responsiveness.<sup>1</sup> Because identifying local preferences is often easier for local or regional governments, a better match between demand for and supply of public services can be expected.

This collection of papers disseminates some of the lessons on the linkages between decentralization and infrastructure service delivery that the World Bank's has learned from its experience and research efforts. It follows up on *World Development Report 1994* and includes some of the background papers. The collection's main contribution is to review the evidence showing that decentralization is not a panacea and to point out that unless some demanding requirements are met, performance gains will not materialize. These papers highlight the conditions surrounding successful decentralization and identify unresolved issues for which only general solutions can be proposed. More specifically, the papers provide:

- A summary of the lessons from World Bank experience on decentralization as a way of providing a general context to the importance of infrastructure decentralization (chapter 1).
- A detailed review of the institutional aspects of decentralization and their implications for policy design (chapters 2 and 3).
- An empirical assessment of the consequences of decentralization on expenditure levels and on performance in infrastructure and some indications of the possible tools available to policymakers to improve the odds of successful decentralization (chapters 4 and 5).
- A research agenda on decentralization relying more systematically on the recent developments in the theory of the firm (chapter 6).

Bill Dillinger describes the context in which the recent intensive focus on infrastructure decentralization should be examined (chapter 1). As *World Development*

---

<sup>1</sup> The other approach is to encourage those who benefit from projects to participate more actively in their selection, design, construction and maintenance as discussed in *World Development Report 1994*.

*Report 1994* was being written, Dillinger was preparing a paper reviewing the lessons of the Bank's experience with decentralization in general. Chapter 1 draws on that effort, focusing on the political nature of decentralization. It highlights the constraints that policymakers confront at every government level and the importance of changing the relationship between central and local governments. This relationship will determine whether many of the policy instruments (transfers, user fees, tax sharing agreements, contracts with the private sector) described in the later chapters will be used successfully.

This assessment points to three main ingredients for a well-structured decentralized government. First, functional responsibilities must be clearly assigned among government levels implying a hard budget constraint on central government participation in nominally local functions. Second, revenue sources must match functional responsibilities with only a minimum amount of room for bargaining and negotiation, and capital financing systems must reward creditworthiness rather than political acumen. Third, a system of accountability that balances central regulation and local political participation must be instituted. In short, experience shows that a system based on rules works better than a system based on negotiations and that political autonomy has to be matched by financial autonomy. These objectives can be met in many different ways, implying that decentralization can have many faces.

Richard Bird shows some of these faces but focuses specifically on the provision of infrastructure services (chapter 2). Subnational governments can be involved in policymaking and in regulating, financing and producing infrastructure services. The degree of subnational authority granted hinges on how these different functions interact. Decision about which public infrastructure projects to build, where they should be built, when they should be built, and how they should be operated, maintained, and used depends largely on how the relevant public sector institutions are organized and financed. In other words, the extent and definition of decentralization are critical determinants of the productivity of infrastructure investment in any country.

Bird supports this observation with many examples drawn from his wide international experience in the field. He shows that decentralization is not necessarily good or bad for infrastructure but that its influence depends on the incentives facing the decisionmakers. Political, economic, and administrative accountability is necessary for creating incentives to make good decisions about the design, timing, finance, pricing, operation, maintenance, and use of infrastructure.

Warrick Smith and Ben Shin analyze a specific institutional issue decentralizing regulatory responsibility for infrastructure (chapter 3). As more countries begin to privatize infrastructure, the issue regulating private providers is attracting greater attention. While this attention initially focused on regulation at the national level, interest is increasingly sweeping to lower tiers of government. In Argentina, for example, the privatization of infrastructure services is being decided province by province, while in Colombia, Hungary, and a growing number of other countries, urban infrastructure is being privatized municipality by municipality.

What are the implications of this trend for effective regulation? Smith and Shin consider this question in three parts. They first describe the challenge of regulating infrastructure, arguing that weaknesses in the regulatory framework, particularly in the credibility of a government's commitment to a particular pricing regime, can stall privatization efforts or lead investors to demand higher returns on their investment to offset the risks involved. Government's regulatory capacities are thus more than trivial considerations and are particularly relevant when subnational governments, with very diversified administrative capabilities, are involved. Smith and Shin then review the main arguments for and against decentralizing regulatory responsibilities. They argue that these issues can only be considered with respect to the relevant industry, jurisdictional units, and regulatory issues. International experience illustrates some of the alternative ways to allocate responsibilities among government levels. The third part of their paper describes the special challenges posed by the weak regulatory capacity of subnational governments in most developing and reforming countries. This constraint affects how particular regulatory arrangements should be designed and how the regulatory capacity of subnational governments should be strengthened. Their main conclusion echoes that of the first two chapters: an ideal model for organizing regulation in a decentralized environment does not exist but a few useful guidelines can be followed.

Estache and Sinha provide the first of two quantitative assessments of the impact of decentralization (chapter 4). They focus on the impact of fiscal decentralization on the level of public expenditures in infrastructure. This impact is estimated econometrically for ten industrialized countries and ten developing countries. The analysis covers 1970 to 1990, although data are not available for every year for every country. Estache and Sinha show that decentralization increases *subnational* public infrastructure spending in both country groups. The effect is more than proportional to the increase in decentralization for developing countries and less than proportional for industrial countries. The effect on *total* infrastructure expenditure is roughly the same in both country groups, but it is only modestly significant in the industrial country group. Significantly influencing the impact of decentralization on subnational expenditure levels is the balance between revenue and expenditure assignments among subnational government levels. The greater is the imbalance, the milder the effect of decentralization on infrastructure expenditure levels.

The increase in public infrastructure expenditures with decentralization may imply that subnational governments prefer more infrastructure services, but it may also imply that decentralization results in less cost-effective service delivery or in a shift toward more expensive services. Humplick and Estache thus focus on the performance effects of decentralization to determine which one of these explanations is the most likely. Using a multi-country data base of performance indicators for roads (76 countries), water (103 countries) and electricity (100 countries), they make two types of analyses. In the first, they calculate the mean and variance of performance in each one of the sectors for countries grouped according to their relative degree of decentralization. In the second, performance is depicted as the output of a production function. The inputs include key institutional variables: standard labor- and capital-related variables, the degree of

decentralization of service provision, and the ownership structure of producers (public, private, mixed), when available. The authors conclude that decentralization has no clear-cut effect. It improves the performance of only a few indicators and has no significant impact on the others. The strongest positive impacts are on roads and electricity. The only potential area of concern is the impact of decentralization on employment. Decentralization also results in a higher variance in performance across jurisdictions. This may reflect a better match between supply and demand in each jurisdiction and would thus be fully consistent with the finding that, at worst, most indicators remain unchanged. But a higher variance could also reflect different capacities at the subnational level, revealing that decentralization wipes out the benefits from national minimum standards set by a centralized regime. From a policy perspective, the analysis shows that the positive effects of decentralization can be reinforced by increasing competition within sectors.

The main conclusion one could draw from these five papers is that some degree of decentralization can improve infrastructure performance, but it is bound to fail if subnational governments do not enjoy political and financial autonomy and are not accountable and if the various actors (government levels, private providers and users) do not face the right incentives. So, how can policymakers built in the right incentives in the design of decentralization? The standard public finance literature on decentralization (based on the Tiebout model developed almost 30 years ago and the 25 years-old Oates' decentralization theorem) does not offer many details on this, focusing more on a ex-post explanation of the virtues of local differentiation of public goods. A more detailed analysis of the incentive mechanisms built into the relationship between the various actors is needed to derive a positive theory of government that would allow an analytical assessment of its internal functioning and its optimal structure. This new approach could be developed by borrowing insights from the recent advances in the new theory of the firm and in contract theory. Cremer, Estache, and Seabright propose an agenda for research along those lines (chapter 6). My hope is that these insights will allow to provide more specific advise on infrastructure decentralization.

## Chapter 1

### Decentralization, Politics and Public Services

*Bill Dillinger*

Decentralization - the transfer of political power to local units of government - is a widespread phenomenon. Of the seventy-five developing and transitional economies with populations of more than 5 million, all but twelve have begun to decentralize political power.

The form and extent of decentralization vary. In parts of Africa national governments are creating local political entities in territories that were formerly administered by the central government. In Eastern Europe, existing local administrative units of the central government have been transformed into separate political entities, with leadership chosen through local elections rather than by a single party. Similarly, in Latin America decentralization has meant a shift from centrally appointed mayors to locally elected mayors and, often, major increases in intergovernmental transfers. Decentralization also takes more subtle forms: in China the socialist political structure - with mayors chosen by party congresses and taxes transferred upward to Beijing - remains intact, but its content has changed. Party congresses now elect mayors based on their loyalty to local interests, rather than their loyalty to Beijing; this change is reflected in growing conflicts over the share of municipal taxes to be transferred upward.

#### Explaining Decentralization

The motivating force behind decentralization is political. While decentralization is thought to improve public sector management, it is politics - not management - that motivates change. This is evident in the sequence of steps that has been taken under the rubric of decentralization; steps that satisfy a political agenda to the detriment of management.

- In much of Africa local governments have been created but given neither power nor responsibility. This move is often explained as an attempt by bankrupt central governments to create a new target for political dissatisfaction without relinquishing real power.
- In Latin America central governments have increased intergovernmental transfers to municipalities without shifting a commensurate share of expenditure responsibilities. This move, though costly to the national

treasury, has been explained as an attempt to "buy off" a growing number of disaffected local political constituencies.

- In Eastern Europe the opposite has occurred: expenditures have been decentralized without revenues; a move explained as a hasty effort by newly victorious political forces to quickly consolidate their positions at the local level, complimented by an effort by central governments to "push the deficit down."

Central governments feel compelled to concede to these pressures for several reasons. Political analysts have suggested that decentralization is an outcome of the declining credibility of the centralized state. Groups that have historically been denied power now demand it, and central governments are increasingly reluctant to combat this demand with force. The state's declining credibility, in turn, has been attributed to conspicuous economic failure (in both formerly socialist countries and Africa)<sup>2</sup> to the relative absence of war and civil unrest (with the consequent decline in acceptance of strong authoritarian government), and to the emergence of educated urban middle classes (and the consequent decline of traditional patron-client relationships between the government and the governed.)<sup>3</sup>

Despite being politically motivated, decentralization does offer some promise for improved public sector performance. Analysts often cite the correlation between the level of development (as measured by GDP per capita) and decentralization (as measured by the local share of total government spending) as evidence.

Several theoretical arguments can also be made for decentralization. Economists argue that, because tastes and preferences for public services vary among communities, welfare gains are achieved by decentralizing expenditure decisions to the level of government that best incorporates a community of common interests.<sup>4</sup> Organization theory argues that decentralization improves accountability by clarifying the responsibilities of distinct units of government, reducing the costs of constituent participation, and increasing the likelihood that participation will influence policies.<sup>5</sup>

Whether or not these arguments hold remains to be seen. The decentralization that is now taking appears to be a reluctant and disorderly series of concessions made by central governments attempting to maintain political stability. Still, from a management perspective, decentralization at least constitutes an opportunity. The political pressure for decentralization has made the structure of governance very fluid; fundamental structural problems are no longer immutable. In this sense,

<sup>2</sup> Fukuyama (1992).

<sup>3</sup> O'Donnell, Schmitter, and Whitehead, (1986); Potter (1993).

<sup>4</sup> Musgrave and Musgrave (1984).

<sup>5</sup> Ostrom, Schroeder, and Wynne (1992).

decentralization represents an opportunity to address the underlying problems of management.

### **Establishing a Framework**

Ample evidence has been amassed showing that the performance of public services cannot be improved *without* changing the relationship between the central and local governments. In developing and transitional countries, central governments have traditionally dominated the entire public sector. This was a legacy of the decades of civil strife that often followed independence (and the consolidation of socialism in the transitional economies), as well as the centralized development models of the post-war period. As a result, local governments have traditionally operated not as autonomous providers of public services, but rather as mediators between the central government and local constituency groups.

As a result, problems in public service delivery cannot be addressed by attempting to change the behavior of municipal governments, in isolation. The constraints on public services do not lie only in factors that are under the control of local government. Instead, the constraints on public services tend to lie in relationships among all the actors involved in public service delivery, and in the relationship between central government and local government in particular.<sup>6</sup> As municipal governments do not encapsulate the problem, and as changes in the intergovernmental relationship are necessary to improve performance, the various decentralization variables--the procedure for choosing the major, the structure of taxes and transfers, the degree of central regulation of local spending--would all appear to have an important bearing on public service performance. These findings support the case for considering decentralization as a means of improving public service performance.

The nature of reform must vary among countries. Every country situation is unique to some extent; cultural and historical conditions differ, and, even in countries with similar backgrounds, the government's readiness to act on specific decentralization issues varies. Any strategy for reform must be custom-tailored. The variety of initial conditions among developing countries is striking. At one extreme are the countries, like Ghana, where local governments have virtually no decisionmaking power; the mayor is appointed by the president, the municipal budget is minuscule (due to the paucity of local tax instruments and central controls over their rates), the budget allocation must be approved by the central government; and all decisions on staff hiring, promotion, and dismissal are made by the central government.

At the other extreme is Brazil, in which local governments are almost sovereign. Brazilian municipios have historically enjoyed complete political autonomy, with councils and mayors chosen in local elections (except during the military regime of 1964-1985). They receive unrestricted, constitutionally-mandated shares of the

---

<sup>6</sup> World Bank (1995).

principal taxes levied by federal and state governments, and they have the power to impose a variety of local taxes, with unrestricted rates. Subject to certain constitutional restrictions, municipios control their own civil service, retaining the power to set salaries and make promotion decisions. These polar cases do not represent a progression from bad to good. For example, Brazil lacks an effective division of responsibilities between state and municipal governments. Both state and municipal governments may operate public services simultaneously within the same jurisdiction, and the de facto division of labor between the two levels of government is the result of historical bargains and ongoing negotiations. The difference between Ghana and Brazil is merely the difference between still-nascent government and competing sovereignties.

Most countries fall somewhere in between. In India, for example, mayors and councils are locally elected, but state governments can legally dismiss mayors whose performance they find unsatisfactory. At any given time since independence, 40 to 50 percent of the local authorities have been under state supersession. Similarly, local governments in many developing countries account for a significant share of public expenditures, but their expenditures are subject to central government approvals and restrictions. In Senegal, for example, each local government's budget must be approved by the central government before any spending can be authorized. In the Philippines (until the recent reforms), nearly half of municipal expenditures were dictated by some form of central government mandate.

Given the variety of baseline conditions, the basis for making global recommendations about decentralization is not strong. Empirical evidence from the developed countries provides a sense of direction, but is not directly transferable. The decentralized governance structures of the Organization for Economic Cooperation and Development (OECD) countries arose under the particular conditions of nineteenth century industrialization, and further, show considerable variety and frequent experimentation. The most relevant body of evidence is emerging from the countries that are now of decentralizing. But these reforms are still in their initial stages.

Still, the evidence, from the reforming countries suggests that three elements are common to successful decentralized governments. First, a clear division of functional responsibilities must be made among levels of government - a hard budget constraint must be enforced on central participation in nominally municipal functions. Second, the financial rules governing local governments reward good performance: local governments must be given the freedom to charge their constituents for the costs of the services they consume; transfer systems must be reformed to reduce the scope for bargaining and negotiation, and capital financing systems must be established that reward creditworthiness rather than political acumen. Third, a system of accountability that balances central regulation and local political participation must be instituted.

## Defining Responsibilities: Drawing the Hard Budget Constraint

A clear linkage between a unit of government and a specific service seems to be critical for ensuring accountability and for eliminating the soft budget constraint, which encourages mayors to act as lobbyists before the central government ministries, rather than as individuals ultimately responsible for providing specific services.

This clarity is rarely found; central governments often assume functions for which local governments bear nominal responsibility. In South Asia specialized technical agencies have been introduced to manage utilities, such as potable water, electricity, or housing for the poor. These agencies are usually autonomous or responsible to a government minister and empowered to override local authorities. In Latin America central participation is more ad hoc. In Venezuela, although municipal governments have the legal responsibility to provide water supply, sewerage, urban roads, and power distribution, central government agencies intervene at will (and in fact account for the vast majority of public sector expenditures on these services.)

In theory, the procedure for clearly differentiating roles is straightforward. Public economics argues that responsibility for discrete public services should be assigned to the lowest level of government whose jurisdiction incorporates the beneficiaries. Assigning expenditure responsibilities to different levels of government should therefore require only the definition of jurisdictions.

While useful as a starting point, this theory ignores several practical considerations. First, it assumes away the difficulty of actually defining the beneficiaries of a particular service, and finding a unit of government that includes them as constituents. For example, road maintenance may benefit local commuters as well as intercity travelers. More importantly, a variety of social services have both localized benefits (on individual students and patients) and wider benefits, such as poverty alleviation, that are of national interest. The benefit jurisdiction model also ignores the administrative costs that would arise from creating a separate unit of government for each service and the economies of scale that might be sacrificed by assigning services with geographically confined benefits to small units of government.

Governments in industrial countries resolve these problems with complex organizational, financial, and contractual arrangements between different levels of government and with private contractors.

*Geographical specificity.* Implementing the benefit-jurisdiction model--matching functions to units of government--requires the recognition of differences in local conditions - between urban and rural areas and among urban areas of different sizes. One of the traditional justifications for avoiding a rigid division of functions is the concern that a hard budget constraint applied to all situations would work against

smaller or poorer jurisdictions. This argument is based on the assumption that a municipal organic law is uniform under all circumstances. Often it is.

In Brazil, for example, the rules that apply to São Paulo (with a population of 8.5 million) also apply to Pirapora de Bom Jesus (population 4,585). Similarly, the laws of Chile, Colombia, and Mexico, make no distinctions between urban and rural areas, or among urban areas of different sizes. The one-size-fits-all approach is also used in some anglophone African countries - Ghana and Nigeria, for example. Under these circumstances, the scope of functional responsibilities that can be unambiguously assigned to municipal governments is constrained by the competence of the smallest jurisdiction.<sup>7</sup> Any broadening of functional responsibilities under a uniform legal framework must be ad hoc.

Distinctions based on size, in contrast, are common in the industrial countries. In Germany, for example, Berlin, Bremen and Hamburg, have a special status that combines the functions of states (Länder), counties (Landkreis), and municipalities (Gemeinden). British law distinguishes urban areas from rural areas: the entire national territory is divided into counties that provide services needed in both urban and rural areas (education, social services, police and fire protection). Services that are specifically urban (housing, public transport, refuse collection) are assigned to separate urban (district) governments. The United States, similarly, has an extremely complex local government structure that recognizes both urban and rural distinctions (counties and municipalities) as well as a variety of local government units responsible only for specific sectors. (In the United States, of the 82,341 units of local government, 43,169 are sector-specific.) Such geographical distinctions also exist in some parts of the developing world. The enabling laws of subnational governments in South Asia, for example, make legal distinctions between urban and rural governments, and provide for varying degrees of autonomy for cities of different sizes. In India, however, the graduation process lag behind the rate of urban growth: areas that were villages at the time of their initial designation are now cities, but retain their village status). Such geographic differentiation - is a key element of successfully decentralized governance.

These arrangements can also be used to improve the match between services and jurisdictions, particularly for services that have both national and localized benefits. Earmarked subsidies from central governments can induce local governments to increase expenditures to the level that reflects the interests of both levels of government.

*Contracting.* The problems of economies of scale and excess administrative costs posed by the benefit jurisdiction model can be addressed through contractual arrangements. In practice small local governments do not have to sacrifice economies

---

<sup>7</sup> This is often extremely small. In Jordan, despite Amman's population of 1.8 million, the average population of the municipalities is 6,200. São Paulo's (município's) population is 8.5 million, but half of Brazil's municípios have fewer than 10,000 people.

of scale if they can contract with larger units of government or private firms for service production. (The economic benefits of local service provision are captured when budget decisions are made. How those budget decisions are carried out is immaterial.)

Private contracting is already widespread for the construction of public works that require specialized skills and equipment. Contracting is also used to operate municipal services. In France, small communes hire large private water companies to provide residential water service. Contractual arrangements need not be limited to the private sector. In Los Angeles small municipalities receive police and fire protection services from the county government. Similarly, in Colombia small municipalities around Bogota rely on the city's utility companies for water and power.

Contracting is also a solution to the high administrative costs that would result from having a separate unit of government for every service. In practice, a single tier of government can assume functional responsibility for many services through contractual arrangements. In the United States, for example, the national government relies on local governments to administer some of its major federally funded welfare programs, including aid to families with dependent children and food stamps. In Chile, similarly, the central government funds most of the costs of primary education, but delegates its administration to municipal governments and private schools.

Clarity in the division of functional responsibilities between levels of government thus does not mean sectoral autarky, but a clear enunciation of the terms and conditions of central involvement in nominally municipal functions. The long-term sustainability of this structure also depends upon the central government's willingness abide by these rules, to refrain from ad hoc interventions even in the face of sporadic municipal crises.

### **Reforming Intergovernmental Finance**

Reform in financial relationship between central and local governments is needed to make a clear division of functional responsibilities workable. Revenue reform has three major components: removal of restrictions on local governments' ability to tax their own constituents, reform in intergovernmental transfers, and reforms in the terms by which local government obtain access to long term capital financing.

### **Deregulation of user charges and local benefit taxes**

Finance follows function. The appropriate structure of local finance - the mix of user charges, taxes, transfers and loans - depends, first and foremost, on the functions that have been assigned to local government. Different sources of revenue have different impacts on behavior and different patterns of incidence: user charges can ration consumption by price; benefit taxes can impose costs more broadly on a whole jurisdiction, but can only ration through the local political process. Transfers enable central governments to influence the behavior of local governments and local

governments to redistribute income among their constituents. Loans offer a means to extend the costs of major capital works to the approximate duration of their benefits. The appropriate choice of instruments depends upon the objectives that are being sought, and the objectives vary according to the service that is being financed.

*User charges.* If the benefits of a service are confined largely to individual consumers and if no adverse distributional consequences arise from their implementation, user charges are an attractive means of financing municipal services. In effect, user charges are a means of rationing consumption according to willingness to pay. They extract information about consumer preferences, moving the consumption decision from the local government to the consumer. Residential water supply, bus transit, and toll roads are all services for which user charges are appropriate.

Local governments in developing countries already impose such charges, but their levels are often far below the financial costs of providing the service. This discrepancy is due in part to central regulation. Central governments often restrict the level of user charges on distributional or macroeconomic grounds. Neither justification holds up to scrutiny. Subsidies for such services are an inefficient means of assisting the poor, as nonpoor consumers benefit as well. Holding down user charges to control inflation is treating a symptom rather than the cause (and the subsidies, if financed by deficits, may actually fuel inflation). The deregulation of user charges should therefore be encouraged.

*Benefit taxes.* Local taxes, in principle, are an appropriate means of financing services whose benefits cannot be confined to individual consumers, but do not extend beyond municipal boundaries. While user charges are the means by which individuals can express their demand for services whose benefits are largely private, local taxes are the means by which taxpayers can express their demand for services that are consumed collectively. Benefit taxes also impart geographical equity to the financing of municipal services, imposing the costs of municipal services on the people who benefit from them.

Virtually all developing countries already assign some form of local tax to their local governments. But like user charges, local taxation is often highly regulated; the central government controls rates and exemption policies and any other factors that affect the level of tax liabilities. But this regulation does not appear to be justified (on distributional or macroeconomic grounds). Central governments are only justified in restricting the *kind* of taxes municipal governments may impose (in order to prevent local governments from exporting their tax burdens onto neighboring jurisdictions).

Local tax deregulation can involve the removal of explicit controls on tax rates. It can also include the removal of more subtle restrictions on tax yields. In countries with high levels of inflation one of the major constraints on the yields of the property tax, for example, is the stipulation that properties may not be revalued without a physical inspection. Indexation is the solution to this problem. Some states in Mexico,

for example, now permit automatic adjustments in property values based on a cost of living index.

Governments can also improve the prospects for local tax mobilization by assigning more buoyant, less politically sensitive taxes to the local government. The property tax is the most common local tax. Virtually all developing (but not all transition) countries assign some form of property tax to their local governments. But the property tax is extremely sensitive politically. In practice, most local governments of developing countries derive more revenue from indirect business taxes than from the property tax, even if the tax base is narrow. Revenues from the service tax in Brazil and the octroi in Pakistan exceed revenues from the property tax. Business taxes are high yielding because they are indirect - they can be passed on in the form of higher prices, lower wages, or lower returns to capital. But this characteristic increases the risk of tax exporting, and thus weakens their effectiveness as benefit taxes. In assigning taxes to local governments, central governments must strike a balance between the economic virtues of the property tax, and the more promising revenue prospects of other, less direct, forms of taxation.

### **Intergovernmental transfers**

Any successful structure of decentralized governance must address the largest source of municipal revenues - intergovernmental transfers. Transfers have an important role in the financing of public services. Intergovernmental transfers permit central governments to induce local governments to undertake expenditures that serve national, rather than only local interests. Transfers also permit central governments to use local governments to administer national programs. Intergovernmental transfers are also appropriate wherever the central government lacks the leverage to mandate the expenditure through regulation.

But the design of transfers must be reformed to better perform this role and to reduce poor targeting or administration. Intergovernmental transfers take many undesirable forms. In some countries the level of transfers is unpredictable or largely determined by negotiation. In Kenya, for example, the central government is legally obligated to make an annual payment to local governments in lieu of property taxes owed on government-owned property. It has often failed to do so.

Even if recurrent transfers are distributed according to formulas, they may have perverse incentive effects. Dearness allowances in some Indian states and personnel grants in Indonesia fund part or all of local personnel costs. Local governments are thus encouraged to lobby for more positions, regardless of need. Transfers based on the size of revenue gaps, similarly, encourage municipal governments to exaggerate expenditures or make less effort to collect local taxes. In Morocco the size of a municipality's transfer was (until recent reforms) based on the gap between its estimated revenues and expenditures.

Transfers can also embody arbitrary interjurisdictional subsidies. Brazil's largest transfer is distributed on the basis of the origin of value-added tax collections. But much of the value-added tax is collected at the point of production - from major manufacturing enterprises - not at the point of consumption, where much of the incidence falls. As a result consumers throughout Brazil subsidize the residents of industrial enclaves - a transfer that, for example, enables the municipio of Sao Bernardo (the site of Volkswagen do Brasil) to sponsor a municipal symphony, courtesy of Volkswagen buyers throughout the country.

Perhaps the most important remedial measure developing countries can take is to reduce the uncertainty and bargaining that now accompanies transfers. Ecuador has recently replaced its system of ad hoc annual grants with a formula-based transfer system. Countries can also revise transfer formulas to remove more subtle perverse incentives: Morocco is replacing its grant distribution formula based on deficit size with one based largely on population size. Countries can also revise transfer formulas to reduce the extent of arbitrary interjurisdictional transfers. Brazil, for example, has recently reduced the origin content in its value-added transfer formula, allowing states to increase the weight attached to factors such as population.

But countries must also expand transfer programs to adequately finance the expenditures they have delegated to local governments. Large recurrent transfer systems are likely to be appropriate for services that have distributional or benefit spillovers. Primary education, for example, is an appropriate target of intergovernmental finance because it affects national income distribution.

Such arrangements are common in the major OECD countries. In most of the G7 countries local government expenditures on primary education are financed - in whole or in part - by intergovernmental transfers (originating at the national level in France and the United Kingdom, and at the state/prefecture level in Germany, Japan, and the United States). Welfare payments are also financed, in part, through grants, although practices vary. Central governments make direct payments to indigent households in some cases, while others (including the United States) share these costs with local governments. In Germany welfare payments are paid with general municipal revenues.

Transfers' effectiveness in achieving sectoral or distributional objectives can, in principle, be increased through changes in the method used to determine the amount to be transferred, the criteria used to distribute resources, and the conditions attached to the use of the transfer. If the intent of a transfer is to encourage increased spending on education, for example, the transfer could be earmarked for this function (and for a matching condition imposed, to ensure that local governments do not reduce expenditures that they would otherwise have made on education by a corresponding amount).

Earmarking and matching are used in OECD countries, although more widely in the United States than in Europe or Japan. The ability of governments of developing countries to use similar techniques to improve the targeting of transfers depends upon whether they also possess the needed information on local revenue and expenditures and if they have the capacity to monitor transfer use. Typically, central governments in developing countries do not. In Nigeria, for example, local governments did not have population data, and few local governments can present an accurate statement of incomes and expenditures. Developing countries may thus have to consider less complex, albeit less accurate, transfer formulas.

### **Access to capital**

The means by which municipal governments finance capital investment must be reformed. Long-term borrowing is an appropriate way to finance capital works. It spreads out the costs according to the duration of their benefits and permits a flow of savings from areas of surplus to areas where municipal infrastructure investments have potentially high rates of return.

But central governments often monopolize the mobilization and allocation of long-term savings for municipal capital investment in developing countries. This arrangement has not been successful. Since taxpayers' ultimately bear the financial risk of bad loans, access to credit has been used for political purposes. As a result scarce resources have been allocated to projects with low returns, and little effort has been made to recover debt service from politically favored jurisdictions.

*Bond Markets* Given this performance, a bond market model - based on a market-intermediated relationship between municipal governments and private savers - is recommended. With credit priced at the opportunity cost of capital, mayors would have an incentive to carefully choose projects. And with their own capital at risk, private lenders would have an incentive to make prudent loans and to insist on repayment. But for a private capital market solution to work, private long-term savings must be available and municipal governments must be sufficiently creditworthy to attract it.

In most developing countries neither condition exists. To begin with, government policies inadvertently inhibit the mobilization of private domestic long-term savings, for any purpose. Long histories of macroeconomic instability render long-term financial commitments extremely risky. Controls on interest rates prevent savers from charging a rate of interest commensurate with this risk. Information on potential borrowers is unreliable, and inappropriate regulation impedes the development of institutional sources of savings and pension funds and insurance companies.

At the same time municipal governments are viewed as a particularly risky investment. Unlike private commercial borrowers they lack marketable collateral. Local revenue-raising ability is constrained by central regulations and local political

pressure and continuity of management is unlikely. Under these conditions, even if long-term private savings was available, local governments would likely remain shut out of the domestic capital market.

For bond market model to function, both conditions must be addressed. To foster the mobilization of private long-term savings, several measures can be taken. First, monetary and fiscal policies can be better aimed toward achieving macroeconomic stability. Domestic long-term savings is likely to remain low as long as inflation rates are high and unstable. Second, government policies must reward savings mobilization. Interest rate caps that reduce investment returns to levels not commensurate with risk should be eliminated, and regulations that restrict the growth of insurance companies, mutual funds, and pension funds should be scaled back. Third, governments can improve the quality of information in the market by enabling regulatory authorities to evaluate the financial health of institutions and by facilitating the development of private rating agencies. Finally, governments can avoid crowding-out private and municipal borrowers by restraining their own issuance of domestic debt instruments.

At the same time local governments can be made more attractive to potential lenders. Bond buyers are ultimately interested in the return of their investment, leading them to focus on three factors:

(1) Revenue-base: bondholders want to know that the borrower has enough revenue to service the bond; that is, that the local economy is strong and that the local government has the instruments to extract revenue from it. While the strength of a local economy is exogenously determined, central governments can strengthen local governments' ability to extract taxes by assigning broad tax bases to local governments and freeing local governments to determine tax rates. Local governments can, in turn, render themselves more attractive to bondholders by using this power prudently - keeping tax rates low leaves headroom for increasing rates if necessary (to continue to service debt).

(2) Expenditure control: bondholders are also concerned about competing expenditure obligations - growth in spending on personnel, capital works, or even subsequent debt service that would compete with debt service obligations for funds. Central governments can reduce this risk by not imposing unfunded mandates on local governments and scaling back regulations that limit local expenditure flexibility (laws mandating uniform salaries or pension benefits or that limit the local governments ability to dismiss redundant staff). Local governments can demonstrate their ability to control expenditures by instituting an adequate budgeting and financial control system.

Actions are more persuasive than systems, however. The most convincing evidence that a local government can offer is a history of balanced budgets, no defaults on existing debt, and a comfortable current account surplus.

(3) Collateral: certain contractual features can protect a lender even if a borrower's finances decline severely. Municipal governments can pledge to enact a specific tax or tax another revenue source to service debt on a specific loan (this is generic to revenue bonds, but is also used in general obligation bonds). Loan contracts can specify that the payment of debt service on a specific loan will be given contractual priority over other expenses (typically excluding normal operating expenses). Contracts can prohibit a municipality from issuing additional bonds backed by the same revenue source until a specific debt is retired. Central governments can also improve the quality of local collateral by allowing bondholders to be paid by deductions from intergovernmental transfers.

*Municipal credit institutions.* For many developing countries a bond market solution is a distant option because the essential preconditions of macroeconomic stability and creditworthy local governments do not exist. With the private sector unwilling to lend and governments unwilling to function as prudent financial intermediaries, many countries have turned to organizational hybrids. Under the general rubric of municipal credit institutions, these hybrids attempt to combine the commercial incentives of private lenders with the financial backing of central governments to mobilize savings.

Municipal credit institutions take a variety of forms, including funds administered by a central government ministry or specialized government-owned banks. Regardless of form, all attempt to isolate lending decisions from the government budgeting process, while still carrying the financial backing of the government.

Although municipal credit institutions have a long and successful record in Western Europe--as funds or as banks, their record in developing countries is uneven. They are often founded at the behest of donors, and often the terms and conditions imposed by donors are not implemented by governments (particularly after funds have been disbursed) nor are they carried over into other channels of funding for municipal capital investment.

Experience suggests that several organizational characteristics can increase a municipal credit institution's viability. Its enabling legislation should clearly segregate its financial role from other the economic or social objectives of the government. This separation would leave the institution free to base lending decisions solely on financial criteria and force it to be accountable for its financial performance. This statutory separation can be reinforced by the terms on which the government funds the municipal credit institution. Government funding should be provided in sum, rather than on an individual project basis, with governments holding the institution accountable for its overall financial performance and conditioning further financial backing on satisfactory financial returns. The government's commitment to the financial integrity of the municipal credit institution can also be reflected in the composition of its board: the representation of the ministry of finance, for example, is a useful counterbalance to the influence of a local government minister.

Internal administrative rules can also reduce political pressure on technical staff. Appraisal regulations should clearly define the terms and conditions under which loans will be approved, employing readily verifiable criteria (such as debt service coverage ratios) to assess the creditworthiness of potential borrowers and explicitly forbidding new loan commitments to jurisdictions that are currently in default. Government consistency is also necessary to enable municipal credit institutions to find a market and influence the overall allocation of resources for local capital investment. Governments often operate a variety of grant and loan programs that offer softer terms than the municipal credit institution, which undermines Municipal Credit Institution lending.

Ultimately, the keys to a successful municipal credit institution are a stable macroeconomic and a market of credit-worthy borrowers. In this sense they are most successful where they are least necessary, that is, where the conditions for a bond market already exist. They can therefore be seen as an interim solution to more direct relationships between municipal governments and private capital markets.

### **Balancing Regulation with Political Accountability**

The third fundamental element in a successfully decentralized system of governance is an appropriate balance between central regulation and local political accountability. Even if local governments are assigned clearly defined functions and have the means to finance these functions, local political leadership will not necessarily respond to the interests of their constituents (or to the central government) unless a balanced system of accountability is in place.

Both forms of accountability, regulation and political participation are complementary. With the recent proliferation of democracy, the role of local politics as the primary tool of accountability has received much attention. Nevertheless, as responsibilities are devolved to local government some central regulations must remain.

#### **Central regulation**

Local governments are now overregulated in many developing countries. In much of Latin America and South and East Asia mayors were, until recently, appointed by the national government. Even where mayors are chosen by elections, state or national governments may possess the legal authority to dismiss mayors whose performance they find unsatisfactory (such as in India).

In many developing countries central governments also make local personnel management decisions, including the number of positions local governments are allowed to maintain at each grade, starting salaries, pay differentials between grades, and the size of annual cost-of-living increases. In some countries, central governments are directly involved in individual recruitment and promotion decisions. In Ghana, for example, local government staff are directly recruited, promoted, and paid by sectoral

ministries of the central government. In Indonesia all full time staffing positions are subject to central government recruitment and promotion and are paid directly by the central government.

Central governments also control the sectoral composition and size of local government budgets. In Morocco, for example, each municipality's budget must be approved by the Ministry of the Interior before funds can be disbursed. In Senegal, similarly, the annual budget review process includes a line-by-line negotiation of the expenditure estimates of each local authority.

This degree of regulation is excessive. Given the weakness of local financial reporting in developing countries (and the difficulties of communication in some) this system permits people who lack information to make decisions for people who have information. In this respect regulation actually undermines accountability, as a mayor can legitimately claim that he is unable to respond to local demands because his hands are tied by central regulators.

Central regulation is, however, appropriate where local government behavior can affect national monetary, trade, or fiscal policy. Thus local governments should not have the authority to print money (a principle that was, in effect, violated by the provincial governments of Argentina under the previous regime). Central regulation on external borrowing is also appropriate in order to control the country's balance of payments. Central regulation of the aggregate level of domestic borrowing may also be justified, as would regulation of the environment.

### **Political accountability**

The counterpart to central regulation is local political accountability - the reliance on voters to regulate the behavior of their political leaders. The view that local elections perform impeccably in this role does not stand up well to scrutiny. The validity of elections after long periods of authoritarian rule is particularly questionable. As Campbell notes, "in most (Latin American) countries, minimum conditions for electoral choice-making - civil liberties and at least quasi-competitive parties - do not apply to the selection of local candidates. The long dominance of central government and parastatals in service supply has weakened voter identification with local governments as instruments for the expression of demand. In this environment, even where there are local multi-party elections, they tend to become miniaturized battlegrounds for expressing preferences regarding national-scale political issues or political ideology."<sup>8</sup>

The advent of local democracy, while increasingly common, is thus no panacea. Nevertheless, some evidence shows that specific changes in election rules can influence the degree to which local elections function as referenda on local government

---

<sup>8</sup> Campbell (1992).

performance. Venezuela has increased the local focus of elections by changing the basis on which candidacies are selected. Until 1988, the winning party of municipal elections in Venezuela was permitted to designate its candidate for mayor. Candidates now run as individuals, a reform that has shifted the focus of the campaign to more localized concerns.

Other means of holding local municipal leaders accountable also exist. In Korea, for example, mayors have traditionally been appointed by the government, but the success of their careers responds to local constituents. To this end Seoul operates "citizen complaint reporting centers" and the mayor and top administrative staff make themselves available every Saturday for a "day of dialogue with the citizen."

The bond market, too, may act as an effective means of holding municipal governments accountable, at least for their financial performance. As bondholders demand higher interest rates on loans to less creditworthy municipalities, mayors have an incentive to improve their finances to reduce their cost of borrowing.

### **Synchronizing the Elements of Reform**

Clearly, decentralized governance can be organized in several ways. Two principles appear universal, however. First, a system based on rules works better than a system based on negotiation. And second, these rules work best when they are complementary. Little is gained by granting local political autonomy if elected officials have no discretion over expenditures or revenues; few benefits are gained by establishing a credit-based system for infrastructure financing if local governments have no tax autonomy.

Pressure for decentralization has prompted governments to change some of the rules of intergovernmental relations before others. In Africa political autonomy was granted before revenues were decentralized. In Latin America revenues were decentralized before expenditures. In Eastern Europe political autonomy and expenditure responsibilities were decentralized before revenues. These results are not surprising. The political impetus behind decentralization has prompted central governments to act hastily. Holding local elections or increasing transfers are actions that can be taken quickly. What is slow and difficult is establishing new regulatory relationships between the central government and local governments, transferring central government assets and staff to local governments, and converting annual budgetary transfers within the central government into intergovernmental transfers that are transparent and predictable. In moving toward a decentralized structure of governance, synchronization is crucial.

## Bibliography

Campbell, T. Decentralization to Local Government in LAC: National Strategies and Local Response in Planning, Spending, and Management. IBRD, 1992

Fukuyama, F. The End of History and the Last Man, Free Press, 1992

O'Donnell, G. Schmitter, P. and Whitehead, L. Transitions from Authoritarian Rule. John Hopkins, University Press, 1986

Ostrom, E., Schroeder, L. and Wynne. Institutional Incentives and Sustainable Development. 1992

Musgrave. R. and Musgrave P. Public Finance in Theory and Practice. McGraw Hill, 1984

Potter, D. "Democratization in Asia" in D. Held, Prospects for Democracy, Stanford University Press, 1993

IBRD, Improving Urban Services: Restructuring Incentives in a Decentralizing World, Washington DC, 1995

## Chapter 2

### Decentralizing Infrastructure: For Good or for Ill?

*Richard M. Bird*

Investment in physical infrastructure (e.g. water, sewerage, roads, transit, power, telecommunications) has long been considered to be important for economic growth. Indeed, some of the earlier writings on economic growth, like some of the early practices of agencies dispensing foreign aid, appear simply to have assumed that investment in infrastructure was not only a necessary but almost a sufficient condition for growth. Although subsequent analysis and experience has undermined this simple belief, several recent studies have again awakened interest in the connection between public sector investment in infrastructure and private investment and economic growth.<sup>9</sup>

Whatever the strength of the connection between infrastructure and economic growth, infrastructure investments almost invariably constitute the core of both national and regional development policy in most countries. Infrastructure investment projects, and the services they provide, are inherently located in, and serve, particular areas and customers. A road built in the middle of an uninhabited desert is not the same as a road built in a major urban area, even if the physical characteristics of the two projects - the thickness of the pavement, the width of the roadway, etc. - are identical. The productivity (in terms of growth) of an infrastructure project thus depends largely upon its environment - upon where it is located. Moreover, location also determines to a considerable extent who benefits from infrastructure investment: water supply systems with pipes that serve only the rich do not do much for the poor. The efficiency and equity of any particular investment thus depends in part - often in large part - upon its physical location. Infrastructure investment is thus invariably location- or site-specific.

Infrastructure investment is also jurisdiction-specific. In principle, there are many alternative ways in which local infrastructure may be provided (Box 1). Is the project designed, financed, regulated, operated and/or maintained by the national government? A regional government? A local government? A state enterprise or other agency reporting to any of these governments? Some sort of public-private interaction (e.g. BOT)?<sup>10</sup> How does the government or agency responsible for these different aspects of the investment finance its responsibilities? To whom is it accountable, in what sense, and how is this accountability exercised?

---

<sup>9</sup> See, notably, Aschauer (1989), and, for an application to developing countries, World Bank (1993). As a side point, it appears that most such studies assume that infrastructure is provided to the private sector free of cost: this may be an accurate depiction of reality, but it is not a particularly desirable state of affairs.

<sup>10</sup> There are many possible forms of public-private interaction in the provision of infrastructure: for a recent discussion in the context of a developed country, see Bird and Slack (1993), chap. 7, and also Kitchen (1993).

**BOX 1. Alternative Ways to Provide Local Infrastructure***Public Sector Provision*

1. Central Government:
  - (a) Department
  - (b) Decentralized Agency
  - (c) Enterprise
2. Regional Government:
  - (a) Department
  - (b) Decentralized Agency
  - (c) Enterprise
3. Local Government:
  - (a) Department
  - (b) Decentralized Agency
  - (c) Enterprise
4. Central-Regional Arrangement
5. Central-Local Arrangement
6. Central-Regional-Local Arrangement
7. Regional-Local Arrangement
8. Association of Local Governments
9. Special-Purpose Local Authority:
  - (a) Encompassing more than one local government
  - (b) Coterminous with a local government
  - (c) Covering less area than a local government

*Mixed Public-Private Provision*

10. BOT (Build-Operate-Transfer) Arrangements
11. Other public-private partnerships
12. Development charges, exactions, and similar schemes

*Private Provision*

13. Compulsory provision by developers
14. Compulsory provision by individuals:
  - (a) Vouchers
  - (b) Self-financed
15. Voluntary provision:
  - (a) Formal Arrangements
  - (b) Informal Arrangements
16. Provision by Non-governmental Organizations (churches, enterprises, etc.)

Even this extensive list is less than complete. Many of the arrangements listed have a number of possible variants, and of course there are various possible combinations of all these organizational structures. Moreover, different structures might apply for e.g. policy-making, regulation, financing, production (delivery of services) and so on. For example, in a particular country water policy may be established by a central government department, with a regional government agency financing the basic water supply trunk lines (although they are constructed by private contractors), and a local government enterprise distributing the water at marginal cost to consumers - who, however, are required by law to connect to the system but must finance the connection charges themselves. In poorer parts of the city, however, water may be supplied entirely by private entrepreneurs or by standpipes erected by non-governmental organizations or informal community organizations.

The answers to questions such as these may affect, sometimes dramatically, both the net social benefit of a particular investment and the distribution of its benefits and costs. Which public infrastructure projects are built, where they are built, when they are built, and how they are operated, maintained, and utilized invariably depends largely upon the way in which the various public sector institutions involved in the process are organized and financed (Box 2).

#### **BOX 2. Infrastructure for Whom?**

From some perspectives, Bank-assisted urban infrastructure projects in Madras, India, have been a major success - in large part, it is thought, owing to the strong centralized control that was exercised over the project by the professionalized state civil service (the Indian Administrative Service). From the perspective of many local residents, however, this centralized control of urban development seems to have resulted largely in the provision of better infrastructure for the few who have and done little to improve the lives of the many who have not. Local participation in urban development decisions was weakened, and local preferences largely ignored, under the "benevolent dictatorship" of the professional elite.

Similarly, a proposed major expressway project in Karachi, Pakistan, would undoubtedly serve useful national purposes by connecting the port facilities of the city more efficiently to the national highway system. But, say opponents of the project, it would do so only by adding to the already bad level of pollution and the poor living conditions found in much of the city. A transport bottleneck would be alleviated, but much of the price would be paid by squatters and other local residents who would be adversely affected by the project.

In striking contrast, another project in Karachi - the Orangi Pilot Project - illustrates how infrastructure may be developed "from below." Over the last decade, a community development project in the Orangi district of Karachi - a crowded low-income area with no effective public services - has installed a sewerage system in much of the district, in addition to building many schools, health-care posts, and other facilities. In total, the poor residents of this district have invested a considerable sum in these facilities, including doing much of the work themselves. One result has been to lower costs: manholes for underground sewerage lines, for instance, cost 500Rs. compared to 2300Rs. in a similar, near-by UNICEF-financed project. Another, more important, result is that the infrastructure work that has been done is what the people served want. All these activities have been carried out with no support at all from any government agency. In fact, the main problem encountered by this successful example of "informal" local government has been the failure of the formal city government adequately to maintain the central sewerage system.

**Sources:** Stackhouse (1993a, b); Webber (1991).

That this is true is obvious to anyone familiar with the sad litany of "wasted" (unproductive) infrastructural investment in all too many countries - roads that lead nowhere, unfinished hospital and school buildings, undermaintained and deteriorating water and sewerage systems. In some countries the same message is conveyed by excessive (in both allocative and distributive terms) public investment in expensive facilities for the few - who as a rule do not

pay for them - while at the same time the many pay a large share of their small incomes for less adequate (and generally unsubsidized) versions of the same service.<sup>11</sup> To mention only two common examples found in many developing countries: "free" university education (albeit usually in undermaintained buildings) for the few and not even primary schooling for the rest; highly-subsidized (but unreliable) supplies of piped-water and electricity for the affluent suburbs while the poor pay ten times as much for even worse service at the other end of town, often provided through the so-called "informal" sector.

Such common outcomes in many countries reflect neither inevitable fate ("the poor are always with us") nor dire necessity but rather the structure of institutional incentives to which decision-makers at all levels are reacting. Inappropriate incentives as codified in the organizational and financial structure of the public sector, largely explain why the "wrong" project seems so often to be built in the "wrong" place (often at the "wrong" time), soon to deteriorate owing to lack of adequate upkeep, while at the same time other projects that people are both willing and able to pay for do not get built - or at least not by the "official" public sector (Box 3).

---

### **BOX 3. The Informal Financing of Infrastructure**

The so-called "informal" sector in developing countries has attracted a lot of attention in recent years. The potential role of the "informal public sector," however, has been much less discussed, in part perhaps because many feel that such essentially "private" activities as those usually subsumed under the "informal" heading cannot easily accommodate public-spirited or collective behavior. Such skepticism may be overdone. Box 2 provided one illustration of how a charismatic community organizer achieved a surprising amount of success in getting a low-income community in Pakistan to provide infrastructure facilities.

Similar examples have been found in Lima, Peru, where informal local community associations have financed projects such as roads and sewerage by systems of informal taxation (including, as in the Orangi Project described in Box 2, taxation in kind). The tax systems set up in Lima's poor districts for this purpose vary in detail but on the whole appear to be similar in spirit to the traditional (formal) systems found in the rural areas of some countries : how the tax burden is shared is determined by some accepted political process - village elders, or a "town meeting" - and collection is enforced by (sometimes strong) social sanctions. What de Soto (1989) calls "extralegal laws" thus help satisfy local preferences for collective goods, including small infrastructure projects, that are not met by formal governmental institutions.

---

How and to what extent the public sector is decentralized, and what exactly is meant by "decentralization," are thus critical factors determining the productivity of infrastructure investment in any country. What infrastructure gets built, where, when, to what specifications,

---

<sup>11</sup> For various examples, see the papers in Bird and Horton (1989).

and how it is maintained and utilized, depends largely upon who is responsible for these decisions, and what "responsibility" means in this context. The next two sections briefly introduce some of the many dimensions of decentralization: what is it (many things), why do so many people advocate it (for many different and often incompatible reasons), and what are its implications for infrastructure (it depends)? The fourth section of the paper briefly sketches a framework for considering infrastructure investments in a decentralized setting and, as summarized in a brief concluding section, suggests some guiding principles for dealing with the many and diverse issues that may arise in practice. Throughout, the discussion in the body of the paper is supported by a number of "boxes" that develop a few aspects of the argument in more detail and illustrate some of the points made in the text by brief case studies.

### **The Many Faces of Decentralization**

"Decentralization" is a slippery term. One way to pin its meaning down is to distinguish three varieties of decentralization as measured by the degree of independent decision-making exercised at the local level. Deconcentration means the dispersion of responsibilities within a central government to regional branch offices: while clearly relevant with respect to some infrastructural investments, this variety of decentralization is not further discussed here. In contrast, delegation refers to a situation in which local governments act as agents for the central government, executing certain functions on its behalf, while devolution refers to a situation in which not only implementation but also the authority to decide what is done is in the hands of local governments. How one views the effects of decentralization on infrastructure depends in part upon whether one is thinking of delegation or devolution. Unless exactly the same people face exactly the same incentives in both situations - which is hardly possible - the outcomes of the two varieties of decentralization are likely to differ sharply.

### **The benefits and costs of decentralization**

How one evaluates such differing outcomes depends both upon the nature of the investment in question and upon whether one focuses on the intrinsic or the instrumental aspects of decentralization. The literature is replete with passages praising the virtues of decentralization.<sup>12</sup> Not only will it produce more efficient and equitable service delivery through making better use of local knowledge, but it will also lead to greater participation and democracy resulting in more popular consent to government and hence improved political stability. When to these good qualities are added such further ascribed virtues as increased resource mobilization and reduced strain on central finances, greater accountability, and more responsive and responsible government in general, it is not surprising that some have seen decentralization in and of itself to be intrinsically valuable.

---

<sup>12</sup> The particular list that follows is based on the discussion in four recent internal Bank documents (on Mexico, Nigeria, Indonesia, and Venezuela, respectively) but it could be replicated many times from many sources.

Whatever the precise outcomes that may emerge from a decentralized (in the sense of devolved) system of decision-making, from one perspective such outcomes must be presumed to be satisfactory simply because the process itself is desirable. Local people may make "wrong" decisions from the perspective of the central government or of an outside observer, but if they make them, the decisions must, by definition, be assumed to be "right" for them. From this perspective, decentralization is intrinsically good because it institutionalizes the participation of those affected by local decisions, and the results of this good process must themselves be good.

Under certain conditions, this argument is persuasive. The conditions for successful decentralization, however, are seldom sufficiently emphasized. In their absence decentralization may not only fail to improve local service delivery, but it may carry risks up to the level of national destabilization.<sup>13</sup> If more expenditure responsibilities than revenue resources are decentralized, service levels will likely fall; if more revenues than expenditures are decentralized, local revenue mobilization will likely decline; even if both sides of the budget are decentralized in a balanced fashion, local governments may not have adequate administrative or technical capacity to carry out their new functions in a satisfactory fashion. These problems may be particularly marked with respect to infrastructure owing to the "large ticket" nature of many projects and the degree of technical competence required to carry them out (Box 4).

Three conditions that are particularly important for successful decentralization in this context are:

- [1] that the local decision process is fully democratic in the sense that the costs and benefits of decisions are transparent and that everyone affected has an equal opportunity to influence the decision;<sup>14</sup>
- [2] that the costs of local decisions are fully borne by those who make the decisions, i.e., there is no "tax exporting" and no funding at the margin from transfers from other levels of government; and
- [3] that the benefits (like the costs) do not "spill over" jurisdictional boundaries.

When these conditions are satisfied, devolution is sensible, whether viewed instrumentally or intrinsically. When they are not, it may not be.

---

<sup>13</sup> As experience in a number of Latin American countries has suggested, this risk is greatest when revenues are decentralized without adequate steps to ensure that local revenue mobilization is maintained and that local authorities are capable of carrying out the corresponding expenditure responsibilities. Argentina in the 1980s offers perhaps the clearest example, but others may be found in e.g. the Philippines and in many of the transitional economies of eastern and central Europe (see Bird and Wallich, 1993).

<sup>14</sup> Given the inevitable imperfection of democratic institutions, and the ability of the rich and powerful to come out on top in most systems, this is obviously a counsel of perfection.

---

**BOX 4. Decentralizing Infrastructure: The Problem of Technical Capacity**

In 1987 Colombia devolved the primary responsibility for the provision of drinking water and sanitation services to local governments. The two national government agencies previously charged with providing these services to around 700 small local governments - one to small towns and one for rural areas - were disbanded and replaced by a division of the Ministry of Public Works with the functions of sectoral planning, setting and enforcing technical standards, and providing technical assistance. (These measures did not affect the 35 largest municipalities, which had their own local water and sewerage enterprises, or another 237 localities where local governments were already providing these services.)

The turnover of the facilities previously provided by national agencies proceeded at differing paces and in different ways in different areas. The regional level of government (called "department" in Colombia) played a critical role in this process. Some departments, for example Cundinamarca, not only provided some financial support but also encouraged localities to form municipal associations to jointly finance and manage programs of common interest (Box 15). Even in the case of the strongest departments, however, the local officials now responsible for water and sewerage facilities suddenly had new and critical needs for such specific technical knowledge as, for instance, the appropriate technology for the provision of drinking water in a specific area or the assessment of the likely spatial impact of a particular investment project.

These needs were met in different ways, and to different degrees, in different municipalities. In some instances, certain requirements for training or advice were contracted out to private consultants; in others, to universities. Among those whose services were utilized in different ways were the Ministry of Public Works, the Army Corps of Engineers, departmental governments and a non-profit organization specializing in water problems. As time went on, all three levels of government as well as a number of private sector parties became involved in financing, designing, and operating water and sewerage facilities in different parts of the country. In one way or another, although in no neat pattern, the previously centralized technical capacity needed to build and run these vital services seems to have been replaced at least to some extent.

Source: World Bank (1989).

---

Even when one or more of these conditions does not hold, the delegation of implementation responsibilities to local bodies may still make instrumental sense provided that the incentives facing local decision-makers are properly structured, that is, structured to produce the results desired by the central government (in its capacity as representing the population as a whole).<sup>15</sup> In the absence of the right incentive structure, however, the effects of either delegation or devolution on the efficiency and equity of resource allocation may be much less beneficial than often alleged (Box 5).

---

<sup>15</sup> How this may be done has been discussed extensively elsewhere e.g. Bird (1993).

### **BOX 5. Giving the Wrong Signals to Local Government**

One reason many worry about the possible effects of decentralizing public sector activities is because of concern about the poor quality of local government administration in many developing countries. While there is often good reason for such concern, to a considerable extent a country gets the local government it wants. Local government officials, like central government officials, respond to the incentives with which they are faced. If those incentives discourage initiative and reward inefficiency and even corruption, then it should come as no surprise to find corrupt and inefficient local governments. The answer to this problem is obviously to alter the incentive structure to make it possible and attractive for honest, well-trained people to make a career in local government.

A recent Bank study has categorized the institutional setting within which many local governments in developing countries must work into three groups: (1) the over-controlled local public sector, (2) the under-controlled local public sector, and (3) the perversely regulated local public sector. The first is perhaps the most common: central governments control all the details of local government - who they hire, what they pay, where the buses run, etc. - and leave no freedom of action for local initiative. In these countries, local citizens look to the national government to fix potholes on their street - and they are right to do so.

While less common, the opposite ill of "under-control" is beginning to emerge in a number of countries as a result of inappropriate decentralization strategies. For example, a number of transitional countries in eastern and central Europe have given local governments shares in national revenues as well as responsibility for important public service functions, but without setting up an adequate institutional structure to ensure that the central funds are being properly spent in, say, maintaining minimum standards of service in education or health.

Whether over- or under-controlled, local governments in all too many countries receive perverse signals from national governments in a number of ways. In some countries, for example, the amount of national funding received depends upon the size of the local budget deficit: a perverse structure if there ever was one! In others, national funding is available for infrastructure investment at no cost but there are no funds for operation and maintenance: this common system is perverse because it pays localities not to maintain existing facilities (which they would have to do out of their own funds) in order to strengthen their apparent need for new ones (which the central government will pay for).

Source: World Bank (1993a), Bird and Wallich (1993).

### **Government structure: constraint or variable?**

To this point, it has been implicitly assumed that the structure of local government is a policy variable: that who does what, and under what rules, may be freely determined by central policy-makers. In some instances, however, the structure of public sector decision-making is not a variable but a given. Perhaps the most important such case arises in federal states, in

which two levels of government (national and state) have specific and independent powers assigned by a constitution which is not easy to change. Even apart from formal federations, however, it is often difficult to alter governmental structures quickly, particularly when, as is usually the case, the existing structure reflects historically-determined patterns of power-sharing.<sup>16</sup>

In such circumstances, the existing degree and pattern of decentralization in effect becomes part of the environment or context within which infrastructure decisions must be made. When, as is often the case, some of the incentives resulting from the prevailing form of decentralization are perverse, careful attention has to be paid to the extent to which those incentives may be altered at the margin without undertaking major (difficult, costly, time-consuming) constitutional (or, perhaps better in formally unitary states, "quasi-constitutional") reforms. Even within a given constitutional structure, however - even one with many "wrong" signals being given (Box 5) - there may often be a surprising amount of local discretion in both policy design and policy delivery, for good or for ill (Box 6).

---

#### **BOX 6. Local Policies Can Make a Difference**

Even when the incentives facing local government are wrong-headed (see Box 5), a number of examples around the world show that local policies can make a real difference. A recent comparison of the provision of education in China and India, for example, found China far ahead in most respects. But one state in India, Kerala, with universal literacy among adolescent males and females and near-universal literacy among the adult population came out better than any province in China. In the words of the study: "This remarkable achievement reflects more than a hundred years of creative interaction between state commitment to, and public demand for, the widespread provision of public education" (Dreze and Saran, 1993, p. 73). Another study of state finance and poverty alleviation in India similarly found that Kerala was much more successful in this field also than either its income level or its state revenues would suggest (Rao and Das-Gupta, 1992).

Similar "anomalies" exist in many countries: in Brazil, for example, a few cities are well-run and efficiently provided with services; others, superficially similar in character and resources, are badly-run and poorly equipped. In Colombia, some departments provide superior health services than others with similar resources. Almost everywhere, some local governments in at least some areas do much better than others. The reason may be because of historical circumstance: for one reason or another they started to do something well some time ago, and they continue to do so. Or it may be because of a caring and charismatic local leader or some other chance circumstance. Whatever the cause, such experiences emphasize two important points: (1) even in the perverse situations in which many local governments are placed by inappropriate central policies, there is usually some scope for local initiative; and (2) such local initiative can make a real difference in the lives of local people. The task of decentralization is to make it easier for such "good examples" to occur and to be emulated elsewhere.

---

<sup>16</sup> For a recent discussion of the importance of such factors, see e.g. Bird (1993a).

Decentralizing infrastructure decisions in an efficient and effective manner may thus require very different strategies in different circumstances depending both upon why this approach is being taken - for intrinsic (because it is good) or instrumental (because it produces good results) reasons - and upon the perceived rigidity (or flexibility, as the case may be) of the formal government structure.

Many other factors must also be taken into account in assessing the likely effects of a particular form of decentralization. Each type of infrastructure investment, for instance, has its own specific characteristics (economies of scale, the identifiability and spatial concentration of beneficiaries, etc.) that may affect the desirable degree and nature of decentralization at each stage of the process - design, finance, construction, operation, maintenance, and utilization. Moreover, since, as was emphasized earlier, infrastructure investment is inevitably location-specific, the local environment may differ in many relevant ways: rural vs. urban; large metropolitan vs. small city; the relative importance of formal and informal markets; historical and political background; and so on. The potential uses, effects, and limitations of different varieties of decentralization inevitably differ in response to these, and other, factors. It is thus singularly difficult to generalize on this subject, even within a single country (Box 7), let alone across countries.

### **The "polycentric" approach**

Matters may often be even more complex than this because the optimal strategy in many cases may not be "decentralization" in the sense of establishing a two- or three-level hierarchy of general-purpose governments, but rather a noncentral or "polycentric" institutional arrangement in which there is no single, ultimate center of authority but rather a number of independent bodies each exercising authority circumscribed by rules (as opposed to superior authority).<sup>17</sup> The private market alone is unlikely to provide adequate infrastructure in part because the phenomenon of "free-riding" makes it impossible to realize economies of scale. Centralized provision may overcome these problems but it also often results in misplaced and misspecified investments owing to its inability to take adequately into account place-specific information.<sup>18</sup> Decentralized provision intended to overcome these problems in turn has seldom succeeded and has given rise to its own problems - corruption, mismanagement, rent-seeking, and so on. Indeed, there are probably as many papers in the literature decrying the limitations of fiscal and administrative decentralization as a solution to the problems of

<sup>17</sup> This concept is most fully developed in Ostrom, Schroeder, and Wynne (1993), chapter 9.

<sup>18</sup> See Box 2. This argument assumes that it is more economical (requires lower transactions costs) to aggregate information on local conditions and preferences at local than at central levels of government. This proposition may be correct, although it is (so far as I know) untested, but it should be noted that it implies that such information could be gathered at the center if sufficient effort was made to do so. Moreover, if the relative costs of acquiring information at different scales change over time - as seems likely - then the comparative advantage of carrying out different activities at different levels of government will also change (as emphasized by e.g. Breton, 1989).

---

**BOX 7. Accommodating Local Diversity**

"Local government" is a term that covers a wide range of realities in most countries. Cities of 10 million people, villages with 200 inhabitants, densely populated rural and urban areas, sparsely populated territories: all are, as a rule, organized in one form of local government or another. Some localities are rich, some are poor; some have strong local community spirit, some have none. Some are run by well-intentioned, well-trained people; others by incompetent and corrupt officials.

Unfortunately, the diversity of local government reality is seldom matched by equal diversity in central government rules governing local governments (Box 5). Even though some may manage to break out of the inappropriate mold into which they have been put (Box 6), most will not. Successful decentralization must recognize the diversity and heterogeneity of the local government universe and allow for an equally diverse and heterogeneous set of responses to particular decentralization initiatives (Box 4), up to and including accommodating "home-brewed" informal-sector solutions to particular local problems (Box 3).

One useful approach to this problem, much used in Colombia for example, is the "contract" or the making of specific agreements with different areas in accordance with their capacities and interests. Education and health are departmental responsibilities in Colombia, although most of the financing comes from the national budget. But just how these responsibilities are carried out varies widely from department to department. In the coffee-growing region, for example, the quasi-public Federation of Coffee Growers plays an important role in shaping (and financing) rural development policy in terms of building roads, schools, etc. In some of the oil-producing regions, the state oil company, Ecopetrol, plays a similar role in helping municipalities put their royalty income to good use. In some of the better-run departments, such as Antioquia and Valle, the departmental government itself takes on the major responsibility for many services. In others, such as some of the coastal provinces, the regional offices of national agencies play a more important role. Although of course there remain an enormous number of problems and deficiencies in the provision of local government infrastructure and services in Colombia, the current decentralization of some key services follows this tradition of flexibly accommodating a wide range of local conditions (Box 4) - of focusing pragmatically on what may work rather than on attempting to fit everyone into the same centrally-determined box.

Source: Bird (1984).

---

developing countries as there are papers propounding its virtues.<sup>19</sup>

In contrast to this linear view of the possibilities - private, decentralized public, or centralized public - what may really be ideal might be, in effect, a different "government" for every relevant "public", that is, for every group affected by a common problem. In some instances, the best solution may be to leave the problem to the market; in others, to form some sort of "club", or some form of joint public-private organization; in still others to create a

---

<sup>19</sup> See, for example, the introductory overview in United Nations (1991).

single-purpose jurisdiction, or to form an association of different general-purpose jurisdictions (Box 1).

Of course, the more jurisdictions there are, the higher the transactions costs will be and, all too often, the more obscure the lines of accountability. Single-purpose jurisdictions (such as water districts and school boards), for example, may be appealing on efficiency grounds in terms of providing the specific service with which they are concerned. But at the same time, they may undesirably weaken general-purpose local governments both in terms of competition for resources and reduced political accountability and hence hamper the efficient provision of other public services.<sup>20</sup>

When this rich palette of institutional possibilities is applied to the diverse settings already mentioned, the optimal results, although in theory presumably limited only by one's imagination, in practice will depend primarily upon three factors:

- [1] the importance attached to various criteria (minimizing resource costs, economic growth, poverty alleviation, participation, etc.);
- [2] the nature of the infrastructure investment (economies of scale, span of benefit, etc.); and
- [3] the political, economic, and institutional environment of the country or region in question.

It is obviously not possible in a short paper to consider all of the possibly relevant combinations of these factors, so most of the following discussion will assume (1) that the major concern is to promote economic growth (with some attention, however, to poverty alleviation and participation), and (2) that there are two classes of investment (small or local and large, as defined below). In addition, the discussion could easily be extended to accommodate two types of countries (federal and unitary) and two types of regions (urban and rural), but this is not really essential: the federal/unitary distinction has already been noted, and the urban/rural distinction may to some extent be subsumed under the small/large distinction. This simple taxonomy is more than complex enough for this preliminary look at some of the implications of decentralization for infrastructural investment.

---

<sup>20</sup> Kitchen (1993), for example, in a recent examination of Canadian experience with special-purpose districts concludes that (1) they make government more difficult for citizens to understand; (2) they reduce the degree of control citizens have over government; (3) they reduce accountability and hence, probably, the overall efficiency of resource allocation in the public sector; and (4) they appropriate significant proportions of revenue that would otherwise accrue to local governments.

### Infrastructure for Whom?

The answer to the question in the title of this section may seem obvious: for the "people." The problem, however, is that there are often two distinct and potentially relevant groups of people - those who benefit and those who pay. Only when the two completely coincide is the answer obvious. At one extreme, those investments that benefit all national residents equally - that are truly "public goods" - and are paid for out of national taxes levied by a democratically-elected government that is fully accountable for its actions should clearly be provided by the national government.<sup>21</sup> At the other extreme, when the public goods aspects of the provision (nonexcludability) and financing (user charges) of infrastructure are small, when there is little or no redistributional concern, and when the spatial clustering of beneficiaries is marked, the investment should be provided by the most efficient (least-cost) form of organization that can aggregate local preferences and collect local contributions - a voluntary club, a cooperative or non-governmental agency, a special district, a local or regional government, or some combination of the preceding, as the case may be (Box 1).

Unfortunately for analytical simplicity, most infrastructure does not fall cleanly into either of these extreme categories. Distributing water to residences and businesses may be a purely local concern, but supplying the water to the distribution system is, except in small rural communities, almost always a matter of regional concern. Similarly, maintaining the airways (air traffic control, etc.) may be a national problem, but regional and local interests are greatly concerned with the location and characteristics of airports. Even when an infrastructure activity appears to be obviously local - for example, the provision of sewerage facilities - there may be overriding concerns (e.g. public health) that in principle require higher-level governments to intervene in a regulatory or supervisory fashion.

For these reasons, the only possible answer to the question posed in the title of this section is: it depends. It depends on what infrastructure, on why it is being provided (at whose behest), on how it is being paid for, and, in some instances, on where it is located (where in the watershed or air basin the facility is located, for example).

### **How to make decentralization work**

To the extent local people decide to carry out some activity through an organizational structure that they form or that is under their control, and they bear the full costs of their decision, they should be free, even encouraged, to do so. Of course, there may remain many potential problems even with such small groups e.g. enforcing accountability, preventing shirking, and so on (Box 8). But on the whole it is probably not misleading to say that the more

---

<sup>21</sup> Possible examples might be a national telecommunications satellite or the maintenance of the airways.

decentralized the decision structure in such instances, the better the infrastructure should be from the only point of view that matters - namely, that of the local beneficiaries (and payors).

#### **BOX 8. Enforcing Local Accountability**

If decentralization is to work, those charged with providing local infrastructure and services must be accountable both to those who pay for them and to those who benefit from them. Unfortunately, enforcing accountability at the local level is not always easy. It requires not only clear incentives from above (Box 5) but also the provision of adequate information to local constituents as well as the opportunity for them to exercise some real influence or control over the service delivery system. "Informal" organizations almost by definition must be structured like this or they cannot exist (Box 3). But it can be a challenge in the political and social circumstances of many developing countries to introduce a similar degree of responsiveness into formal governmental organizations.

A recent village-level study of the provision of primary education in India and China emphasizes this problem, concluding that "the effective functioning of these services often depends crucially on combining local information (e.g. on the performance of village teachers) with a control mechanism that makes it possible to deal with observed problems" (Dreze and Saran, 1993, p.70). The information is often available to village residents; what may be missing is any way to use it. In the Indian village studied, popular complaints did not result in change because there was no way for the village to control how the state-provided school functioned. This problem would, of course, be exacerbated if different factions of village residents had different interests. In the Chinese village studied, on the other hand, the Communist Party still had effective control and to the extent its interests coincided with village interests, the latter could be influential. In neither case, however, was there really a dependable basis for ensuring either meaningful local participation or, even less, local control, whether over the operation of the village school or the decision to fix a road rather than expand water and sewerage facilities.

Sometimes such decentralization has been considered an impossible dream in poor countries owing to the lack of experience at local levels and the difficulty of figuring out who the likely beneficiaries of projects are going to be, let alone making them pay for what they get. In fact, however, in many countries it appears that even the poorest people operating informally, within the severely limited conditions open to them, can sometimes manage to provide the local public services that they want and are willing to pay for but that they cannot obtain from the established (and usually much too centralized) provision system (Box 3).<sup>22</sup> Experience thus suggests that at least in some cases the obstacles can be overcome, at least with respect to small-scale activities.<sup>23</sup>

<sup>22</sup> Perhaps the most detailed account of this process at work is de Soto (1989); see also Jenkins (1988) and Ostrom, Schroeder and Wynne (1993).

<sup>23</sup> Of course, small-scale activities may add up to be big ones: Jenkins (1988, p.20), for example, reports that small "informal" suppliers provide 93 percent of urban mass transit facilities in Lima.

What is needed to get the right infrastructure for the right people in these circumstances, whether they are located in remote rural areas or metropolitan slums, is essentially to provide mechanisms by which their wishes can become reality. Three steps seem essential in this regard:

- [1] to ensure that fiscal, financial and political accountability is both transparent and enforced (Box 8);<sup>24</sup>
- [2] to provide a mechanism (e.g. a trusted court system) for resolving any disputes that may arise within the local service unit (or, conceivably, when there are boundary problems, between units);<sup>25</sup> and
- [3] to provide adequate technical support (e.g. access to engineering and project design and administration skills) to enable small units to carry out projects efficiently.<sup>26</sup>

None of these tasks is easy, and, as already suggested, they become even more difficult when there are significant benefit or cost spillovers or when the redistributive aspects of infrastructural investment are important. Again, however, the principles of good system design are relatively obvious, and more or less identical to those in the "small" local infrastructure case just discussed. Basically, the idea is that while local residents should again finance - through user charges (Box 9) or locally-borne taxes - the costs of designing, building, operating, and maintaining facilities to the extent that they receive the benefits, regional or national governments (as the case may be) should assume the balance of the cost - that is, "their share" of the benefits spilling over. Locally, taxes, like transfers from the central government, are often earmarked for investment. As Box 10 notes, however, this common practice is usually not a good idea.

<sup>24</sup> For a more extensive discussion of accountability in general, see Paul (1991) and on fiscal accountability, see Bird (1993). See also the interesting discussion of the need to develop formal evaluation as a means of accountability in Wiesner (1993). Although Wiesner (1993) appears in part to see evaluation as an alternative to decentralization as a way of improving public sector efficiency, I would see it more as a necessary complement (Box 14). Effective decentralization depends upon improved accountability, and formal reporting and evaluation systems constitute essential components of any workable accountability system - whether to users, to local taxpayers, or to the central government, depending upon the source of financing. In Wiesner's words (1993, p.16) "the nature and source of financing is the crucial determinant of efficiency" but, as he also emphasizes (p.18), a system of independent and well-publicized assessment is required not just for accountability but also, often more importantly, to help establish a "public" to whom to be accountable.

<sup>25</sup> All too often, a well-founded lack of trust in formal political (and judicial) institutions is one reason why community "self-help" organization have developed to provide local public services, including infrastructure: for examples, see de Soto (1989) and Jenkins (1988).

<sup>26</sup> Note that there is of course no presumption that small local agencies will themselves actually e.g. design water systems; the point is rather that they must have access to specialized and knowledgeable private (or public) agencies that can do so for them (Box 4). In this connection, it is of course especially important to keep the process as open and accountable as possible (see Wiesner (1993) and sources cited there).

### **BOX 9. User-Financed Infrastructure**

An attractive and feasible way to finance local infrastructure in some instances is through some variant of benefit taxation. In Latin America, for example, street improvements, water supply, and other local public services have been financed by a system of taxation known as "valorization," in which the cost of the public works is allocated to affected properties in proportion to the benefits estimated to be conferred by the work in question. The valorization system has had varying success in different circumstances. Studies in Colombia, where it has been most used, suggest that critical to its success are careful planning and execution of projects, participation of beneficiaries in both planning and managing projects, an effective collection system, and, in many instances, significant initial financing of the valorization fund from general government revenues (so that works can be begun in a timely fashion, without requiring prospective beneficiaries to put up all the funds in advance). Somewhat similar lessons have emerged from experience with an alternative approach called "land readjustment" in Korea, in which large land parcels are consolidated and developed by the local government and then part of the property is returned to the original owners in proportion to their ownership, while the balance is sold by the government at market prices in order to recoup development costs. Again, careful planning and fairly sophisticated management are required for success.

These experiences demonstrate that local governments can in some circumstances develop urban infrastructure in effect by playing the role of a developer. Recently, another way in which beneficiaries may finance local infrastructure has been developed extensively in North America through the use of so-called "exactions", "lot levies", "development charges", and similar systems, under which governments impose levies on would-be property developers in proportion to the estimated costs the development will impose on the urban infrastructure. For example, if 100 new residences are to be erected, and the average cost of adding them to the urban water and sewerage system is \$100, the development charge - to be paid up front before the project is authorized - would be \$100 (or possibly some discounted equivalent). While such schemes are far from perfect, they have been increasingly used by financially-pressed urban governments to accommodate population expansion without deteriorating service levels.

Of course, all formal systems of "user-pay" infrastructure development can operate successfully only in the formal sector. To the extent development takes place primarily in the informal sector - squatter settlements and the like - less formal systems must be used if there is to be any beneficiary-related finance (Box 3).

Source: World Bank (1988); Slack and Bird (1991).

---

Such cost-splitting may be achieved in various ways - through appropriately designed service charges to non-resident beneficiaries, individually or collectively, through matching grants (Box 11), through borrowing, possibly at subsidized rates (Box 12), or through direct higher-level assumption of certain costs.<sup>27</sup> A common example is for the central government to make the initial investment and to require the local government to fund subsequent running costs. Experience suggests, however, that this common split is dangerous since in the absence

---

<sup>27</sup> The less salient distributional concerns, the more reliance should be put on benefit as opposed to "ability"-based financing at the national and regional levels also, but this is a secondary issue in the present context.

**BOX 10. Earmarking: Good or Bad?**

One of the most pervasive features of local government finance in developing countries is the prevalence of earmarking. In Gujarat state in India, for example, a portion of the state entertainment tax is earmarked for urban local governments, and some of this portion is in turn earmarked for investment in capital projects that are co-financed by the municipalities. In many Latin American countries, the earmarking of substantial parts of intergovernmental transfers to localities to local infrastructure investment has characterized much of the recent decentralization: this feature is found in Argentina (for housing), in Brazil, in Colombia, in Chile, in Ecuador, in Guatemala, and in Venezuela, for example. Presumably motivated by the desire to prevent local governments from "wasting" transfers on expanding local payrolls, such earmarking has had the paradoxical effect of exacerbating local fiscal problems in some instances. Although not fully effective - there is usually some substitution of transfers for own-source revenues - the result has usually been to expand capital spending to some extent, while making the already difficult problem of funding operating and maintenance expenditures even more difficult.

These and many other examples of earmarking found throughout the world have relatively little to be said in their favor: they distort local preferences, exacerbate perverse incentives already found in the local finance system (Box 5), and often connect revenue sources with expenditures in totally illogical ways. For these and other reasons, earmarking has often had a very bad press, and in many instances deservedly so.

Yet there is also "good" earmarking. When there is a strong benefit link between the payment of an earmarked tax or fee and the use of the tax to finance additional expenditures, not only is the source of financing eminently sensible in equity and political terms, but it may also serve the important efficiency purpose of signalling local preferences. Well-designed earmarked benefit taxes are in effect surrogate marginal cost prices. Like such prices, when set appropriately they provide needed guidance to both efficient utilization and optimal investment decisions. Of course, in the conditions of many developing countries, this is a counsel of perfection. Nonetheless, the interdependence of pricing and investment decisions, and the potentially important role of earmarking in linking revenues and expenditures deserves careful consideration when it comes to financing local infrastructure (Box 13).

**Source:** Rao (1991); Campbell (1991).

of involvement with the investment decision local governments are all too likely to be apathetic with respect to operation and maintenance (Box 13). Why should they fund the maintenance of something that all too often they did not want in the first place? - especially since, all too often, they can count on the central government to come to the rescue again if things get bad enough. As usual, what is needed is to face all relevant decision-makers with a sufficiently "hard" budget constraint. Provided accountability is again transparent (and there is an accepted dispute resolution mechanism), if the prices facing decision-makers at all levels from the individual to the national government are "right" in this sense, the results should be as good as can be achieved.

#### **BOX 11. The Virtues and Pitfalls of Matching Grants**

There is a strong theoretical argument for the use of a matching grant, in which the central government pays part of the cost of an expenditure carried out by a local government, in cases in which some of the benefits from the local activity in question spill over to other localities. The share paid by the central government - the matching rate - should be related to the size of the spillover and may perhaps also depend in part upon the financial position of the local government - i.e., by altering the matching rate in accordance with local capacities one can, in principle, stimulate similar responses in different localities. Properly-designed matching grants also have the political advantage of introducing an element of local involvement, commitment, accountability, and responsibility for the aided activities. Unfortunately, while the theory of matching grants is clear, in practice the precise matching rate appropriate for particular expenditure programs is difficult to determine and hence invariably arbitrary. Although it is difficult to make this assessment, on balance it seems likely that in many cases the central government's share is set unnecessarily high.

One reason for this conclusion is because even when there are interjurisdictional spillovers, they may largely be inframarginal and of course the appropriate subsidy (matching) rate is that which applies at the margin. Another reason is that in many instances redistributive concerns, not efficiency concerns, determine matching rates: poor localities get more assistance because they are poor, not because (as suggested above) a higher matching rate is required to induce them to produce the socially optimal amount of the service in question. Intergovernmental transfers may have a role to play in distributional policy, but it is important not to confuse their distributional and allocative tasks.

Matching grants should thus be used primarily for activities in which there is a clear and significant interjurisdictional externality at the marginal level of service provision. Where such externalities affect only a few localities, a more efficient approach might be direct agreements or arrangements among the affected local governments (Box 15).

It is of course much easier to state such dicta in general terms than to prescribe precisely what should be done in any particular case to achieve efficient and equitable resource allocation, let alone to work out what is likely to be administratively and politically feasible in the circumstances of a particular investment in a particular country. In federal countries, for instance, the scope for creative institutional design may be much more restricted with respect to federal-state interaction than at the state-local level, particularly when states represent real difference in values and experiences (e.g. there are linguistic differences). Even with respect to the "simple" case of purely local infrastructure, the possibility of building on indigenous informal organizations to provide local infrastructure in an efficient and equitable fashion may be much greater in a traditional rural community than in a dynamically changing metropolitan area.<sup>28</sup>

---

<sup>28</sup> It is perhaps not entirely due to the terms of reference of the research project on which it is based that the stimulating book by Ostrom, Schroeder, and Wynne (1993) deals solely with rural areas.

---

**BOX 12. Local Borrowing**

When the benefits from infrastructure projects are enjoyed over a period of time, it may be both fair and efficient to finance such projects in part or whole by borrowing. In any case, borrowing may often be the only practical way to finance large capital projects without large and undesirable fluctuations in local tax rates from year to year.

In most developing countries, however, local government access to capital markets is limited in practice both because capital markets themselves are little developed and because central governments are seldom keen to allow any but very restricted access by local governments. When local borrowing is permitted, it almost invariably requires central approval and is heavily restricted. As a rule, local capital finance through borrowing takes place only from government-sponsored and financed agencies such as municipal development funds. Unfortunately, the record of such agencies in most countries is poor, with many loans not being repaid and local governments having few incentives to repay.

Some transitional countries in eastern and central Europe appear to have given their newly-created local governments virtually unlimited authority to borrow from commercial banks or other sources. This is likely to prove a mistake. Unrestrained local access to credit in a situation in which financial markets are not well-regulated and local governments are desperate to expand local economic activity may result in disaster. A better alternative, despite the problems mentioned in the preceding paragraph, might be to develop more appropriate modalities for local government capital financing and borrowing, in the first instance through centrally-controlled sources. Such borrowing, however, should be on commercial terms: operating redistributive policy through loan finance is even less appropriate than through matching grants (Box 11).

Source: Bird and Wallich (1992).

---

### **Guidelines for Policy Design**

The essential framework for policy design with respect to the decentralized provision of infrastructure thus basically amounts to little more than the familiar economic dictum "Get the Prices Right." In terms perhaps more familiar in the public sector, this may be translated as "Impose a Hard Budget Constraint", i.e. face all decision-makers at the margin with the responsibility of raising the funds and facing their constituents with the full (incremental) cost of the decision. The present section sets out in a little more detail some suggestions as to how the institutional framework of the public sector may be structured to help achieve this aim.

#### **The basic principles**

To begin with, it is clear that one size will not fit all, that is, that precisely what can and should be done in any particular case depends upon a myriad of local factors (Box 7) and cannot be prescribed from afar. Nonetheless, the basic principles to be followed in all cases are the same and may be summarized as follows:

### **BOX 13. The Recurrent Cost Problem**

The developing world is clearly short of capital. But too often the capital projects that do exist are inadequately maintained. One reason for the widespread failure adequately to provide for the operation and maintenance of infrastructure is the assumption that local governments, even when - as is usually the case - not involved in the selection or execution of projects, can and will look after the subsequent costs required to keep the infrastructure operating and in good condition. Experience suggests that very often this assumption has been mistaken: not only may they not have the financial resources or technical capacity to undertake this task, but the incentives facing them do not encourage them to do so. Indeed, they are often perverse in the sense that the less a local government does to maintain its infrastructure the more likely it is to be rescued from above.

All is not despair, however. There are at least a few instances in which ingenious solutions have been found to the problem of financing the recurrent costs required to keep infrastructure in operation. A study of rural road maintenance in Indonesia, for example, found several promising paths to solution. In one instance, a private firm was willing to maintain a road it needed to get its product to the main highway. In another, a well-defined group of farmers who clearly benefited from road improvements were similarly willing to carry out routine maintenance tasks. In yet another, an appropriate solution appeared to lie in the imposition of explicit road user charges since most road users (like the firm mentioned above) were willing and able to pay for the improved service.

These examples are all of well-defined projects with clear beneficiary groups who have no good alternative. While of course not all infrastructure fits this description, many small projects do - and even some larger projects have sufficiently clear beneficiaries to make some variant of user charge financing the preferred alternative. Indeed, it is critical in initial project planning to factor in appropriate cost-recovery assumptions from the beginning - and to carry them out in practice - if the expected benefits of the project are to be realized. The usual distributional objections to user charge financing seem particularly irrelevant when the underfinancing of recurrent costs means that any redistributive objective is not being achieved in any case.

**Source:** "Financing" (1991).

- [1] Ensure to the extent possible that who benefits, pays;
- [2] Do so in part by making the lines of accountability (the rules, or incentives) as transparent as possible; and
- [3] Provide some enforcement mechanism to ensure that the system works as it should (Box 14).

Although precisely how these principles may be best satisfied depends, of course, upon the nature of the investment, the structure of government, and many other local factors, the following brief comments may make their application clearer.

#### **BOX 14. Evaluation and Accountability**

Accountability is the key to improved public sector performance, and information is the key to accountability. The systematic collection, analysis, and reporting of information that can be used to verify compliance with goals and to assist future decisions is thus a critical element in any decentralization program. Such information is essential both to informed public participation through the political process and to the monitoring of local activity by central agencies responsible for supervising and (usually) partially financing such activity. Unless local "publics" are made aware of what is done, how well it is done, how much it cost, and who paid for it, no local constituency for effective government can be created (Box 8). Unless central agencies monitor and evaluate local performance, there can be no assurance that functions of national importance are adequately performed once they have been decentralized.

An important accompaniment of any decentralization program is thus an improvement in national evaluation capacity. Decentralization and evaluation (e.g. cost-benefit analysis) are not substitutes; they are complements. An essential element of the "hard budget constraint" system needed to induce efficient local decisions is thus adequate central enforcement capacity in the shape of credible information-gathering and evaluation. The "carrot" of central financial support of local efforts must be accompanied by the "stick" of withdrawn support if performance is inadequate, which of course requires both some standard of adequacy and some way of knowing how performance measures up.

Two possible mechanisms for building such evaluative capacity into a decentralization program may be suggested. One is to build in "sunset" provisions into the program, i.e. to provide that (say) the newly prominent role given to local institutions in the water supply area will be subject to renewal in a number of years, provided they pass some kind of independent evaluation of their performance. Another is to use the likely need for some centrally-supported access to capital markets (Box 12) not only as a screening device to reject obviously flawed projects but also an evaluation system to build up "ratings" of local capacity.

#### **Purely local projects**

So far as purely local infrastructure projects are concerned, they should clearly be financed to the extent possible on benefit lines, that is, by appropriately-designed user charges where suitable and otherwise by local taxes, where "local taxes" are understood to be those borne by local residents (the presumed beneficiary group).<sup>29</sup> Provided there is a responsible and accountable local political structure (Box 8), the results in terms of both the efficiency and equity aspects of infrastructural decisions should be as economically and politically good as can be hoped for. Only those projects will be built that people are willing to pay for, and when they are built they will be adequately maintained so long as people are willing to pay for it;

---

<sup>29</sup> For further discussion of the choice of local taxes, and of various varieties of user charges, see Bird (1993, pp. 212-14). Such recommendations are of course not uncommon in the literature: but what should perhaps be emphasized is how very seldom they have been followed in practice.

moreover, if the correct prices are charged, the projects will be efficiently maintained and utilized.<sup>30</sup>

Of course, this simple picture conceals many potential problems. One concerns the distributional aspect of infrastructure. Locally-desired demands for distribution may readily be accommodated through the siting of projects, their design, precisely how they are financed, etc. - but only to the extent such demands are effectively articulated through the local political structure. If that structure is captured by the better-off, as may often be the case in practice, and if there is a national concern (articulated through the presumably more heterogeneous national political structure) for a more redistributive delivery and/or financing system, the national government may attempt to satisfy that concern in a number of ways - e.g. by restricting the extent to which projects can be financed through user charges or by mandating certain service delivery patterns. Unless the national government pays for any "excess" costs its requirements place on local power-holders, however, the result of such interference will be to reduce the efficiency with which the noncentralized public sector decides on and delivers infrastructural services.

Another concern is how to ensure the transparency and accountability of local political bodies. Local authorities should not, for example, be able to "export" any of the costs of their decisions to persons to whom they are not politically accountable. Their access to taxes on businesses that trade outside their jurisdiction should therefore be restricted whenever possible.<sup>31</sup> Political and administrative mechanisms for public accountability - e.g. making the books open or setting up watchdog agencies of various sorts - need to be in place (see Box 14). Whenever possible, infrastructure projects should proceed only when there is a clear decision by a politically responsible body as to exactly how their construction and maintenance are to be financed. Where the projects are big enough, this requirement may call, for example, for a special voting or other approval procedure.

Finally, anyone contemplating letting small (or even large) subnational agencies make their own investment decisions in the circumstances of most developing countries must also be prepared to invest substantial resources in "backstopping" such agencies by giving them adequate access to e.g. technical skill in designing, financing, and managing the construction and operation of infrastructure (Box 4). There is no need for such aid to be provided by a specific central or regional agency, of course: local bodies can and should be encouraged to contract such assistance privately, to hire it from other, more experienced public sector agencies, or, if it is appropriate, to contract with a central or regional agency experienced in the particular field (Box 7). But they should be required to prepare projects in a professional manner, to report on

<sup>30</sup> For examples of the links stressed in the text, see Brent (1993) and Box 13.

<sup>31</sup> This common recommendation, like most suggestions for increased transparency, is more honoured in the breach than the observance: all the incentives for politicians, both local and national, are to conceal what is going on. Too often, obscurity, not transparency, is the key to political success.

their execution and operation in a transparent fashion (Box 14), and to bear the consequences (political and economic) of any mistakes they make in these respects.

It may of course be easier to enforce some of these requirements when some of the financing comes directly from a superior level of government - see below - but in general what seems required for success in this approach to decentralizing local physical infrastructure is to create four pieces of institutional infrastructure:

- [1] A local finance law that provides access to local (not non-local) revenues in sufficient quantity and that also requires regular and uniform financial reporting both to the local citizens and to independent auditing and evaluation authorities (Box 14);
- [2] A political structure that provides for adequate local financial and political accountability;
- [3] Adequate institutional infrastructure to support and develop the capacity of localities to operate in the environment sketched above.
- [4] Acceptance at the national (and international financial institution) level that what local governments (or other local actors) choose to do with their own funds is their own lookout: there should be no "Father" who either knows best or rescues Junior from the consequences of his (or her) own mistakes.

While it is unlikely that any country in the world today fully satisfies these conditions, if the general line of argument made here is accepted, it is these matters - building institutional capacity to support and operate responsive and responsible local governments, establishing adequate "rules of the game" for local finances, and ensuring that the desired degrees of local participation in local political institutions and of the political responsibility of those institutions are achieved - that require attention if political, administrative, and fiscal decentralization is to produce better and more sustainable decisions with respect to infrastructure.

### "Super-local" projects

Even if all of the above conditions are satisfied, when the benefits of infrastructural investment spill over local boundaries, decentralized decision-making can produce the "right" results in the absence of intervention from above only in very special circumstances. If, for example, only two or three contiguous jurisdictions are involved, particularly if there is some reciprocity of benefit or cost flows, voluntary agreements may approximate to the efficient result (Box 15).<sup>32</sup> When more jurisdictions, or less clearcut reciprocal gains, are involved,

---

<sup>32</sup> As Box 15 suggests, voluntary agreements may also be used to subdivide local governments into relevant benefit areas.

however, the costs of reaching an acceptable agreement may often outweigh the benefits from doing so. The traditional solution to this problem is to call in a "higher" level of government. But how can one obtain the benefits of doing so (i.e., taking externalities into account) without incurring the costs (i.e., imposing undesired uninformities)? The answer is, broadly, that an optimal result may, at least in principle, be achieved by designing an appropriate system of national (or regional) matching grants (Box 11) and, within this framework, allowing the non-central authorities to make the decisions.<sup>33</sup>

---

#### **BOX 15. Local Government "Clubs"**

Countries establish local governments in the way they do for many reasons - political, historical, geographic, and so on. The boundaries of the local governments thus created seldom coincide neatly with the benefit areas of the activities of local governments. One way to deal with interlocality benefit spillovers is through the use of matching grants (Box 11). Another is through the creation of "clubs" or associations of affected municipalities. Such associations may be voluntary or they may be orchestrated and induced by special financial assistance from higher levels of government. (Such assistance may be warranted, for example, to achieve economies of scale.) Two-tier local governments exist in many countries, with the higher tier being responsible for such services in whole or in part. But even when such formal levels do not exist, lower level localities should often be encouraged to work together when they have shared interests.

In addition to such "super-local clubs" there is also often an important role to be played by "sub-local clubs" such as community associations (Box 3). When local residents have a common interest in the provision of a particular service that is different from the interests of members of the wider community, they should, as a rule, be encouraged and facilitated in working out a solution to their common problem. The economic advantages of such community solutions are often obvious, as is the general desirability of the increased local participation in the political process that results. Of course, the interests of the formal local government structure in building up potential rivals is often rather muted. Nonetheless, whether local public services are provided by nonprofit community associations or by private development (as is increasingly the case in the US, for example, where some 150,000 "residential community associations" now operate), the need for such "sublocal" activities seems obvious both in isolated rural areas and in heterogeneous metropolitan areas - although their potential for politically fragmentation in the latter carries with it obvious risks for the development of adequate municipality-wide services.

Source: Dilger (1993).

---

Once again, the first requirement for successfully carrying out jurisdiction-specific investments with extrajurisdictional spillovers is to ensure that to the extent local benefits are reaped, local beneficiaries pay for them, whether through user charges or current or future local

---

<sup>33</sup> Of course, if the central government really wants something done (even something with purely local effects) it may either do it itself or, if it makes sense to delegate operational responsibility, it may pay the entire cost either directly or through a cost-reimbursement grant.

taxes. Applying the same principle to those benefits that spill over, wherever possible users (individuals or communities as the case may be) should pay for what they get, barring some overriding distributional reason - to be covered from general national revenues - as to why they should be relieved of this burden. Where this is not possible, or it would not be efficient to do so - for example, because of problems in identifying and collecting from beneficiaries - the "nonlocal" portion of the project could be financed by matching grants.

To be effective "incentive-revealing mechanisms" such grants (loans) should be designed and administered in accordance with the following principles:

- [1] Recipients should be required to prepare adequate plans with respect to (a) the design of the project; (b) its subsequent operation and maintenance; and (c) its financing (including, where appropriate, pricing policy).
- [2] Assuming that the qualified projects eligible exceed the available financing, priorities should be assigned in accordance with the assessment by the financing authority (which is of course responsible to its own taxpayers for the use made of their money) of the need for the project and of the capacity of the recipient to execute and finance it.<sup>34</sup>
- [3] Information asymmetry works both ways: the central government does not know what to do, the local government does not know how to do it. The granting authority (or other appropriate agency) should stand ready to provide such technical assistance as may be needed in developing investment plans, arranging financing plans, managing construction, and maintaining the facility once constructed. It may also assist localities in assessing their future infrastructure needs e.g. by helping survey the condition of existing infrastructure.
- [4] In the absence of shared goals, the granting authority should also monitor and evaluate the progress of projects, requiring progress reports, perhaps making field inspections, and conducting periodic evaluations of outcomes in order to improve its procedures, assist applicants, and better assess their capacity to carry out their promises and the extent to which they are carried out (Box 14). A credible enforcement mechanism is needed to ensure that the contract explicit (or implicit) in a matching grant is carried out.

The similarity of some of these requirements to the sort of institutional support noted earlier to be essential for successful decentralization of purely local infrastructure investment decisions is,

---

<sup>34</sup> Both need and capacity should be taken into account: for further discussion of the design of matching (and other) transfers: see Bird and Wallich (1992).

of course, not a coincidence.<sup>35</sup> The costs of monitoring intergovernmental transactions is not small and must be explicitly taken into account in designing and implementing decentralization policies.

The principles just stated apply to all intergovernmental financial assistance for specific investment projects. What they do not and cannot indicate is just how much assistance should be provided to whom for what. To make such principles operational in any particular country, a good deal of work would have to be done e.g. to identify as best as possible the proportion of the cost of particular projects that should be borne by other than local residents. In addition, since both the willingness (price-elasticity) and the ability (income-elasticity) of different communities to contribute the locally-financed proportion will vary with the nature of the project and the wealth and interests of the community, an "equalization" component may be needed even in a strictly project-oriented matching grant program, thus further complicating the design of such programs.<sup>36</sup>

### Conclusion

It is difficult to draw very sharp conclusions from the rather diffuse exposition of principles and examples relating infrastructure and decentralization that has been presented in this paper. On the whole, however, the moral of the story this paper tries to tell may perhaps be summed up in a few short propositions, as follows:

- [1] In all countries, some critical infrastructure is provided through a decentralized political structure. Moreover, current trends in many countries make it likely that this will be even more true in the future. It is therefore important to understand the relation between infrastructure and decentralization.
- [2] The first thing to be understood about this relation is that decentralization, however defined, in and of itself has no necessary implications for good or evil so far as infrastructure is concerned: its effects depend upon the incentives facing the various decision-makers in the decentralized structure.

<sup>35</sup> At this point - or sooner - some might say: if all this effort will be needed to make decentralization work, why bother? Why not simply create a single national agency to, say, provide water or power, staff it with competent technicians, allow it to set its prices properly (providing from budgetary revenues any socially-required shortfall), and let it do the job? Not only will the danger of political interference and technical and financial mismanagement be reduced by this approach, but it is obviously much easier for an agency like the World Bank to deal with a single professional institution than with 100s or 1000s of less-qualified local agencies. This line of thought is tempting - but it is also of course precisely the slippery path of overcentralized, unresponsive decision-making from which so many countries are trying, however imperfectly, to redeem themselves by various forms of decentralization. For a detailed evaluation and critique of the "professional" approach to infrastructure provision and the ensuing ills of "functional fragmentation," see Bird (1980), pp. 28-32.

<sup>36</sup> See Feldstein (1975) and Bird and Wallich (1992).

- [3] The key to ensuring that these incentives are conducive to "good" decisions with respect to the design, siting, timing, finance, pricing, operation, maintenance, and utilization of infrastructure is to ensure that to the greatest extent possible those who make the decisions bear the financial (and political) consequences.
- [4] Politically, what this means is that political leaders at all levels should be responsive and responsible to their constituents, and that those constituents are fully informed about the consequences of their (and their leaders') decisions. Making politicians bear the consequences of their own mistakes is as close as one can get to a "hard" political budget constraint.<sup>37</sup>
- [5] Economically, what is required is to make it difficult for local residents to shift costs to nonresidents who do not receive benefits and to make local decision-makers fully responsible to their citizens for the use they make of revenues collected from them (through local taxes), to users of infrastructure, local or otherwise for the use made of the revenues they contribute (through user charges of various sorts), and to taxpayers in general for the use made of any transfers (or subsidized loans) they receive.
- [6] Administratively, what such a system requires is a clear set of "framework" laws (on local budgeting, financial reporting, taxation, contracting, dispute settlement, rules to be followed in designing user charges, etc.), as well as adequate institutional support for localities to operate in this environment.

It is of course much easier to lay down such general prescriptions than to satisfy them in the very diverse situations found in the real world. Nonetheless, to the extent that these conditions are not met, the perverse incentives that too often already exist owing to the structure and finance of the public sector in many countries seem all too likely to be exacerbated by the current tendency to decentralize more and more decisions in the public sector. Decentralization - or, perhaps better, the realization that the optimal decision-making structure in the public sector is almost certainly polycentric (non-centralized) in nature - may in principle yield a more efficient and equitable pattern of infrastructure investment and use than the overcentralized and unresponsive public sector found in many developing countries. But it will do so in practice only if it is properly implemented, along the lines sketched here.

---

<sup>37</sup> For further discussion, see Israel (1987) and Wiesner (1993).

## References

- Aschauer, David (1989) "Is Public Expenditure Productive?" Journal of Monetary Economics, 23: 177-200.
- Bird, Richard M. (1980) Central-Local Fiscal Relations and the Provision of Urban Public Services (Canberra: Centre for Research on Federal Financial Relations Australian National University).
- Bird, Richard M. (1984) Intergovernment Fiscal Relations in Colombia (Cambridge, Mass.: Harvard Law School International Tax Program).
- Bird, Richard M. (1993) "Threading the Fiscal Labyrinth: Some Issues in Fiscal Decentralization," National Tax Journal, 46: 207-27.
- Bird, Richard M. (1993a) "A Comparative Perspective on Federal Finance," Paper prepared for Conference on The Future of Fiscal Federalism, Queen's University, Kingston, Canada, November.
- Bird, Richard M. and Susan Horton, eds. (1989) Government Policy and the Poor in Developing Countries (Toronto: University of Toronto Press).
- Bird, Richard M. and Enid Slack (1993) Urban Public Finance in Canada (2nd ed.; Toronto: John Wiley).
- Bird, Richard M. and Christine Wallich (1992) "Financing Local Government in Hungary," WPS 869, World Bank, March.
- Bird, Richard M. and Christine Wallich (1993) "Fiscal Decentralization and Intergovernmental Relations in Transition Economies: Toward a Systemic Framework of Analysis," WPS 1122, World Bank, March.
- Brent, Robert J. (1993) "Cost-Benefit Analysis, User Prices and State Expenditures in India," WP No. 5, National Institute of Public Finance and Policy, New Delhi, May.
- Breton, Albert (1989) "The Growth of Competitive Governments," Canadian Journal of Economics, 22: 717-50.
- Campbell, Tim, George Peterson, and Jose Brakarz (1991) Decentralization to Local Government in LAC: National Strategies and Local Response in Planning, Spending, and Management, Regional Studies Program Report No. 5, Latin America and the Caribbean Technical Department, World Bank.

de Soto, Hernando (1989) The Other Path: The Invisible Revolution in the Third World (New York: Harper and Row).

Dilger, Robert Jay (1993) "Residential Community Associations: Their Impact on Local Government Finance and Politics," Government Finance Review, 9: 7-10.

Dreze, Jean and Mrinalini Saran (1993) "Primary Education and Economic Development in China and India: Overview and Two Case Studies," No. 47, Development Economics Research Programme, London School of Economics, September.

Feldstein, Martin (1975) "Wealth Neutrality and Local Choice in Public Education," American Economic Review, 65: 75-89.

"Financing Rural Road Maintenance in Indonesia" (1991) Revenews (Metropolitan Studies Program, Syracuse University), Summer.

Israel, Arturo (1987) Institutional Development: Incentives to Performance (Baltimore: Johns Hopkins University Press).

Jenkins, Jerry, ed. (1988) Beyond the Informal Sector: Including the Excluded in Developing Countries (San Francisco: ICS Press).

Kitchen, Harry (1993) "Efficient Delivery of Local Government Services," Discussion Paper 93-15, School of Policy Studies, Queen's University, Kingston.

Ostrom, Elinor, Larry Schroeder, and Susan Wynne (1993) Institutional Incentives and Sustainable Development: Infrastructure Policies in Perspective (Boulder: Westview Press).

Paul, Samuel (1991) Strengthening Public Service Accountability, World Bank Discussion Paper 136.

Rao, M. Govinda (1991) "State Government Transfers to Urban Local Bodies," National Institute of Public Finance and Policy, New Delhi.

Rao, M. Govinda and A. Das-Gupta (1993) "Intergovernmental Transfers as an Instrument to Alleviate Poverty," Economic Development Institute, World Bank.

Slack, Enid and Richard M. Bird (1991) "Financing Urban Growth through Development Charges," Canadian Tax Journal, 39: 1288-1304.

Stackhouse, John (1993a) "Underground Movement No Longer a Pipe Dream," The Globe and Mail (Toronto), September 29.

Stackhouse, John (1993b) "An Environment for Controversy," The Globe and Mail (Toronto), September 29.

United Nations Economic and Social Commission for Asia and the Pacific (1991) Fiscal Decentralization and the Mobilization and Use of National Resources for Development: Issues, Experience and Policies in the ESCAP Region (Bangkok).

Webber, Melvin et al. (1991) "World Bank Urban Projects in Madras: A Review," INURD Technical Paper, April.

Wiesner D., Eduardo (1993) From Macroeconomic Correction to Public Sector Reform: The Critical Role of Evaluation, World Bank Discussion Paper 214.

World Bank (1988) World Development Report 1988 (Published for the World Bank by Oxford University Press).

World Bank (1989) "Colombia: Decentralizing Revenues and the Provision of Services - a Review of Recent Experience," Report No. 7870-CO, October.

World Bank (1993) "The Impact of Infrastructure on Economic Development," LA4IE, May.

World Bank (1993a) "Municipal Development Sector Review", Draft paper.

## Chapter 3

### **Regulating Infrastructure: Perspectives on Decentralization**

*Warrick Smith and Ben Shin*

The last decade has seen a fundamental shift in the role of government in the provision of infrastructure. Governments around the world are retreating from the role of owner and operator of infrastructure services and placing greater emphasis on their new role as regulator of services provided by private firms. This shift has led to greater interest in the quest for improved regulation of infrastructure industries, including the use of independent regulatory agencies. While early attention focused on regulatory issues at the national level of government, the privatization wave is increasingly engulfing sub-national levels of government, including states or provinces in federal systems, administrative departments or regions in unitary systems, and municipalities in both.

#### **Regulating Infrastructure: Key Tasks and Challenges**

Regulation affects most aspects of life in modern economies and has many economic, social, and political objectives. This chapter focuses on regulating infrastructure - predominantly power, gas, water, telecommunications, and transport - where regulation seeks to avoid the potential inefficiency and other ills arising from the natural monopoly characteristics of many of these industries.<sup>38</sup> The central - and most controversial - regulatory task is controlling prices or profits in monopolistic markets. Other important regulatory tasks are defining and enforcing compliance with concessions or similar arrangements, including adherence to service quality, investment levels, and technical standards. Environmental and antitrust regulations affecting these industries may also require definition and enforcement.

Designing and implementing regulatory arrangements for these sectors pose a number of challenges for policymakers.<sup>39</sup> On the one hand, regulated firms have incentives to manipulate the regulatory process to increase their profits and are assisted in doing so by the inevitable information asymmetry between firms and regulators. On the other hand, setting prices for most infrastructure services has political dimension, and governments face strong political pressure to use regulation to keep prices below the long-run costs of supply. Potential investors in infrastructure activities are aware of this risk and of the vulnerability of their usually large and highly-specific investments once they have been made. A government's ability to

---

<sup>38</sup> An activity can be characterized as naturally monopolistic if a single supplier can meet all market demand at least cost. It is not recognized that many infrastructure activities, including power generation, gas production, and cellular and long-distance telephony, do not exhibit this feature, and a growing number of countries are introducing competition in these activities.

<sup>39</sup> See Smith & Klein, (1994).

credibly commit to regulatory policies will provide investors with assurance of a fair return on their investment. This condition is necessary for attracting initial investment (at a reasonable cost) and encouraging the efficient operation of that investment once it has been made.

In order to commit to their regulatory undertakings, governments establish a regulatory framework that limits discretion over regulatory rules and authorizes an agency with requisite expertise and independence. An exercise that limited discretion maintaining independence in this context includes preventing the regulatory decisionmaking process from being "captured"<sup>40</sup> by short-term political interests, the regulated industry, or other special interest groups.<sup>40</sup>

The most appropriate means of implementing this strategy will vary from jurisdiction to jurisdiction. In jurisdictions with stable political and legal institutions and an established reputation for treating private firms fairly, perceptions of lower regulatory risk may reduce investors' demands for safeguards against the misuse of regulatory discretion. More flexible rules will, in turn, allow regulators to pursue efficiency goals and adapt regulation to changing economic and technological conditions more easily.

In other jurisdictions with less conducive conditions - which include the overwhelming majority of developing and reforming countries - the tradeoffs can be stark; investors respond to increased risks by insisting on greater safeguards or demanding higher returns on capital. The less comfort safeguards provide, the higher is the risk premium required to attract investment. Another tradeoff also arises: the lower is the confidence in the regulator's independence, the greater is the emphasis on specific, rigid rules and hence the constraints on using regulation to pursue efficiency goals.

### **Assigning Regulators Responsibilities**

The basic challenges and tradeoffs involved in infrastructure regulation are inescapable, regardless of whether regulation is a national, regional, or municipal responsibility. But, several variables will influence the appropriateness of different allocations of responsibilities.

#### **Arguments for decentralizing regulatory responsibility**

Four main arguments can be made for assigning regulatory responsibility for infrastructure to lower tiers of government:

- It enables regulatory objectives and approaches to be shaped by local conditions and preferences.
- It can help to ameliorate the information asymmetry between regulators and firms by bringing the regulatory authority closer to affected firms.

---

<sup>40</sup> For a useful discussion of the theory of regulatory capture and its implications for the design of regulatory policies, see Neven, Nuttall and Seabright, (1993).

- It can improve the responsiveness and accountability of the regulator by bringing the regulatory authority closer to users.
- It can foster experimentation with innovative approaches to regulatory problems.

The last argument is sometimes characterized as a benefit of "regulatory competition." According to this view, governments compete against each other to attract mobile factors of production - including workers and private investment in infrastructure - through their regulatory regimes. This competition creates incentives for governments to improve the quality of their regulation and to emulate the approaches of successful governments.<sup>41</sup>

### **Possible weaknesses in decentralized approaches**

Arguments of the kind outlined above are often considered sufficient to support a strong presumption in favor of decentralizing regulatory responsibilities. Depending on the industry, jurisdictional subunits, and regulatory issue in question, however, decentralized approaches may have weaknesses.

*Spillover Effects.* Decentralized regulators have weak incentives to take account of spillover effects on other jurisdictions. This spillover may result in insufficient production of a good or service that generates positive externalities or excessive production of a good or service that generates negative externalities. A classic example of the second is inadequate environmental regulation of water systems that affect downstream users.

In principle, affected jurisdictions can negotiate coordinated responses to these problems without transferring regulatory responsibility to a higher tier of government; some countries have established special mechanisms to facilitate approaches of this kind. In practice, however, such negotiations tend to be laborious, and incentives to comply with the resultant agreement may be weak.<sup>42</sup> In these circumstances some centralization of regulatory authority may be desirable. Many constitutions in federal systems, such as those in Argentina, Australia, Canada, and the United States, address these problems by assigning responsibility for interstate activities to the national government. But it often remains contentious as to what degree of interstate impact is required to invoke federal jurisdiction.

*Interjurisdictional trade.* While not strictly spillovers, a number of regulatory issues may directly affect inter-jurisdictional trade. In some cases efficient interjurisdictional trade may require harmonization of key technical standards. For example, adoption of different

---

<sup>41</sup> The notion of competing governments and jurisdictions was introduced by Tiebout (1956) and has been a popular idea ever since. For strong proponents of this view see Siebert and Koop, (1993); Easterbrook, (1983). For a critical view of the application of this theory to the regulation of different utility sectors within one tier of government see Helm, (1994).

<sup>42</sup> See Neven, Nuttall, and Seabright, (1993).

railway gauges between jurisdictions can impose practical restrictions on interstate rail transport, as can some technical standards affecting water, electricity, telecommunications, and gas. Similarly, regulatory policies that create subsidies for local producers or maintain local monopolies may distort or restrict interjurisdictional trade. For these reasons interstate trade in sectors such as electricity, gas, rail, and telecommunications is typically regulated at the national level, including the terms and conditions of access to relevant network facilities.

*Economies of scale.* Many infrastructure activities require large capital investments and exhibit significant scale economies. Some decentralized jurisdictions may be smaller than the minimum efficient size for particular activities. For example, it may not be efficient for small jurisdictional units to procure and regulate their own power systems, and some municipal water systems may be too small to attract private investors. In these cases several jurisdictions must collaborate, which may increase costs and weaken the credibility and effectiveness of the regulatory regime.

Some of the potential difficulties in this area are illustrated by the attempt to grant a private concession for a water system in Caracas. Twenty-three municipalities had to cooperate to form a concession area of sufficient size to attract private investment. The difficulty of establishing a credible regulatory framework under these circumstances was one of the reasons that no responsive bids were received.<sup>43</sup>

*Destructive competition.* It is sometimes suggested that regulatory competition between decentralized jurisdictions might be destructive. One concern is that strong bargaining pressure from multinational investors coupled with limited labor mobility may lead subnational jurisdictions to bid up subsidies or regulated rates of return or bid down taxes or other obligations to attract investors. Evidence on this issue is mixed, but concerns of this kind may contribute to pressures for jurisdictions to adopt coordinated approaches.<sup>44</sup>

*Constrained regulatory capacity.* Regulation of infrastructure industries is a complex and demanding task. Depending on the detail of the regulatory regime, staff with specialized economic, financial, and legal skills may be required. Moreover, if the regulatory entity is independent, decisionmakers must be able to resist improper inducements or pressures from regulated firms, political authorities, and other interest groups.

Such resources are scarce in many developing and reforming economies and often have a high opportunity cost. Further, the resource pool typically becomes much shallower as one progresses to lower tiers of government, while closer proximity to firms and to consumers may increase the risk of capture. The special challenges this may pose for establishing and maintaining effective regulatory arrangements at decentralized tiers of government is considered in the last section of this paper.

---

<sup>43</sup> See Triche, Mejia and Idelovitch, (1993).

<sup>44</sup> Siebert and Koop, (1993), evaluates the findings of empirical studies on the impact of interjurisdictional tax competition.

## Striking a Balance

The optimal balance between national, state, and municipal regulation depends on the characteristics of the industry, jurisdictional units, and the regulatory issue in question. It also depends on the broader legal and political environment. Regulatory responsibilities are sometimes assigned in constitutions or other political compacts, and so may not be very flexible in the near term. Nevertheless, some of the main mechanisms that can be employed to manage policy tradeoffs should be examined.

*Division of policy determination and implementation.* In the simplest model, regulatory policy is set and implemented by one tier of government. In practice, however, it is quite common to find regulatory policy set one tier of government and implemented a lower tier. The degree of discretion conferred to lower tiers can vary considerably.

At one extreme, policy administration is delegated to a subordinate entity that has little independent discretion. For example, national antitrust policy in countries such as Australia and Canada is administered in part by regional offices of national regulatory agencies; they operate according to identical rules and policies and are expected to adopt a consistent national approach. This limited form of decentralization may still improve responsiveness to consumers and help to ameliorate information asymmetries between regulators. At the other extreme, broad regulatory goals and objectives may be determined at the national level but implementation details left largely to the discretion of lower tiers of government. One example is product standards in the European Union: member states often have substantial discretion over how to achieve the minimal requirements specified by European Union directives.<sup>45</sup>

Between the two extremes national governments may delegate certain responsibilities to subnational governments, but do so subject to certain conditions intended to achieve some national consistency or regulatory policy may be set at the national level, but they allow national jurisdictions to create exemptions. For instance, federal antitrust laws in the Australia, Canada, and U.S. permits states to create limited exemptions in accordance with local policy preferences.<sup>46</sup>

*Division of different regulatory tasks.* In the simplest model all questions of regulatory policy concerning a particular industry are set by a single tier of government. In practice, however, different aspects of one industry may be regulated by different tiers. In Canada, for example, primary responsibility for regulating of water utilities falls on municipal authorities. Environmental regulation is largely the responsibility of the provinces, and antitrust regulation is enforced at the federal level. Similarly, electric utilities in Germany are subject to economic regulation by municipalities (granting of concessions), Länders (rates), and the federal government (antitrust laws). In many countries a single firm may be subject to

---

<sup>45</sup> See Gatsios and Seabright, (1989).

<sup>46</sup> See Government of Australia, (1993).

environmental regulation at the municipal, state, and federal levels. Approaches of this kind place a premium on mechanisms to coordinate regulatory requirements.<sup>47</sup>

*Formal responsibilities and induced or cooperative approaches.* In the simplest model regulatory responsibilities for particular activities and objectives are clearly assigned among tiers of government by a constitution or some other political compact. In practice, however, constitutions and other arrangements are subject to differing interpretations and applications over time. No less important, the assignment of regulatory responsibility is often blurred by induced or cooperative approaches between jurisdictions. In many cases national governments induce subnational authorities to pursue national goals or policies with funding arrangements. In the area of the roads, for example, the Australian and the U. S. federal governments have a long history of using conditions imposed on federal road funding to influence decisions on planning and regulatory policy.

As noted above, subnational authorities may also work together to establish common regulatory approaches to address shared problems, even without inducement from federal authorities. In some cases, special intergovernmental forums have been established to facilitate cooperative arrangements of this kind.. For example, in Australia the Council of the Australian Government consists of the heads of the federal state, and territory governments. It meets approximately twice a year with an agenda advanced by working groups of officials. A number of other formal and informal intergovernment groups also handle policy coordination on specific issues. The European Union is more advanced model of the same approach, where national sovereignty is pooled according to a formal treaty with an elaborate institutional apparatus to facilitate joint decisionmaking.<sup>48</sup>

### Confronting Constrained Regulatory Capacity

Most of the policy considerations relevant to assigning regulatory responsibilities among tiers of government are identical across countries, developed and developing alike. But, constrained regulatory capacity is especially important in many developing and reforming countries. The principal concern is the relative scarcity (and high opportunity costs) of qualified regulatory personnel at decentralized tiers of government, and this concern is exacerbated by the greater risk of regulatory capture flowing from closer proximity to consumers (voters) and firms. These concerns affect the optimal design of regulatory arrangements and the development of strategies to strengthen the regulatory capacity of decentralized regulators.

### Designing of regulatory arrangements

As noted earlier, the main strategy for handling the contracting problems associated with infrastructure regulation is to circumscribe the discretion contained in regulatory rules and to allow an entity with the requisite expertise and independence to exercise residual discretion. The scarcity of skilled regulatory personnel and greater

---

<sup>47</sup> For a criticism of existing arrangements in the U.S., see Phillips, (1993).

<sup>48</sup> See Keohane and Hoffmann, (1991).

exposure to industry and consumer pressures must be taken into account in designing relevant regulatory arrangements.

*Discretion and independence.* In this environment potential investors are likely to prefer detailed regulatory rules and standards to more discretionary approaches. To the extent that discretion is tolerated - it is virtually impossible to remove all discretion - a premium will be placed on measures that safeguard the independence of the regulator. Measures may range from procedures affecting the appointment process and security of tenure to procedures ensuring transparent decisionmaking and the review of decisions. To the extent that these conditions are not met, investors will demand higher rates of return to offset the regulatory risks they perceive.

*Sectoral breadth of jurisdiction.* Entities regulating infrastructure can be organized according to the sectoral breadth of their jurisdiction.

- *Sector-specific.* Separate agencies are responsible for telecommunications, gas, water, electricity, rail, and so on. Examples of this approach include the United Kingdom and national level regulators in Argentina.
- *Multisectoral.* A single regulatory agency is responsible for all or most infrastructure sectors. Examples include the states in the United States and several provinces in Canada, the states in Australia, and new national-level arrangements being implemented in Jamaica and Bolivia.
- *Clustered sectors.* Separate agencies are responsible for clusters of related sectors. An energy regulator for electricity and gas. A transport regulator for rail, roads, and air. A communications regulator for telecommunications, post, and broadcasting. Clustered regulators are being established in Russia and have been advocated for the United Kingdom.<sup>49</sup> Countries first use clustered regulators for energy utilities include Colombia, Hungary, and the national regulator in the United States.

Establishing regulatory agencies on a multisectoral basis offer a number of advantages over sector-specific agencies, particularly in countries with limited regulatory capacity and experience. These advantages are even more important when subnational regulators are involved. They include:

- Opportunities to share regulatory resources - for example, financial analysts, economists, and lawyers can work across sectors, and administrative personnel can be shared.
- Greater resistance to industry capture - the agency's broader constituency weakens the influence of any one industry.

---

<sup>49</sup> See Helm, (1994).

- Greater resistance to improper political interference - the broader constituency and higher political profile increase the stakes of inappropriate political intervention.
- Application of consistent approaches - this can contribute to greater predictability (and hence reduced risk) for investors while reducing the risk of product market distortions arising from "regulatory arbitrage" (a possibility when inconsistent regulatory approaches are taken for substitute services, such as gas and electricity or road, rail, and air transport).<sup>50</sup>
- Easy translation of Lessons and experience gained in one sector to other sectors.

Three broad strategies can be adopted to set up multisectoral regulatory framework. First, a multisectoral framework can be established at the outset, with each sector brought within the regime at the time of or before privatization. This model is being adopted in Bolivia. Second, if a sector-specific regulatory agency already exists, new sectors may be brought within its jurisdiction rather than creating additional entities. The feasibility of this approach will depend on how easily the structure and operation of the initial institution can be modified to meet a broader mandate. Third, regulators can be established on a sector-specific basis but consolidated over time through mergers. This happened in many states in the U.S. and pressure is mounting to merge sector-specific regulators in the United Kingdom. But this strategy has a number of weaknesses, including the likelihood that existing entities resist merger or that benefits will not flow immediately. Visible benefits are particularly important in the early phases of a new regulatory system.

One of the main challenges in establishing multisectoral agencies is to ensure that specialized knowledge or understanding of particular industries is not unduly sacrificed. This challenge can be addressed by ensuring that internal organizational arrangements foster the development of industry-specific expertise, for example, by establishing strong sector-specific departments. This approach has been adopted by many state-level regulators in the U. S. and is being emulated in Bolivia.

*Functional breadth of jurisdiction.* The question may arise whether the body responsible for economic regulation of an industry should also have responsibility for safety, environmental, and other regulation. While international experience is mixed, two general principles are widely accepted: where regulatory capacity is limited, a smaller number of regulatory agencies is preferred; and where several regulators are involved, the respective jurisdiction of each should be defined as precisely as possible to reduce uncertainty, duplication, or conflict. Moreover, where two or more regulators are responsible for closely related aspects of the same industry - such as water quality standards set by an environmental regulator and water rates set by an economic regulator - close coordination will be required to ensure effective regulation.

*Minimization of regulatory demands.* If regulatory capacity is limited, this limitation must be accounted for in designing all aspects of the regulatory system.

---

<sup>50</sup> See Helm, (1994).

Regulatory discretion can be limited and residual discretion can be tempered by clearly articulated rules. Administrative procedures intending to make regulatory decisionmaking transparent should avoid excessive legalism, a criticism often leveled at regulatory processes in the U.S.. The burden of supervising compliance with rules can be reduced by ensuring that penalties are clearly defined and set at a level that will provide appropriate incentives for firms. Consumers may also help to monitor industry by giving them incentives to report noncompliance. For example, in addition to fines, consumers may receive rebates if a firm has failed to meet clearly defined performance obligations. The New Zealand and the U.K. are adopting such strategies in the telecommunications sector.

*Contracting out of regulatory tasks.* Another way to reduce demands on regulators is to allow them to contract out particular tasks. For example, some of the analytical work associated with price regulation could be contracted out to consultants, and external arbitrators could be used to settle certain types of regulatory disputes. In each case it will be important to ensure that the proposed arrangements do not raise new concerns over regulatory capture or otherwise weaken the legitimacy of regulatory decisionmaking.

### **Strengthening Regulatory Capacity**

Even where regulatory arrangements have been designed to reduce regulatory demands, nascent regulators will typically require assistance in a number of areas, including training in specific regulatory functions. In many cases this type of assistance will exhibit significant scale economies, as training programs and other materials may be shared by several decentralized regulators. A number of strategies exist for delivering such assistance.

*Assistance through national-level agencies.* A national policy favoring decentralization of regulatory responsibility may be complemented by technical assistance channeled through a national-level agency. For example, such an agency could organize training programs for regulators, provide model contracts for concessions, or provide technical advice on specific regulatory problems. It may also act as a focal point for the disseminating lessons of experience among subnational regulators.

*Mutual assistance through a regulatory association.* An alternative or complementary strategy is to establish an association of regulators. Subnational (and national) regulators can interact in this forum and share lessons of experience. The association may reinforce professional norms (and hence reduce vulnerability to improper influences) while providing a group of peers to respond to charges of improper political interference. It could also provide a framework for jointly developing training programs and (possibly) funding of research on common regulatory problems. The National Association of Regulatory Utility Commissioners in the U.S. is a possible model.

*Twinning arrangements.* A third vehicle for supporting nascent regulators is establishing "twinning" relationships between subnational regulators and more experienced

regulators, whether from foreign or national jurisdictions. Arrangements of this kind can provide a source of ongoing institutional support, exchange and training opportunities, and technical advice. Many U.S. and other OECD regulators have experience with these relationships with regulators in reforming and developing economies.

### **Conclusions**

Selecting the most appropriate assignment of regulatory responsibility for infrastructure among tiers of government calls for complex policy judgments, often made in sensitive political environments. This choice requires careful consideration of the particular industry, jurisdictional subunits, and regulatory issues involved.

While most policy considerations are identical across countries, constrained regulatory capacity is of special concern in developing and reforming countries. This constraint must be considered in any decentralization strategy. Failure to do so may make the promised benefits of decentralization illusory.

## Bibliography

Easterbrook, F.H. (1983), "Antitrust and the Economics of Federalism", *Journal of Law & Economics*, 26, 23-50.

Government of Australia (1993), *National Competition Policy : Report of the Independent Committee of Inquiry*.

Gatsios K. and P. Seabright (1989), "Regulation in the European Community", *Oxford Review of Economic Policy* 5, 37-60

Helm, D. (1994), "British Utility Regulation: Theory, Practice & Reform", *Oxford Review of Economic Policy*, 10, 17-39

Keohane, R.O. and S Hoffmann (eds) (1991), *The New European Community : Decisionmaking & Institutional Change*

Neven, D., R. Nuttall & P. Seabright (1993), *Merger in Daylight : The Economics & Politics of European Merger Control* (Centre of Economic Policy Research)

C F Phillips (1993), *The Regulation of Public Utilities : Theory and Practice*

Siebert, H. & M J Koop (1993), "Institutional Competition versus Centralization : *Quo Vadis Europe?*", *Oxford Review of Economic Policy*, 9, 15-30

Smith, W. & M. Klein (1994), "Infrastructure Regulation : Issues & Options", (mimeo, World Bank

Triche, T., A Mejia & E Idelovitch, (1993), "Arranging Concessions For Water Supply & Sewerage Services : Lessons From Buenos Aires & Caracas", *World Bank Infrastructure Notes* (May).

## Chapter 4

### Does Decentralization Increase Public Infrastructure Expenditure?<sup>51</sup>

*Antonio Estache and Sarbajit Sinha*

When the benefits of an infrastructure service are mostly local and there is little scope for economies of scale, as in solid waste management, urban transit, water supply, and roads maintenance, it is commonly argued that decentralization is the most effective way to deliver service. These categories of expenditure are already decentralized in so many countries and are increasingly being decentralized in so many others.

There are many other infrastructure services, such as power and telecommunications, for which most expenditures are still mainly the responsibility of the central government. But this is changing rapidly as the responsibility for some of these activities is increasingly being transferred to or shared with subnational governments. The increased opportunity to decentralize infrastructure is the result of recent technological innovations that reduce the need for services to be provided by monopolistic utilities.<sup>52</sup> In the power sector, generation and distribution can now be handled competitively by decentralized units.<sup>53</sup> Similarly, even if parts of local telephony remain natural monopolies, other portions will be exposed to competition from wireless telephony and rival wireline systems.<sup>54</sup>

How have increases in decentralization in infrastructure affected expenditure levels in infrastructure? The outcome reflects the net impact of opposing effects. Expenditure will increase if, collectively, subnational governments rank infrastructure as a higher priority than did the federal government, if they are less effective at delivering services, or if they give up the benefits of economies of scale in order to obtain more autonomy. It will decrease if decentralization results in a lower ranking of infrastructure or if it results in increased cost-effectiveness for most projects.

<sup>51</sup> The chapter has benefited from comments by Richard Bird, Mathias Dewatripont, Greg Ingram, Peter Lanjouw, Kant Pritchett, Gerard Roland and Joachim von Amsberg.

The paper has benefited from comments by Richard Bird, Mathias Dewatripont, Greg Ingram, Peter Lanjouw, Lant Pritchett, Gerard Roland and Joachim von Amsberg. Any mistakes are of course our sole responsibility. Moreover, the discussion does not reflect the views of the World Bank, its Executive Board of Directors, or its member countries.

<sup>52</sup> At the local level, monopolies will remain, but their monopoly power will be reduced by the introduction of yardstick competition between local monopolies.

<sup>53</sup> See Besant-Jones (1993) or Humplick (1992).

<sup>54</sup> See Baumol and Sidak (1993).

The paper estimates econometrically the net impact of decentralization on total and subnational infrastructure expenditure in two country samples: one including ten industrialized countries, and the other ten developing countries.<sup>55</sup> The two samples are separated because infrastructure expenditure in the developing countries is likely to increase faster since their coverage ratios are still lagging significantly behind those found in industrialized countries and in many cases the private sector is unlikely to pitch in.<sup>56</sup>

The analysis focuses on expenditure level and ignores the sources of changes in these levels.<sup>57</sup> Thus no conclusions can be made about the impact of decentralization on the efficiency of expenditures. However, because the level of infrastructure expenditure is also related to other factors, including some over which policymakers have leverage, such as grants and matching revenue and expenditure assignment, the analysis has direct policy relevance. More specifically, the paper identifies the relative importance of these factors and shows how they can complement or offset the direct effect of decentralization of expenditure and revenue responsibilities.

### **Checking Facts: What is the Data and What Does It Say?**

Organization for Economic Cooperation and Development (OECD) countries have good databases on decentralization in infrastructure. Developing countries, where most decentralization efforts are now taking place, do not. To obtain a comparable measure of the extent of decentralization in infrastructure for a multiple country sample, the International Monetary Fund (IMF) government statistics provide the only source of data. This database covers public expenditures in power, transport, and communications for both central and subnational government levels, but it has limitations. The most important limitation is the omission of many autonomous parastatals. Hence, the expenditure levels reported are lower bounds. This is important because in many countries, some of the infrastructure services discussed here (power and telecoms) are provided by public enterprises. Some of these parastatal expenditures are included in the IMF data since the government finance statistics include transfers by government departments to these public enterprises when they fail to address financial autonomy. In sum, if the IMF series are not an exact measure of the actual level of expenditure in the sector, they provide a reasonable proxy of the evolution of expenditure behavior. A second problem is the grouping of different subsectors. For instance, transport and communications each represent a single expenditure category with different degrees of involvement of the public sector, yet they

---

<sup>55</sup> For a recent discussion of infrastructure decentralization, see Bird (1994).

<sup>56</sup> See chapter 1 in *World Development Report* 1994.

<sup>57</sup> A companion paper by Estache and Humplick (1994) assesses the efficiency gains and losses due to decentralization.

are compiled together. A final problem is that this database does not separate capital and recurrent expenditures. This prevents a comparison of the differential role of these two categories of expenditure.

**Table 1. Evolution of Decentralization in Developing and Industrialized Countries (Percent)**

	Developing countries		Industrialized countries	
	1975-84	1985-92	1975-84	1985-92
Share of subnational expenditure in total public expenditure	19	18	38	36
Share of subnational nongrant revenue in total nongrant revenue	13	12	31	29
Share of subnational revenue in total revenue	20	17	39	37
Ratio of subnational nongrant revenue to subnational expenditure	49	60	65	67
Ratio of subnational revenue to subnational expenditure	96	94	97	98
Share of infrastructure expenditure in total expenditure	8	8	7	6
Share of infrastructure expenditure in total subnational expenditure	9	9	9	7
Share of subnational expenditure in total infrastructure expenditure	35	27	48	49

In spite of these limitations, the IMF source has the significant advantage of allowing a comparison of subnational infrastructure expenditure for a sample of industrialized and developing countries (listed in the Appendix).<sup>58</sup> The sample size is

<sup>58</sup> Oates (1989), Dillinger (1994), and Easterly (1993) address some of the issues raised by the IMF statistics. The main impact of these omissions is that the data provide a lower bound for the extent of decentralization since most of the omissions are subnational expenditures.

however limited to: ten industrialized and ten developing countries. They were the only countries for which time series on infrastructure expenditure were available for all government levels. The subsectoral data are aggregated to define a proxy for infrastructure expenditure. The main weakness of this proxy is the omission of the water sector, which can not be singled out in the IMF database.

In this sample, decentralization of expenditures and of revenue is at least twice as large in the industrialized country group as the developing country group (Table 1).<sup>59</sup> In both country groups, all three average indicators have stagnated between 1975 and 1992. This suggests that the evidence on the increased decentralization must have been found elsewhere.

This is revealed in the evolution of the imbalances between expenditure and revenue assignments to subnational governments. This is where the greatest change over time has been observed. Measured as the ratio of own revenue sources to expenditure, the imbalance is always larger in developing countries than in industrialized countries. But the average gap between own revenue and expenditure was cut from 51 percent in developing countries and 40 percent in industrialized countries between 1975 and 1984 to 35 percent in developing countries and to 33 percent in industrialized countries between 1985 and 1992. This may be the best indicator of the commitment to increased decentralized autonomy over expenditure decisions, particularly in developing countries. Grants appear to correct the imbalances substantially in developing countries, and almost completely in industrialized countries. The level of aggregation available hides a potential problem. In many countries the earmarking of grants is significant and may favor or penalize infrastructure.

The decentralization figures suggest that if decentralization increases with income, it does not affect the share of total expenditure spent on infrastructure subsectors (Table 1). If anything, it reduces it somewhat. The share of expenditure subnational governments spend on these sectors is essentially the same in both groups of countries although two differences are worth pointing out. First, subnational governments contribute only a third of total infrastructure expenditure in developing countries, while in industrialized countries they contribute half of it. Second, although this share has been constant over the past eighteen years in the industrialized countries, it has been declining in the developing countries.<sup>60</sup> The country-specific averages suggest wider differences. Subnational expenditure in these sectors vary from close to zero in Chile to more than 70 percent in other countries, both industrialized and developing, with federal government structures. Even if this approximation is somewhat overestimated because the large, central parastatals' expenditures are not accounted for, it provides a quantitative hint of the key role of subnational governments in infrastructure.

<sup>59</sup> The Appendix gives the details on country and period coverage for each government level.

<sup>60</sup> Note that expenditure levels may be declining because efficiency is increasing. For evidence, see Estache and Humplick (1994).

## A Survey of Studies on the Effects of Decentralization on Total Public Expenditures

The previous sections rough data analysis must be complemented by a more detailed econometric study that can draw on the lessons from extensive literature on aggregate expenditure levels. This section summarizes this literature. It draws some conclusions about the variables that have consistently been found relevant and hence should be included in the analysis of the effects of decentralization on infrastructure expenditure.

The literature on the relationship between the size of the government (usually measured as the ratio of public expenditure to GDP) and the degree of decentralization is large. It has primarily focused on the total size of the public sector rather than on the size of specific expenditure categories. It provides, however, useful and relevant insights. In particular, it shows that the interactions of many opposing factors explains the size of the government. Yardstick competition across subnational governments or increased accountability to voters may reduce the size of government as suggested by public choice theory.<sup>61</sup> A stronger preference by subnational governments for *private* provision of services, as observed in the solid waste management and some aspects of the road and water sectors may also contribute to lower *public* spending.<sup>62</sup> In contrast, decentralized control over expenditure decisions may be less tight than central control and result in higher expenditure levels, as was seen in Brazil after the 1988 constitutional reform. A differentiation of technologies across regions may only partially reduce the cost reductions offered by economies of scale, and hence increases in expenditure levels may result from the different technologies adopted by subnational governments. Finally, higher expenditure levels may result from higher marginal and fixed costs, since the development of a local administration can be a costly operation.<sup>63</sup>

The specific effect that each factor has on public sector growth is essentially an empirical matter ignored by the literature because the data needed to assess their relative importance are difficult to find. Most empirical research focuses instead on the reduced form that provides some indication of their net impact. The empirical studies measure different aspects of the problem (intracounty competition compared with intercounty competition) depending on the factors explicitly considered in the models. These factors are generally reflected in the proxy picked to describe the extent and nature of decentralization (such as total expenditure or revenue share versus number of local units,

<sup>61</sup> This is the Leviathan hypothesis proposed by Brennan and Buchanan (1980).

<sup>62</sup> Humplick (1992).

<sup>63</sup> As mentioned by R. Prud'homme in a comment on a draft of the *World Development Report*, 1994.

unit specific revenue share, general purpose or specific purpose, political nature of federalism) and in the selection of the database (national versus international, time-series versus cross-section). Since these studies have recently been surveyed by Oates (1989, 1991, 1993), the discussion below focuses on cross-country studies, which are the most relevant to this paper.

Studies based on international data bases have slowly moved toward rejecting a linkage between decentralization and total expenditure growth. The first international cross-sectional study was conducted by Oates (1972). He examines a cross-sectional data set of fifty-seven countries in 1965 and finds inconclusive results. While he shows a negative relationship between the size of the public sector and a dummy variable describing whether the country is federalized, he finds a positive relationship for a variable measuring the degree of decentralization. Oates (1985) revisits the issue with a cross-sectional study of a 1982 international data set distinguishing between industrialized and developing countries. He rejects the hypothesis that a negative relationship exists between the extent of fiscal decentralization and tax receipts as a share of GNP (a proxy for the size of government) for both groups of countries. Heil (1991), working on two different international data sets (1987 IMF data and 1988 OECD data), confirms these results. Saunders (1988) disagrees. Adding a dummy variable for federal countries, he finds that decentralization reduces aggregate expenditure for a panel of eighteen industrialized countries between 1978 and 1980.

These results have been criticized because studies based on international data bases assume that mobility is not an issue and hence may underestimate the reduction in public expenditure growth that can result from mobility. When mobility can be taken into account, as in the case of cross-sectional studies of the U.S., allowing for the analysis of very small units of observation, such as counties and local governments, decentralization seems to result in lower public sector growth, providing some credibility to the Brennan-Buchanan hypothesis.<sup>64</sup>

### **An Econometric Analysis of Total and Subnational Infrastructure Expenditures**

This section estimates a simple model explaining the behavior of per capita infrastructure expenditure between 1970 and 1992 from a panel of data provided by the two samples of countries previously described.<sup>65</sup> The results reported here were obtained using weighted least squares (WLS) to minimize the risks of failing to reject insignificant variables because of potential heteroskedasticity problems.<sup>66</sup> The variable explained is the

---

<sup>64</sup> Oates (1991) provides a recent survey of these studies.

<sup>65</sup> Argentina was omitted due to data problems for some of the right hand side variables.

<sup>66</sup> Since the error variance is not known, we assumed that it is proportional to the square of the GDP variable, since this was the most significant variable in all models.

level of per capita expenditure in infrastructure measured in 1985 US dollars.<sup>67</sup> The explanatory variables selected are similar to those found in the literature surveyed in the previous section:

- The per capita income level, to approximate the importance of the level of development of the country. Any significant difference in the importance of this variable in the two samples of countries would provide some evidence that fiscal decentralization may affect rich and poor countries differently.<sup>68</sup>
- The country size, to approximate the importance of economies of scale. The benefits of economies of scale tend to be mostly regional in large countries and national in smaller countries, explaining why decentralization has generally been more common in larger countries.<sup>69</sup>
- The population density, to approximate the importance of congestion and economies of scale, which can result from population density at the local level.
- The degree of decentralization measured in terms of the share of subnational expenditure in total expenditure or own revenue in total revenue.<sup>70</sup>
- The ratio of subnational revenue to subnational expenditure, to measure the degree of vertical imbalance. The financial autonomy of subnational governments is a common theme in the fiscal federalism literature. Grants are not viewed as central government expenditures and are seldom perceived by voters as part of the tax burden imposed on them by the subnational governments (revealing a certain form of fiscal myopia since often they pay some of these grants through taxes to the central government).
- The price-related variables, reflecting the degree of subsidy given to subnational governments through grants and the overall price index as a proxy

<sup>67</sup> The model could also be viewed as an estimate of the demand for infrastructure expenditure, since from the perspective of that specific sector, the supply can be viewed as infinitely elastic.

<sup>68</sup> Bahl and Linn (1992).

<sup>69</sup> The inclusion of the country size has two roles. In addition to addressing one source of economies of scale, it picks up any country-specific characteristic (a proxy for a fixed effect traditionally accounted for in panel problems). The importance of this second role is that it implies that the interpretation of the coefficients can focus on the time-series component. In a nutshell, this interpretation assumes that all observations are from the same data generation process and thus country differences arise because of differences in location along the same path. This interpretation would have been much more difficult to sustain in a panel of data covering both country groups.

<sup>70</sup> It could be argued that causality could run either way between decentralization and infrastructure expenditure. But infrastructure expenditure levels are not large enough to be considered plausible candidates to Granger-cause decentralization, as measured here.

for the evolution of infrastructure service prices in each country and for the extent to which public sector financing relies on the inflation tax.

In an earlier version of the model, we had also included a dummy variable describing the political structure of the country, that is whether it has a federal structure or not. But this variable was never significant and we decided not to include it in the model. This decision did not affect the results reported here.

The functional form of the model is Cobb-Douglas, and it is estimated in logarithms. This allows us to interpret the estimated coefficients as elasticities. For each country group, the model is estimated for two data sets: the per capita total public infrastructure expenditure and the per capita subnational expenditure. A model is then estimated for each of these data sets. Decentralization is measured in terms of expenditure in one model and in terms of revenue in the other. Table 2 summarizes the results for developing countries and for industrialized countries.

### **The developing countries sample**

All the variables are significant in all the models of the developing country sample and the adjusted R<sup>2</sup> suggests a good fit for each (Table 2). The main conclusions focus on the impact of decentralization. The elasticity of total infrastructure expenditure to the degree of decentralization in developing countries is about 0.3, whether decentralization is measured in terms of revenue or expenditure. This is not negligible since public investment in infrastructure averages 4 percent of national output and typically accounts for half of all public investment.<sup>71</sup> The impact of decentralization on subnational infrastructure expenditure is about 4 times as large. A one percent increase in the degree of decentralization results in a 1.1 to 1.3 percent increase in subnational infrastructure expenditure for a given level of imbalance between revenue and expenditure assignments. Obviously, decentralization matters and increases total and subnational expenditure on infrastructure services.

The impact of decentralization can, however, be offset by other factors related to decentralization. For instance, the increases due to decentralization are likely to be more than offset by an increase in the imbalance between revenue and expenditure assignment, as typically found in developing countries (Table 1). This is the case for total infrastructure expenditure. For subnational expenditure, the results are less clear because many of the resources available to subnational governments are fungible and the increase in imbalance may be offset by a shift of local resources in favor of infrastructure and at the expense of any other subnational expenditure category. When decentralization is measured in terms of expenditure, the effect of the gap between own revenue sources and expenditure is less than half the effect of decentralization. When decentralization is measured in terms of revenue, it is about 30 percent more. In either case, the net effect on infrastructure expenditure levels is negative.

---

<sup>71</sup> See *World Development Report 1994*, chapter 1.

**Table 2. Determinants of Per Capita Expenditure on Infrastructure in Developing Countries and in Industrial Countries (1985 US\$)**

Determinants	Developing countries				Industrial countries			
	Total public expenditure		Subnational public expenditure		Total public expenditure		Subnational public expenditure	
Population density	-0.21 (-3.12)	-0.19 (-2.71)	0.34 (3.30)	0.30 (2.6)	-0.22 (-7.09)	-0.22 (-7.06)	0.05 (1.76)	-0.13 (-0.37)
GDP per capita	0.93 (6.3)	0.90 (5.69)	-1.18 (-4.54)	-0.99 (-3.26)	0.84 (5.60)	0.84 (5.50)	1.64 (10.38)	1.71 (10.34)
Country size	-0.24 (-3.0)	-0.24 (-2.8)	-1.55 (-10.92)	-1.43 (-8.77)	-0.20 (-8.08)	-0.20 (-8.14)	0.05 (1.76)	0.03 (1.13)
Decentralization of expenditure	0.36 (3.38)		1.30 (7.02)		0.19 (1.82)		0.87 (7.91)	
Decentralization of revenue		0.28 (2.64)		1.14 (6.08)		0.17 (1.85)		0.69 (6.76)
Imbalance between expenditure assignment and own revenue sources	-0.70 (-5.85)	-0.94 (-5.11)	-0.49 (-2.55)	-1.47 (-4.48)	0.31 (1.95)	0.18 (0.93)	-0.89 (-5.59)	-1.41 (-7.08)
Grants to subnational governments as a share of subnational expenditure	-0.42 (-4.33)	-0.43 (-4.31)	-0.03 (-2.88)	-0.03 (-2.82)	-0.01 (-0.05)	-0.01 (-0.03)	-0.02 (-2.08)	0.11 (1.36)
Price index	0.08 (2.69)	0.09 (3.01)	0.13 (3.18)	0.15 (3.46)	0.16 (3.16)	0.16 (3.13)	-0.23 (-4.69)	-0.25 (-4.93)
Constant	-2.45 (-1.76)	-2.47 (-5.69)	21.11 (8.37)	18.43 (6.19)	-1.94 (-1.45)	-1.89 (-1.40)	-8.99 (-6.31)	-9.73 (-6.54)
Adjusted R <sup>2</sup>	0.85	0.84	0.89	0.88	0.58	0.58	0.80	0.78
Number of observations	109	109	77	77	174	174	147	147

Surprisingly, the impact of grants is also negative. If services were local public goods, and the burden of providing these services was financed through grants and hence shared by the total country population, the grant variable should have a positive sign. The negative sign may be interpreted in three ways. First, the local users do not show fiscal myopia in the sense that they know that if they do not pay for the services through user fees or local taxes, they will pay for them through general taxes. Second, a large share of the grants picked up in the sample may be mostly matching grants that force local users to make choices they don't care for. Third, a large share of the services provided by

decentralized units are not local public goods, and hence grants do not lead to local free riding.

In addition to the implications of the results for the variables related to decentralization, there are other striking differences in behavior between total and subnational expenditure. The most obvious is the difference in signs for the income per capita and the population density variables. Total expenditure in infrastructure has a positive income elasticity of 0.9, irrespective of how decentralization is measured. In contrast, subnational infrastructure expenditures have a negative income elasticity equal to or greater than one.

The most likely explanation for the difference between total and subnational expenditure is that the income level is strongly correlated with the degree of efficiency and is hence a proxy for two opposing effects: (i) expenditure requirements from higher production levels reflecting the importance of infrastructure in the production process and (ii) efficiency gains seen in the most successful developing countries. The larger the country's production level, the larger the need for infrastructure expenditure. The larger the income level per capita the more efficient that country is or the least important in relative terms are fixed costs induced by decentralization, at least in this sample. Hence, the more effective is the use of the current infrastructure capacity and the lower the need to increase infrastructure expenditure. In net terms, as income grows, overall investment requirements in the sector expand more than the gains achieved from efficiency, while the subnational requirements do not have to grow as fast and are able to benefit from the efficiency gains.

Population density also has opposing effects on total and subnational expenditure in developing countries. Congestion tends to be more a local problem than a national problem, and it thus applies mostly to the decentralized services. At the aggregate level, this variable also picks up the gains from economies of scale in infrastructure. For this sample, these gains are reflected in an elasticity of expenditure with respect to population density of about -0.2. At the local level, as population density increases, the demand for denser road and communication networks and for the number of connections also increases. This implies higher maintenance costs that may offset, at the local level, the efficiency gains from network externalities. The elasticity of subnational expenditure with respect to population density is about 0.3.

The other aspect of economies of scale, as measured by country size, shows different behavior. The country size variable is much more important for subnational infrastructure expenditure than for total infrastructure expenditure. The larger a country, the larger its provincial units tend to be. The larger the province, the larger the gains from economies of scale in decentralized infrastructure expenditure.

The positive coefficient on the price variable is difficult to explain. The most probable reason is that monetization is an effective way of financing infrastructure in developing countries. A second explanation is related to the evolution of infrastructure

service prices. This explanation is more tentative since the price variable used is a very poor proxy for the price of infrastructure relative to other prices. In developing countries, the price of infrastructure is often relatively more controlled than other prices since many are public tariffs, and adjustment lags lead to a deterioration of this relative price. Surprisingly, its effect is somewhat stronger for subnational governments than for the full public sector. In absolute terms, however, it is not very significant. A one dollar increase in prices results in, at the most, an increase in infrastructure expenditure of about fifteen cents.

### **The industrialized countries sample**

The model is less successful in explaining aggregate expenditures in the industrialized countries sample, as suggested by the lower  $R^2$ . Moreover, some of the variables are not significant. There are however a few interesting results.

Decentralization increases both total and subnational expenditure in infrastructure in industrialized countries. However, it increases the subnational level more than the total level. Moreover, in contrast to what was observed in the developing country sample, the elasticity of subnational expenditure in infrastructure is less than one. In other words, the reranking of expenditure allowed by decentralization leads to a decline in the share of total expenditure allocated to infrastructure.

Imbalances between total revenue and expenditure assignments tend to neutralize the increases in subnational infrastructure expenditure could be increased expenditure decentralization. It more than offsets the increases from higher revenue decentralization. The impact of imbalances on aggregate expenditure levels in the sector is not significantly different from zero.

The effect of grants as a percentage of the expenditure level is insignificant, irrespective of the way decentralization is measured. This may be due to a multicollinearity problem between the imbalance and grant variables, suggesting that the role of grants in industrialized countries is more one of addressing a mismatch between revenue and expenditure assignments. For the developing country sample, the variable was significant, suggesting a more proactive role in sector-specific resource allocation.

Population density has no role in explaining subnational expenditures in this sample. One explanation may be that congestion is better priced in industrialized countries. For instance, while the population coverage for phone services is still low in many European countries, the markup built in the phone charges is often a rationing scheme to reduce excess effective demand for the service in spite of high potential demand. Another explanation may be that the stocks of infrastructure are so large that the focus in industrialized countries is more on low-cost maintenance than on costly increases in investment to expand coverage.

The elasticity with respect to the price level is positive for total infrastructure expenditure, but negative for subnational expenditure. This suggests that over the last twenty-two years, the inflation tax tended to penalize subnational governments but benefited the general government. Economies of scale due to population density or country size reduce the total level of expenditure but have little effect on subnational expenditure levels.

### **Comparing developing and industrialized countries**

A comparison across country groups is also useful (Table 2). Elements of the determinants of *total public infrastructure* expenditures in developing and industrialized countries, both economies of scale variables (population density and country size) have a similar intensity across country groups. Also, the effect of income level is similar. But there are also some clear differences. First, an increase in the degree of decentralization results in larger increases in infrastructure expenditure in developing countries than in industrialized countries. Second, the imbalance between revenue and expenditure assignment has a strong and significant negative impact on the total level of infrastructure expenditure in developing countries. It has an insignificant or more modest effect in industrialized countries, depending on how decentralization is measured. Third, grants have a significant negative impact in developing countries while they have no effect in industrialized countries. Fourth, the price level has a much stronger positive effect on the level of infrastructure expenditure in industrialized countries than in developing countries.

With respect to the level of subnational infrastructure expenditures, there are only two roughly common elements. First, the degree of imbalance between revenue and expenditure assignments significantly reduces subnational expenditure in both country groups, and the reduction is much larger when decentralization is measured in terms of revenue than in terms of expenditure. Second, the effect of grants is very small in both country groups. The conclusion on grants is, however, not very robust since the level of aggregation of the data used impedes a detailed analysis of the importance of grant designs.

There are more differences than similarities between the two country groups. Economies of scale and congestion matter in developing countries. They are insignificant or irrelevant to the level of per capita infrastructure expenditure in industrial countries. The large negative impact of country size on the demand for public infrastructure expenditure by subnational governments is in fact very significant, highlighting one of the potential costs of excessive decentralization in countries often pressed by limits on fiscal resources. As income per capita grows, the demand for subnational expenditure grows more than proportionately in industrial countries, while it declines in the same proportion in countries. A higher degree of decentralization increases the level of infrastructure expenditure more than proportionately in developing countries and less than proportionately in industrial countries. Higher prices increase the level of subnational expenditure in developing countries while they decrease it in industrialized countries.

## Policy Conclusions

The paper has shown that the behavior of infrastructure expenditure in both developed and developing countries is reasonably well explained by a few factors: proxies for economies of scale, the level of development of the country, the degree of decentralization of fiscal resources or responsibilities, the price level, the imbalance between revenue and expenditure assignment and the extent to which grants correct that imbalance. While the model has better explanatory power for subnational expenditure than for total expenditure, its overall relevance is sufficient to make a few key policy conclusions.

The most obvious conclusion is to be careful when applying lessons learned from the experience of decentralization in industrialized countries to less developed countries. In particular for subnational expenditure, it does not provide a good leading indicator for *subnational* expenditures. The elasticity is larger than 1 in developing countries (between 1.1 and 1.3 depending on how decentralization is measured) and less than one in industrialized countries (between .7 and .9).

Second, decentralization tends to increase both aggregate and subnational infrastructure expenditure. This suggests that infrastructure expenditures are not neutral with respect to decentralization and that a reranking of expenditures may occur. For subnational expenditure in infrastructure, when less elasticity with respect to the degree of decentralization measured in terms of expenditure is less than 1, it means that infrastructure expenditure is valued more than the average expenditure category (since the variable measuring decentralization measures the average level of expenditure decentralization). When the elasticity is lower than 1, infrastructure is less valued than the average. In developing countries, decentralization increases infrastructure expenditure proportionately more, in developed countries, proportionately less than the average degree of decentralization.

Third, the sector-specific results confirm the conventional wisdom that policymakers in industrialized or developing countries, must guarantee a balance between revenue and the expenditure assignment for decentralization. In contrast, a good instrument to offset the impact of decentralization on expenditure levels is to increase the imbalance between revenue and expenditure assignments.

## Data Appendix

All data are from the IMF *Government Finance Statistics* or the IMF *International Finance Statistics*, except for data on areas that appeared in previous World Development Reports. The time coverage is from 1970-92, for twenty countries (ten developing and ten industrialized) including Argentina, Australia, Austria, Canada, Chile, Czechoslovakia, Denmark, France, Germany, Hungary, Iceland, India, Indonesia, Israel, Romania, Switzerland, Thailand, United Kingdom, United States, and Zimbabwe. For subnational government data, the sum of state and local government figures were used where available and applicable. Otherwise, the data are either state or local government. The other data are consolidated central government figures. The general government (total) has been defined as the sum of these three (or two, when only two levels exist) levels of government. Infrastructure expenditures include expenditures on energy and fuel and transport and communications only. All expenditures include transfers. Except for ratios, figures have been converted to constant U.S. dollars using GDP deflators and exchange rates (1985 values only). All regressions are in natural logarithm. Because some of Argentina's data (particularly highly volatile exchange rates and multiple changes in exchange rate regimes) were unreliable, it was dropped from our econometric analysis.

### Data Availability by Country, Level of Government and Year

<b>Country</b>	<b>Government level</b>	<b>Year</b>
Argentina	Central	1978-89
	State	1978-87
Australia	Central	1970-91
	State	1970-91
	Local	1970-91
Austria	Central	1970-91
	State	1970-91
Canada	Central	1971-89
	State	1971-89
	Local	1971-89
Chile	Central	1972-88
	Local	1974-88
Czechoslovakia	Central	1989-90
	Local	1989-90
Denmark	Central	1970-90
	Local	1970-90
France	Central	1972-91
	Local	1972-91
Germany	Central	1970-91
	State	1970-91
	Local	1970-91
Hungary	Central	1981-90
	Local	1981-90
Iceland	Central	1972-86
	Local	1972-86
India	Central	1974-88
	State	1974-88

<b>Country</b>	<b>Government level</b>	<b>Year</b>
Indonesia	Central	1975-90
	State	1975-90
Israel	Central	1974-89
	Local	1974-89
Romania	Central	1970-91
	Local	1970-91
Switzerland	Central	1970-84
	State	1970-84
	Local	1970-84
Thailand	Central	1972-92
	Local	1972-92
United Kingdom	Central	1973-90
	Local	1973-90
United States	Central	1972-90
	State	1972-90
	Local	1972-90
Zimbabwe	Central	1976-86
	Local	1976-86

## Bibliography

- Bahl, R., and J. Linn. 1992. *Urban Public Finance in Developing Countries*. New York: Oxford University Press.
- Baumol, W.J., and J.G. Sidak. 1993. *Toward Competition in Local Telephony*. AEI Studies in Telecommunications, Cambridge: The MIT Press.
- Besant-Jones, John, ed. 1993. "Reforming the Policies for Electric Power in Developing Countries." World Bank, Industry and Energy Department, Washington, D.C.
- Bird, Richard. 1994. "Decentralizing Infrastructure: For Good or for Ill?" World Bank Policy Research Working Paper 1258, Washington, D.C.
- Brennan, G., and J.M. Buchanan. 1980. *The Power to Tax: Analytical Foundations of a Fiscal Constitution*, New York: Cambridge University Press.
- Dillinger, W. 1994. "Decentralization and its Implications for Urban Service Delivery." World Bank Urban Management Program Discussion Paper 16, Washington, D.C.
- Easterly, William, and Rebelo. 1993. "Fiscal Policy and Economic Growth: An Empirical Investigation." *Journal of Monetary Economics* 32 (2): 417-58.
- Estache, Antonio and Frannie Humplick. 1994. "Does Decentralization Improve Efficiency in Infrastructure?" World Bank, Washington, D.C.
- European Economy*. 1994. No 53 *Stable Money—Sound Finances*
- Heil, J.B. 1991. "The Search for Leviathan Revisited." *Public Finance Quarterly* July, pp.334-46.
- Humplick, Frannie. 1992. "Private Ownership, Competition and Decentralization: Impacts on Infrastructure Performance." World Bank, Washington, D.C.
- Oates, W.E. 1972. *Fiscal Federalism*. New York: Harcourt Brace Jovanovich.
- Oates, W.E. 1985. "Searching for Leviathan: An Empirical Study." *American Economic Review*, September, pp.748-57.
- Oates, W.E. 1989. "Fiscal Decentralization and the Size of the Public Sector: Some Further Reflections." *American Economic Review*, pp579-83.

- Oates, W.E. 1991. "Public Finance with Several Levels of Government: Theories and Reflections." Working Paper No. 90-20, University of Maryland, College Park, Maryland.
- Oates, W.E. (1993), "Fiscal Decentralization and Economic Development", Working Paper No. 93-4, University of Maryland, College Park, Maryland.
- Owens, J., and J. Nooregaard. 1991. "The Role of Lower Levels of Government: The Experience of Selected OECD countries." in J. Owens and G. Panella, eds., *Local Government: An International Perspective*. Amsterdam: North Holland.
- Prud'homme, R. 1994. "Decentralization in Madagascar", World Bank, Washington, D.C.
- Saunders. 1988. "Explaining International Differences in Public Expenditure: An Empirical Study." *Public Finance* 43(2):271-94.
- World Bank. 1994. *World Development Report 1994*. New York: Oxford University Press.

## Chapter 5

### Does Decentralization Improve Infrastructure Performance?

*Frannie Humplick and Antonio Estache*

The potential to improve public service delivery is one of the main arguments made in support of decentralization. By bringing providers closer to consumers the argument runs, accountability and the incentive to perform will increase. Overall, services should become more effective. This conclusion has not been subjected to rigorous testing, however. Most of the evidence is partial at best, and the impact of decentralization on the quality of public expenditures has not been measured.

Most of the tests of the impact of decentralization on public expenditures follow several papers by Oates (see, for example, his 1972 paper on fiscal federalism) charting the interaction between decentralization and the size of the public sector. Estache and Sinha (1995, this volume) provide the only analysis of the impact of decentralization on the level of infrastructure expenditures. They show that subnational infrastructure expenditures increase more than proportionately to the increase in the degree of decentralization in developing countries but less than proportionately in developed countries. Decentralization has a relatively modest positive impact on total public expenditures in the sector, and this effect is not highly statistically significant for industrial countries. These results could have different explanations. Infrastructure may matter much more to subnational governments, and to be able to spend more in that sector, they cut spending somewhere else. Subnational governments might simply prefer better and more expensive services, or they may be less effective at providing the same level of services. A much more detailed analysis is needed to choose the most accurate explanations. That analysis is the main purpose of the paper.

Extending the results of Humplick (1992), the paper first analyzes the available evidence on the impact of decentralization on the quality of several services traditionally provided by the public sector: roads, electricity, and water. It then tests the impact of decentralization on the performance of the infrastructure subsectors. Since performance can be measured in different ways, the paper examines several performance indicators for each subsector, and then determines if the outcomes converge.

The paper is organized as follows. Section 2 presents the methodology and the organization of the data available. Section 3 presents the main results concerning the impact of decentralization on the performance of roads. In Section 4 we present the empirical results of the impact of decentralization on the performance of the electricity sector. The impact of decentralization on the performance of water supply is included in section 5. Section 6 summarizes the main findings and Section 7 draws the main policy conclusions.

## Methodology

The impact of decentralization on infrastructure performance can be measured by considering performance to be a vector of outputs produced under a particular provision regime. This regime is characterized by the degree of decentralization and the structure of ownership - public, private, or mixed. Using such a general specification, a production function is defined as follows:

$$S = \theta K^{\beta_1} G_1^{\beta_2} G_2^{\beta_3} A^{\beta_4} + \mu$$

where

- $S$  = a vector of the performance of infrastructure;
- $K$  = the unit cost of labor, capital, and materials to maintain service quality - this variable could also be considered the private cost of maintaining service quality;
- $G_1$  = per capita GNP of a country, which measures the public capacity to maintain service quality;
- $G_2$  = the degree of decentralization in the provision or maintenance of service;
- $A$  = the land area of the country (thousands of square km), which is an input to the production of infrastructure stocks as well as a measure of the size and diversity of demand for service quality maintenance;
- $\theta$  = a measure of productive efficiency;
- $\beta$ s = estimated coefficients; and
- $\mu$  = a random term.

Performance is defined using indicators of service quality, which differ from one sector to another. For example, we consider the quality of the ride that road users receive - which determines vehicle operating costs and the comfort of using the road network. We distinguish between technologies, such as paved and unpaved roads, to better capture the variation in service quality. We also include the unit cost of road maintenance (dollars per km) as a measure of cost efficiency. Measures of performance for power supply include system losses, customers served per employee, generation capacity factor, rate of return on investment, and employees per Gigawatt-hour produced. These efficiency measures directly affect the quality of service that users receive. The performance of water supply services is measured by indicators such as production costs, operation costs, tariff levels, incidence of waterborne diseases, access to service, and water losses (unaccounted for water).

The coverage, and sometimes the definition, of the decentralization measure varies across sectors. For roads, since we are focusing on the quality of ride, we measure the degree of decentralization in the provision of maintenance. A continuous variable measuring the amount that the central government contributes to financing road maintenance is the primary measure of the degree of decentralization. We also consider the percentage of local government participation in the financing of maintenance, which measures the depth of decentralization. This distinction is

made to capture the separate effects of regional decentralization and local and municipal decentralization.

In the case of power, because we focus on efficiency, we use variables that measure the joint effect of ownership, competition, and the degree and type of decentralization. We define seven regimes that are characterized by the type of ownership (public, private, mixed), the presence of competition, and the type of decentralization (spatial, functional).

The measure of decentralization of water supply is two-dimensional: service provision may be centrally planned and service production may be centrally coordinated. A joint variable combining these two types of decentralization is used for the analysis, taking a value of 0 if services are neither centrally planned nor coordinated, 1 if services are either centrally planned or coordinated, and 2 if services are both centrally planned and coordinated.

In addition to the production function approach, we analyze the mean and variance of the performance vectors under different decentralization structures. This type of analysis allows us to comment on the impact of the degree and type of decentralization on the: level of performance (measured by the mean) and the diversity of performance (measured by the variance). A provision regime - such as spatial decentralization in the presence of mixed ownership - that achieves a high mean and a low variance is preferred, as it consistently performs well. Conversely, a low mean and low variance characterizes a provision regime that consistently performs badly. Between these extremes are regimes with high means and high variances or low means and high variances, which vary in their performance. High variance also indicates that a regime may be prone to inequities (regional or income-based).

### **The Impact of Decentralization on the Performance of Roads**

Decentralization of roads is defined using two variables: the amount that the central government contributes to the finance of road maintenance and the amount that local governments contribute to the finance of road maintenance. The two variables are used jointly in order to separate the effect of decentralization to regional governments and decentralization to state governments.

Performance of roads is defined by three variables: the percentage of the road network that is paved, the percentage of paved roads in poor condition; and the percentage of unpaved roads in poor condition. The first variable measures the value of the stock of roads, where paved roads have a higher value than unpaved roads. The other two variables represent the quality of that stock. The judgment of whether performance is good or bad is based on a standard measure, the International Road Roughness Index (IRI) as defined in Paterson (1987).

## A first look at the data

Decentralization results in better performance (more paved roads), but performance gains are limited and the variability of performance increases (Table 1). Higher levels of decentralization (subnational governments financing more than 55 percent of maintenance governments) results in a lower percentage of paved roads.

**Table 1. Performance in the Road Sector by Level of Decentralization**

Category	Paved (%)		Paved poor		Unpaved poor (%)		Unit cost of maintenance (\$/km)	
	Mean	Variance	Mean	Variance	Mean	Variance	Mean	Variance ('000)
Centralized	23	354	26	332	44	425	2,395	5,465
Partially decentralized	35	878	10	43	22	70	4,045	7,705
Totally decentralized	28	601	19	276	24	24	1,690	2,180

Note: Means and variances based on the 1985 performance outcomes in seventy-six developing countries. Partial decentralization is defined as more than a 56 percent but less than a 96 percent central government contribution to maintenance. Total decentralization is defined as less than a 55 percent central government contribution to maintenance.

The condition of paved roads is better under decentralized than under centralized provision indicating that local governments are better able to maintain high service quality than central governments. Local governments can better assess demand and more accountable to users. But there are limits to how much decentralization can achieve; countries in the partially decentralized group have a larger share of paved roads than those in the fully decentralized group (and in the centralized group).

The same limit to gains in performance can be observed with respect to quality. This finding could indicate that scale and technological effects may make central governments better providers of paved roads. However, increasing decentralization reduces the variation in condition, supporting the idea that decentralized units are better able to assess demand and gather the information necessary to provide the required level of service. The condition of unpaved roads shows a pattern similar to that of paved roads but with more dramatic differences between centralized and decentralized provision. This finding gives additional strength to the possibility that technological or scale and coordination effects for paved roads may be at work. It is also corroborated by data on the unit cost of maintenance, which are highest under partial decentralization. Unit costs under centralized provision are lower than those under partial decentralization but higher than those under total decentralization. The variation in the unit cost of maintenance across regimes follows the same pattern as the mean unit costs.

In sum, a first look at the data indicates that the impact of the presence of decentralization is stronger than that of level of decentralization.

### The production function approach

The stylized facts derived from this simple data analysis provide some indication how performance and decentralization interact in the road sector, but they do need to be complemented by a more systematic analysis. The impact of decentralization on performance can be addressed through the production function approach. This approach assumes that the good produced is the flow of services from the stock of roads in a country and that performance is explained jointly by many factors. The inputs to production include: labor, capital, and materials used to maintain the stock of roads; the capacity of the country to provide quality infrastructure services as represented by per capita GNP; the land area of a country, which measures the size and dispersion of service demands and maintenance responsibilities; the organization of service provision in a country as measured by the degree of decentralization; and a productive efficiency factor. The function is:

$$S_r = \theta K^{\beta_1} G_1^{\beta_2} G_2^{\beta_3} A^{\beta_4} + \mu_r$$

where

- $S_r$  = the quality of services generated from the road infrastructure stock;
- $K$  = the unit cost of labor, capital, and materials to maintain service quality on the road network (\$/km)--this variable could also be considered as the private cost of maintaining service;
- $G_1$  = per capita GNP of a country which measures the public capacity to afford maintenance of service quality;
- $G_2$  = percent central or local governments contribute to financing maintenance, which measures the degree of decentralization of service maintenance;
- $A$  = land area of the country (thousands of square km) which is an input to production of infrastructure stocks as well as a measure of the size and diversity of demand for service quality maintenance;
- $\theta$  = a measure of the productive efficiency;
- $\beta_s$  = estimated coefficients; and
- $\mu$  = a random term.

Service quality on roads is measured by a performance score generated from the three components of performance. The performance score, in turn, measures the impact of decentralization on performance. This score is calculated as follows:

$$S_{ir} = \beta_{i1} X_1 + \beta_{i2} X_2 + \beta_{i3} X_3 + \varepsilon_{ir}$$

where

- $S_{ir}$  = the performance score on quality of roads for country i;
- $X_{i1}$  = the percent of roads that are paved in country i;
- $X_{i2}$  = the percent of paved roads in good condition in country i;
- $X_{i3}$  = the percent of unpaved roads in good condition in country i; and
- $\varepsilon_{ir}$  = an error term.

Linearizing the production function, we derive the following multivariate relationships:

$$\ln(X_1) = \alpha + \gamma_1 Y_1 + \gamma_2 Y_2 + \gamma_3 Y_3 + \gamma_4 Y_4 + \delta_1$$

$$\ln(X_2) = \alpha + \gamma_1 Y_1 + \gamma_2 Y_2 + \gamma_3 Y_3 + \gamma_4 Y_4 + \delta_2$$

$$\ln(X_3) = \alpha + \gamma_1 Y_1 + \gamma_2 Y_2 + \gamma_3 Y_3 + \gamma_4 Y_4 + \delta_3$$

$$\ln(S_r) = \alpha + \gamma_1 Y_1 + \gamma_2 Y_2 + \gamma_3 Y_3 + \gamma_4 Y_4 + \eta_r$$

where

- $\ln$  = log transform of the performance variables;
- $Y_1$  = log transform of the unit cost of maintenance K in \$/km;
- $Y_2$  = log transform of the per capita GNP;
- $Y_3$  = log transform of the decentralization variable
- $Y_4$  = log transform of the area of the country in thousands of square km;
- $\alpha, \gamma$  = estimated coefficients; and
- $\delta_r, \eta_r$  = specification errors.

The unit cost of maintenance is a price variable, which measures the efficiency of maintenance activities. The coefficient  $\gamma_1$  measures the value of road infrastructure preserved - as represented by the performance variable - per unit of maintenance expenditure. The higher the unit cost of maintenance per value of infrastructure preserved, the less efficient is the system of maintenance. We therefore expect this parameter to have a negative sign.

The performance of road infrastructure should be positively correlated with the level of development - as measured by per capita GNP. A number of studies have shown a positive correlation between per capita GNP and the condition of infrastructure: Quieroz and Gautam

(1992) for the condition of roads and Humplick (1994) for electricity. We therefore expect the coefficient  $\gamma_2$  to be positive and significant.

We expect the size of a country to affect performance because it captures country specific effects and because a country with a large surface area should have more difficulty maintaining its infrastructure network than a smaller country (holding the size of the infrastructure network constant). We therefore expect the coefficient  $\gamma_3$  to have a negative sign.

We want to test whether decentralization has an impact on the performance of roads. A positive coefficient on the percent of central government contributions to maintenance financing would mean that centralization improves performance. A negative coefficient would mean the opposite. Similarly, a positive coefficient on the percent of local government participation in maintenance financing would mean that decentralization improves performance, while a negative value would mean the opposite.

**Table 2. Explaining the Performance of the Road Sector**

Variable	Share of paved roads in total	Share of paved roads in poor condition	Share of unpaved roads in poor condition	Overall performance score
Constant	n.s.	n.s.	3.66 (5.29)	5.46 (7.87)
Expenditure on roads in 1980	0.12 (1.62)**		n.s.	n.s.
Per capita GNP	0.32 (2.68)	-0.30 (-2.44)	n.s.	9.76 (2.70)
Country surface	-0.01 (-1.22)**	n.s.	n.s.	n.s.
Degree of Centralization	-0.19 (-0.42)**	0.55 (1.05)**	0.19 (1.97)	-0.21 (-1.55)**
Share of paved roads			0.12 (1.39)**	
Number of observations	52	63	57	52
Corrected R <sup>2</sup>	0.19	0.01	0.01	0.15

\*\* not significant, also denoted by n.s. when t-statistics are less than 1.6, except for the decentralization variables.

Note: T-statistics in parentheses.

The estimations were performed using the model specification above and data from seventy-six developing countries. The data are attached in Appendix 1. The model is generally poor, but it does give some indication of the overall correlation between decentralization and road quality (Table 2). The effect of centralization is significant only for the share of unpaved roads in

poor condition, meaning the higher is the degree of centralization, the worse off are the roads. In all other cases these variables are not significant.

The most significant variable in general is the trend variable (per capita GNP). The percent of paved roads increases with per capita GNP, as expected and the percent of paved roads in poor condition decreases. Past expenditures on maintenance (expenditures in 1980) are also positively correlated with percentage of paved roads (paved in 1985), but not very significantly. This may indicate that the value of the road stock improves with increases in maintenance expenditures, but that the effect is lagged (expenditures in 1985 had no effect on the percentage of paved roads in 1985). As expected, countries with larger surface areas have fewer paved roads, but this effect is not significant. When the paved road network is in poor condition, the unpaved network is as well. This result is expected since rural roads (many of which are unpaved) generally receive lower priority when resources are scarce.

### **The Impact of Decentralization on the Performance of the Electricity Sector**

Decentralization in electricity provision is defined in seven regimes that are characterized by type of ownership (public, private), the presence of competition, and type of decentralization (spatial, functional). These seven are defined as follows:

1. Centralized public monopoly controlling all aspects of service production.
2. Centralized public entities with the private sector owning a share of generation capacity factor.
3. Private monopoly.
4. Spatial decentralization (every region, state or province is viewed as a separate unit) of public regional monopolies.
5. Spatial decentralization of public and private regional monopolies.
6. Functional decentralization (generation, transmission, and distribution are separated) of non-competitive public and private entities.
7. Functional decentralization of competitive public and private entities

These categories measure varying degrees of decentralization as well as the joint effects of ownership and competition. Performance of electricity provision is defined by five variables: percent of system losses, customers served per employee, generation capacity factor, rate of return on investment, and employees per Gigawatts produced. These indicators measure different dimensions of performance, but all are related to the quality of service that electricity receive.

### **A first look at the data**

We first consider the variation in the level of performance as measured by the mean performance achieved under a particular decentralization regime (Table 3).

The level of system losses varies with the provision regime. Losses are the highest under centralized provision with mixed ownership and the lowest under private monopolies. System losses under centralized provision (with or without mixed ownership) and functional decentralization with competition are guaranteed to be low. Private monopolies also consistently perform well (low mean and low variance).

The number of customers per employee is highest under spatial decentralization, with public ownership and no competition (regional monopolies) and lowest under centralized public monopoly. The result indicates that regional decentralization allows greater access per employee than centralized provision, an unsurprising result given the performance gains expected with vertical unbundling. Functional decentralization, in which separate entities are involved in generation, transmission, and distribution, is a second-best option, showing benefits from horizontal unbundling as well. Variation in performance is greatest for regional monopolies, however. Centralized public monopolies perform poorly most consistently, serving fewer customers per employee. In other words, centralized provision results in lower but equal performance, possibly because of standardization, an outcome of centralization. The best performance in terms of customers per employee (high mean, low variance), is under functional decentralization with no competition.

**Table 3. Performance of the Electricity Sector by Industry and Government Structure**

Category	System losses percentage		Customers per employee		Generation Capacity percentage		Average revenue (\$/kwh)		Rate of return percentage		Employees per Gwh	
	Mean	Variable	Mean	Variable	Mean	Variable	Mean	Variable	Mean	Variable	Mean	Variable
<b>Centralized Monopolies</b>												
Public	18	48	56	1175	34	217	13.40	46.49	4	101	3.52	3.68
Mixed	20	73	65	3737	34	138	9.06	63.45	4	15	5.27	33.83
Private	14	37	45	4624	30	359	9.26	27.23	4	25	1.21	1.24
<b>Spatially Decentralized Entities</b>												
Public	17	20	145	20939	26	373	7.78	73.74	4	12	7.06	79.46
Mixed	17	31	65	3668	37	157	9.44	35.22	4	28	3.13	11.12
<b>Functionally Decentralized Entities</b>												
No comp.	18	80	81	3550	43	89	2.98	3.12	8	36	1.57	1.24
Comp.	18	9	103	5462	43	51	6.63	25.70	6	16	0.89	0.54

Note: Means and variances based on the 1988 performance outcomes in 100 developing countries.

Mean generation capacity is highest under functional decentralization (both with and without competition), meaning that generation resources are used more efficiently when separate entities provide generation, transmission, and distribution services. Spatial decentralization, however, results in efficient use of generation capacity only when assets are owned both publicly and privately. This result may derive from the benchmark competition that is possible under such a regime.

Revenues are maximized under centralized public monopolies. Functional decentralization without competition results in the lowest average revenue, although functional decentralization with competition generates a high average revenue. This result may indicate that public monopolies charge higher rates, but that collection is better under functional decentralization (when with competition). Revenues are consistently maximized under functional decentralization with competition, making the variance in revenue low under this regime. Spatial decentralization has consistently higher revenue if regional public monopolies are used rather than regional entities with mixed ownership. The impact of monopoly power in revenue generation is evident from these results. The best performers are those with a high mean and a low variance: functional decentralization with no competition (if the objective is to maximize revenues and the impact of high revenues on users is ignored) and functional decentralization with competition (if the objective is to minimize user charges).

The average rate of return on investment is highest under functional decentralization, in both the presence and absence of competition. Competition generates slightly lower rates of return, which is expected since profits are generally thinner under competition. Centralized and spatial monopolies as well as private monopolies show similar average rates of return. Centralized public monopolies have the highest variance in rate of return. All other regimes have very low variance. Functional decentralization with competition, the best performer, with a high mean and low variance, guarantees consistently high rates of return.

More workers are employed per Gigawatt-hour produced (a sign of inefficiency) under regional and national monopolies with mixed ownership. The most efficient regime is functional decentralization with competition, followed by private monopoly. The advantages of horizontal unbundling and competition are apparent in this case. The effect of provision regime on employees per Gigawatt-hour produced is a measure of efficiency in the use of labor. Regional monopolies have the highest variation in this variable. The best performers have low means and low variances: functional decentralization with or without competition and private monopolies, in this case.

### **The production function approach**

A production function approach is also used to model the impact of decentralization on the performance of the electricity sector. The good produced is the flow of services from the power generation, transmission, and distribution stock in a country. The inputs to production include: labor, capital, and materials used to maintain the stock in serviceable condition, as

measured by the average revenue from electricity sales in dollars per Kilowatt hour; the capacity of the country to provide quality infrastructure services, as represented by the per capita GNP; the land area, a measure of the size and dispersion of service quality demands and maintenance responsibilities; the organization of service provision, as measured by the degree of decentralization; percent public ownership; the number of actors involved in service provision (multiplicity); and productive efficiency. The production function that measured road performance is also used in this case.

The dummy for centralization has a slightly positive but insignificant coefficient, indicating that system losses are not affected by the degree of centralization (Table 4). Functional decentralization is preferred to spatial decentralization, with respect to system losses, as the dummy for spatial decentralization is not significant. Functional decentralization without competition also results in high system losses, as this dummy variable is positive and somewhat significant. Therefore, the best form of public provision is functional decentralization with competition. Competition seems to be at least as important as ownership and more important than the degree or type of decentralization for minimizing system losses. These results corroborate the findings of the mean-variance analysis conducted earlier, with the exception of the effect of private monopolies.

Public ownership of power generating capacity is significantly correlated with system losses; these losses increase with increasing public ownership. The large and significant constant term indicates that system losses that cannot be avoided because of transmission and distribution technologies. System losses also decrease significantly with per capita GNP as richer countries are better able to maintain their networks and hence reduce losses during transmission and distribution. The size of the country is also negatively correlated with system losses. This result makes sense as one would expect less transfer losses in large countries, where networks are less likely to be integrated.

The number of customers per employee is sensitive to national income: the higher is per capita GNP, the higher is the number of customers per employee. The result is understandable in that richer countries have a larger potential customer base. Centralization has weak negative effects indicating that under centralized provision, fewer customers are served. The effect of functional decentralization, which was considered the best regime in the mean-variance analysis, is corroborated as the dummy for spatial decentralization is not significant. Thus, this performance variable seems to be unaffected by the type of provision regime, governed more by income.

**Table 4. Explaining the Performance of the Electricity Sector**

Variable	System losses	Customer per employee	Generation capacity	Employee per gigawatt
Constant	3.43 (6.90)	n.s.	2.05 (2.66)	5.40 (4.69)
Public	0.19 (1.89)	n.s.	n.s.	n.s.
Degree of functional centralization	n.s.	-0.22 (-1.05)**	-0.21 (-1.24)	0.66 (2.66)
Degree of spatial decentraliz.	n.s.	n.s.	-0.32 (-1.81)	0.61 (2.28)
Degree of competition	0.23 (1.60)**	n.s.	n.s.	n.s.
Per capita GNP	-.20 (-5.41)	.45 (5.87)	0.20 (3.41)	-.64 (-7.32)
Country surface	-3.67 (-2.01)	n.s.	n.s.	-0.20 (-4.71)
Number of observations	97	84	96	91
R <sup>2</sup>	.24	.29	.12	.46

\*\* Not significant (also denoted by n.s.)

Note: T-statistics are in parentheses.

Generation capacity is negatively correlated with centralized provision and spatial decentralization. Income and country size, however, have the most significant effects. These results support the finding (in the mean-variance analysis) that functional decentralization is the best regime with respect to maximizing generation capacity.

The rate of return is independent of all variables except per capita GNP and the country size. None of the dummy variables representing the provision regime are significant.

Production inefficiency as measured by the number of employees per Gigawatt-hour produced, is positively correlated with centralized provision and spatial decentralization. This relationship indicates that national and regional monopolies tend to have larger labor forces and hence a smaller number of employees per unit of production. Per capita GNP and the size of the country are negatively correlated with employees per Gigawatt-hour produced, indicating that richer and larger countries can afford less-labor-intensive technologies and more efficient production technologies. These results corroborate the findings in the mean-variance analysis,

where private monopolies and functional decentralization were found to be the best regimes with respect to this performance variable.

### **The Impact of Decentralization on the Performance of Water Supply**

Decentralization of water supply is defined by a variable that can take a three different values. This variable is equal to zero if the water sector is completely decentralized, one if the sector has either national planning or central coordination, and two if the sector has both national planning and central coordination.

#### **The basic facts**

The performance variables used for water supply are: the production costs of water in dollars per cubic meter; the operation costs in dollars per cubic meter; tariffs in dollars per cubic meter; the incidence of waterborne diseases in cases per 100,000 people; the percentage of access to service at the national level; and the percentage of water losses as measured by unaccounted-for water.

Water production costs decrease with greater centralization, possibly indicating the presence of economies of scale in production (Table 5). Decentralization seems to have no impact on operating costs. Tariffs are generally lower under centralized provision, possibly because they are centrally controlled or because production costs are lower under centralized systems. Incidence of waterborne diseases is also lower under centralized systems because of the greater likelihood that sound regulations will be passed with centralized planning and coordination. However, despite lower water production costs, fewer people have access to services under centralized provision. The importance of decentralization in assessing demand is evident from this result. The data also show that centralized provision is less efficient as water losses are higher.

**Table 5. Decentralization and Performance of the Water Sector**

Category	Production costs (\$/m <sup>3</sup> )		Operating Cost (\$/m <sup>3</sup> )		Tariffs (\$/m <sup>3</sup> )		Waterborne diseases (per 100,000)		Access percentage		Water losses percentage	
	Mean	Variable	Mean	Variable	Mean	Variable	Mean	Variable (000)	Mean	Variable	Mean	Variable
Centralized	0.49	0.36	0.34	0.16	0.25	0.04	1,333	1,942	73	343	41	93
Partially decentralized	0.44	0.15	0.33	0.10	0.28	0.15	2,503	7,513	58	454	34	162
Decentralized	0.65	1.27	0.34	0.07	0.32	0.10	3,680	16,883	65	587	33	153

Note: Means and variances based on the 1992 performance outcomes in 103 developing and industrialized countries.

The interesting difference between the performance of the water sector and that of roads and electricity is how performance under each decentralization regime varies. In the water sector variance is minimized with increasing degrees of centralization for all performance indicators

except tariffs and water loss. This finding indicates that decentralization may result in more appropriate pricing structures, that is, pricing by location and cost of production rather than uniformly. Additionally, greater incentives to minimize losses at the local level may exist - albeit jointly with lower technological capacity - explaining why the variance in water loss is low while mean losses are high.

### The production function approach

A production function approach was also used to investigate these effects. The effect of centralization on production is negative but not significant (Table 6). Production costs are mostly affected by the size of a country, increasing when the size increases. The size of a country and the presence of centralized provision may be correlated, which needs to be corrected for. The ability to recover costs, defined as the percentage difference between revenues and costs, increases with per capita GNP and decreases with the size of a country. This result corroborates the previous results in that large countries have high water production costs and hence low possibilities for cost recovery.

The centralization variable is not significant; access to water supply seems to be predominantly a question of income and size. The large constant term means that an average level of access that is always present perhaps a basic level of service. This result is expected as water is a good that everyone uses and people find a means to obtain water service even in the absence of organized provision. Income has a weak impact on the reduction of waterborne diseases. The impact of centralized provision is strong with respect to water losses; unaccounted-for water increases significantly with increasing degrees of centralization.

**Table 6. Explaining the Performance of the Water Supply Sector**

Variable	Production costs	Operation costs	Percentage of water losses	Incidence of waterborne diseases	Percentage of access to service
Constant	-4.32 (-2.51)	n.s.	2.46 (5.44)	8.64 (2.25)	3.45 (2.39)
Degree of centralization	-0.10 (-0.35)**	-0.01 (-0.27)**	0.01 (0.89)**	n.s.	0.38 (1.74)
Per capita GNP	n.s.	n.s.	0.27 (4.90)	n.s.	n.s.
Country surface	0.47 (2.06)	-0.37 (-2.71)	-0.003 (-1.01)**	n.s.	n.s.
Number of observations	17	29	41	22	14
Corrected R <sup>2</sup>	0.15	0.16	0.36	0.01	0.01

\*\* Not significant (also denoted by n.s.)

Note: T-statistics in parentheses.

### Summary of Findings and Policy Conclusions

A quick review of this paper's findings reveals decentralization has no clear-cut effect on every indicator of infrastructure performance (Table 7). In fact, decentralization has no statistically significant effect on many indicators. On the other hand, the only clearly undesirable effect found is the impact on employment in the electricity sector (the only sector for which we had employment data): decentralization increases employment lowers labor efficiency in electricity.

**Table 7. The Main Effects of Decentralization**

Sector	Desirable	Undesirable	Neutral
Roads	<ul style="list-style-type: none"> <li>condition of <u>unpaved</u> roads improves</li> <li>overall performance of roads improves</li> </ul>		<ul style="list-style-type: none"> <li>condition of <u>paved</u> roads is unchanged</li> <li>share of <u>paved</u> roads in total network is unchanged</li> </ul>
Electricity	<ul style="list-style-type: none"> <li>generation capacity improves</li> <li>tariffs are lower</li> </ul>	<ul style="list-style-type: none"> <li>employees per Gigawatt per hour is high if there is no vertical unbundling</li> </ul>	<ul style="list-style-type: none"> <li>customers served per employee is unchanged</li> <li>system losses are unaffected (but spatial decentralization preferred to than functional decentralization)</li> </ul>
Water supply	<ul style="list-style-type: none"> <li>percentage of water loss decreases</li> </ul>		<ul style="list-style-type: none"> <li>production costs unchanged</li> <li>operation costs unchanged</li> <li>percent access to service unchanged</li> <li>incidence of water borne diseases unchanged</li> </ul>

In each of the sectors at least one performance indicator improved as a result of decentralization. But these gains were limited. For instance, decentralization results in better performance of roads (as measured by the percentage paved and unpaved roads in good condition) only up to a certain point; ultimately gains from economies of scale dominate gains from decentralization.

The mean-variance analysis also shows that decentralization can result in higher variance in performance across jurisdictions. The larger variance may reflect better assessments of demand and willingness to pay, but may also reflect different local capacities to provide services. These differences in performance can be minimized if competition is present, either among regional or district monopolies or among private firms. The advantages of centralized provision are more

obvious when providing goods with high technological or coordination requirements, such as paved roads and piped water systems with treated water. However, the operation of these services is almost always cheaper when carried out by local authorities. These results are corroborated (in the case of water supply) by the lower incidence of waterborne diseases and the lower costs of producing water under centralized provision. The costs of operating water systems (mean and variance) and water losses (mean) are lower with partial decentralization, however.

Policymakers should realize from this empirical analysis that the effects of decentralization are always going to be sector- and country-specific. It is unreasonable to make an across-the-board generalization about the type and level of decentralization that would be optimal for all situations. But the paper does show that policymakers have some tools that they can use to influence the performance of a decentralized sector. For example, industry structure affects the performance of infrastructure sectors. Policymakers may benefit from considering other options, such as service contracting, leasing, and service delegation to the private sector, when considering transferring responsibilities to lower levels of government.

### References

- Estache, A. and S. Sinha. 1995. "Does Decentralization Increase Government Expenditure on Infrastructure: A Macroeconomic Perspective?" World Bank, Latin America and the Caribbean Department, Washington, D. C.
- Humplick, Frannie. 1992. "Private Ownership, Competition, and Decentralization: Impacts on Infrastructure Performance". World Bank, Latin America and the Caribbean Department, Washington D.C.
- Humplick, Frannie. 1994. "Does Multiplicity Matter More than Ownership in the Performance of Infrastructure?" In Advances in Spatial Science. City: Springer Verlag.
- Paterson, William D.O. 1987. *Road Deterioration and Maintenance Effects: Models for Planning and Management*. Baltimore, Md.: Johns Hopkins University Press.
- Quieroz C., and S. Gautam. 1992. "Road Infrastructure and Development: Some Diagnostic Indicators." Policy Research Working Paper 921. World Bank, Infrastructure and Urban Development Department, Washington, D.C.
- Oates, Wallace. 1972. *Fiscal Federalism*. New York: Harcourt, Brace, Jovanovich.

## Chapter 6

### The Decentralization of Public Services: Lessons from the Theory of the Firm

*Jacques Cremer, Antonio Estache and Paul Seabright*

The large expansion of government powers in some of the Western countries in the post World War II period was given theoretical backing by the theory of market failure and the advances in the studies of externalities, public goods, and optimal taxation. Many of these studies have found their way into the analysis of economic development issues. During the 1980s, these theories, or at least their applications in the public debate, have been justly criticized for their lack of attention to government failures. Moreover, in recent years government intervention in the economy has come to be regarded with more suspicion than in the past, and an increasing number of policymakers in countries as different as Argentina, China or Hungary have adopted a more pragmatic approach to development favoring reliance on the market to allocate goods and service.

The theoretical intuition behind the superiority of market allocation is well known. Given the efficiency of market exchanges, agents should be left to make as many decisions for themselves as possible. When these decisions are transferred to the public sector, there are asymmetries of information and the associated opportunities for rent seeking activities, and the loss of efficiency may be large enough for even the poorest members, who are supposed to benefit from these policies, to lose out.

These insights have been applied to the organization of the public sector itself. If political economy teaches us that as many decisions as possible should be decentralized through the market, doesn't it follow that within the public sector decisions should also be decentralized as much as is feasible? What cannot be left to private initiative should be handled by the lowest possible level of government.

These policy insights, however, are based on a very unbalanced theoretical underpinning. Economists have a good theory of the functioning of markets. Our understanding of governments and of public administration is much more imperfect because these topics are more complex. This makes it difficult to compare two types of public provision, for instance a very centralized government with a federation that leaves much power to local units, since neither is very well understood.

We believe that improvements in the analysis of the internal functioning and the optimal structure of government should be made through the transfer of the intuitions developed in the theory of the firm in the last twenty years. Some work has been done on this topic, but much more can be done. In particular, the very important advances of contract theory in the last ten years have not been adequately integrated into the analysis. The aim of this paper is to open

channels of thought along these lines, emphasizing the provision of infrastructure. This is not to imply that results from the theory of the firm can be directly imported. The public sector has very specific features, some of which will be discussed below. What can be imported are intuitions and techniques for the study of organizational problems.

### **The Received Wisdom on Decentralization**

This section summarizes the received wisdom on decentralization of responsibilities for regulation and provision of goods and services in the standard public economics literature. It outlines the key assumptions underlying the main policy guidelines of the standard public finance literature on fiscal federalism, focusing in particular on those that can much more easily be addressed by a contractual approach to the issues raised by the structure of government.

#### **A quick survey**

The standard public finance literature provides both ex-ante and ex-post arguments for decentralization. The classic ex-ante case for decentralization is provided by Oates in 1972. He points out that public goods can have spatial characteristics reflecting the specific boundaries--global, regional or local--of the benefits they provide to their consumers. Oates' decentralization theorem suggests that, for a given information structure about demands, each type of good should be provided by a level of government -- central, state or municipal--enjoying a comparative advantage in accounting for the diversity of preferences in its choice of service delivery. Club theory provides related arguments for an optimum size of local authorities.

Based on these demand elements and on the recognition that spillovers and other forms of production and consumption externalities can matter, a "standard" list of desirable expenditure assignments--in terms of provision and/or responsibility--provides the basis of the policy guidelines for countries considering decentralizing government structures. For instance, airways and railways should be a central concern in view of the national scope of their benefits and costs, while provision of services in highways could be national, state or local--balancing between spillovers and local preferences.

The comparative advantage of the various government levels reflects an assumed government failure. In one argument, the failure stems from an informational asymmetry between central and subnational governments. Central governments are assumed to have some institutional disadvantage in picking up local information on preferences. More decentralized governments have better knowledge of local preferences, because they have access to information denied to central government, or because they more accurately observe preferences. In a second government failure argument, the central government is assumed to be institutionally compelled to adopt a uniformity constraint in service delivery. Even if it were able to identify the diversity of

demands across regions and municipalities, it could not diversify its supply accordingly. These failures reveal the second best nature of the decentralization argument.

The classic ex-post case for decentralization was made by Tiebout in 1956. Tiebout's claimed that, ex-post, population mobility reinforces the ex-ante case based on superior information or flexibility of local government. This mobility should eventually ensure a perfect match between public sector supply and consumer preferences. Consumers vote with their feet and move to the municipality or region which provides them with the services and financing mix -- taxes, user fees, etc.--they want. In sum, it explains how jurisdictions of optimal size are established or how individuals take membership in these "local clubs".

### **Shortcomings of the Tiebout approach**

Since most analysts of fiscal federalism have used generalized versions of the Tiebout model in which the incentives of the different districts are fundamentally linked to the ability to attract new inhabitants and/or new capital, it is worth focusing on some of its limitations as a model of political decentralization in practice:

- The role of the national government is not endogenous, or rather it can only be considered as trying to circumvent the negative aspects of the competition between jurisdictions.
- The governments' objectives in the Tiebout model are assumed to be profit maximization (see Bewley, 1981), without any discussion of how such objectives might arise from a realistic model of the political process. The latter issue is generally only addressed explicitly in public choice models.
- Government failures (including corruption) can arise at the subnational level as they arise at the central level.
- The actual mobility of factors is generally much more limited than assumed by Tiebout and the effect of positive decisions by the government of one district will influence the competitive position of the district only in the long run. From an empirical point of view, as pointed out by Walsh (1992), the main relevance of the model is in a metropolitan setting--i.e. within suburbs located near other communities and hence with exit options.
- Mobility can give rise to externalities which are not accounted for in the design of the financing mode of the jurisdiction.
- In practice, politicians often try to favor specific interest groups in their districts (for instance, US congressmen will try to introduce in the law tax breaks designated to favor specific firms whose headquarters are in their districts). Tiebout theory would predict more stress on favoring the transfer of factors of production to the district.
- Responsibilities are actually often shared by various levels of government. For instance, governments must decide on aggregate road expenditures in a jurisdiction, and on the allocation of this expenditure among different types of roads. The first

decision can be left to the federal government and the second to the local government. Similarly, the federal government can set pollution standards, and the local government can be in charge of monitoring their implementation (see Estache and Zheng (1992) and (1993) and Jack (1992)). The difficulty in the study of this responsibility sharing mechanism stems from the modelling of the incentives of the different levels of governments.

In addition to appreciating the particular shortcomings of the Tiebout framework, it is important to appreciate what the underlying approach can and cannot be expected to achieve. Tiebout's basic insight was that population mobility can enable governments to overcome the well-known problem of inducing citizens to reveal their preferences for public goods. This problem arises if governments have no way to exclude from consumption those citizens who state that they would prefer not to pay for the provision of a certain public good. If goods are "local", however, they can be provided only for the citizens of a given local jurisdiction (together with a local tax), thereby excluding from consumption all non-residents and allowing citizens in their choice of residence to select their preferred combination of public goods. In the limit, when mobility is costless and various other technical conditions are satisfied, the public goods problem disappears and the allocation of resources is efficient.

The Tiebout approach has nothing to say, however, about how the appropriate local bundles of public goods might come to be established. This might, of course, happen as the result of spirited competition between independent local governments (though to do so they would have to be profit maximizing, and it is far from clear how such a goal might emerge from any plausible political process). But there is no reason in principle why a central government could not also put the Tiebout insight to use, and differentiate its supply of public goods by locality in order to induce the revelation of preferences. In short, the Tiebout model describes the virtues of local differentiation of public goods supply, not the virtues of decentralization of power. In order to understand the pros and cons of decentralization as such, it therefore needs supplementing by an account of the respective abilities of central and local governments to undertake the kind of local differentiation whose virtues the Tiebout model has described.

Such an account would return us essentially to the *ex ante* approach to decentralization. Underlying many scholarly as well as popular accounts of decentralization is a view of the essential informational advantages of local government, and an implicit model with the following elements:<sup>72</sup>

- A country is divided into n districts, and there are no other political divisions, either above the district or below it.
- Each district has a local government which has knowledge of the relevant characteristics of that district.

---

<sup>72</sup>A model with some of the features discussed below is presented in De Groot (1988).

- Each local government takes decisions in the interest of its own district, without taking into account the desires of other districts except if this is imposed by the federal government.
- There is a central government that takes decisions in the interest of the country as a whole (whatever exactly this may mean).
- The central government knows only the average of the characteristics of the districts. Consequently it can do no better than implement a uniform package of public goods for all districts.<sup>73</sup>

For each issue, the power to take decisions is given either to the central government or to the local governments. The types of issue that we have in mind are the levels of expenditure on elementary education, pollution standards, the mileage of new roads to be built.

Such a model yields results that are quite close to the "common" wisdom on decentralization: there is a fundamental trade-off between decisions that are more appropriate to local conditions and the internalization of externalities. There are of course other benefits from coordinated decisions than simply the internalization of externalities: those due to the exploitation of increasing returns, for instance.

The drawback of the model, however, is that it leaves the informational advantage of local government essentially unexplained. To explore this issue further we turn to a discussion of the implications of recent developments in contract theory.

### **A Simple Contract Model of Decentralization**

In this section, we revisit the preceding model with the help of a simple contractual approach. This allows us to enrich the description of the communications between federal and local governments. We begin by a brief exposition of revelation contracts, and apply the insights to the problem of decentralization.

#### **Asymmetry of information and contracts**

For many years, economists had talked informally about the strategic use of information (see for instance the famous planning debate of the 1930's between Hayek and Lange (1938)), but it was not until over thirty years later that the strategic use of information was for the first time formally integrated into our models. This revolution changed our understanding of markets (following the path breaking contributions of Akerlof (1970) and Spence (1973)) and of

<sup>73</sup> This inference is not correct in a dynamic model in which the central government, while initially uninformed, experiments with differentiated public good supply and thereby learns about the different characteristics of the districts. This would be similar to a tatonnement process in Walrasian models. We are not aware of such a dynamic model explicitly developed in the public finance literature.

incentives in organizations (following the no less path breaking contributions of Groves (1973) and Weitzman (1974)).

The basic framework is very simple. A federal government wants a municipality to build a sewage system in a poor neighborhood. It has no administrative power to force it to do so, and must offer a cost sharing formula. Typically, this formula will be part of a contract that links the amount paid by the federal government to the characteristics of the sewage system that is built. If the costs of building the sewage system are better known to the local government than to the federal government, the former will be able to extract an informational rent. This informational rent is not only a transfer from one government level to another, it has efficiency costs: in order to reduce it the federal government will build a cost sharing formula that will induce the local government to choose a system that is not optimally dimensioned.

It is possible to show that the federal government of our example never loses anything by offering a contract of the following form: "Tell me everything you know that is relevant to the estimate of cost. As a function of what you tell me I will, according to a predetermined formula, transfer funds to you and order you to build a system of predetermined characteristics".

Furthermore, it is possible to choose a contract such that the local government will truthfully reveal its information. The equivalence of any cost sharing formula to one of these "revelation mechanisms" in which the informed party is given incentives to announce its information truthfully, is called the revelation principle.

The intuition behind this principle is that, given any initial contract, the federal government can calculate under what circumstances the local government would have incentives to misreport its information. It can then modify the contract so as to increase the transfers to which the local government would be eligible under these circumstances, so as to leave it no worse off if it tells the truth. The increased transfers which it must therefore implement are a necessary cost of the initial asymmetry of information, and cannot be reduced by any strategic manipulation. The validity of the principle depends, however, on the assumption that the federal government knows enough about the payoffs of the local government to calculate its incentives for lying; even more importantly, it depends on the assumption that it has no difficulty committing itself to a truth-inducing contract. We shall discuss the limitations of these assumptions below, but shall concentrate for the moment on the theory's strengths.

The revelation principle can easily be adapted to a situation where the construction of the sewage system extends over a long period of time and where the information becomes available to the local government progressively. Then, any contract between the two parties is equivalent to a contract in which the local government informs the federal government as soon as information becomes available.

The fact that any contract is equivalent to a revelation mechanism is an extremely useful technical tool. It also reveals the limitations of the theory. The Constitution of the United States

can be considered the founding contract of that country. Using contract theory to analyze the present, one would need to assume (implicitly) that the Founding Fathers had foreseen present conditions as one of the contingencies in the contract they drew up.

### **Implications for decentralization**

In light of contract theory, the basic model that we have sketched above can be substantially modified. There is no reason to assume that the federal government will accept the fact that the information of the local government is not accessible. It can propose contracts (implicit or explicit) that ask the local governments to reveal their information and commit it to some actions as a function of this information. All the apparatus of contract theory can be used to study the end result.

A revelation mechanism need not only be interpreted as a contract signed between the federal government and the local governments. It can also be thought of as a system of taxation, where the tax is levied according to the observable actions and characteristics of the district. The same fundamental trade-off will be involved: efficiency requires large informational rents to the more fortunate districts. This makes a very strong case for performance based grants, though it also underlines that such grants may conflict with considerations of equity. The informational rents will not necessarily be allocated according to any normatively justifiable formula.

In order to limit informational rents, the federal government will find it desirable to accept inefficiencies. The service that the district provide will not be priced in such a way that marginal cost is equal to its social marginal value. It will only be for these districts who are the most efficient at providing the service that the equality will hold.

An example may help. In a country in which the federal government subcontracts to the local governments maintenance of the roads, the latter would try to exploit their superior knowledge of local technical conditions and of the taste of the local population. They would have a tendency to overstate costs and benefits of additional maintenance. The theory tells us that they will be able to reap some advantage from this superior knowledge. Furthermore, in order to limit this advantage the federal government will accept that some inefficiencies creep into the system, and the direction of these inefficiencies can be predicted: there will be too little maintenance.

The rigour and clarity of the theory of revelation mechanisms has an associated cost. By appearing to suggest that a central government can, if it wishes, overcome the informational advantages of local government, it undermines the entire basis of the trade-off between information-gathering and the internalization of externalities that constituted the conventional wisdom as we characterized it in section 2. The conclusion might appear to be that centralization is always to be preferred to decentralization, but in fact the subversion of the traditional approach goes further than that. For if a central government can sign contracts with local governments, what is to prevent local governments from signing contracts with each other without the intermediation of a central authority at all?

### **Why do we need a central government in order to internalize externalities?**

The management of river basins represents a typical example of decisions that one should expect to leave to levels above the local level (assuming, of course, that, as is usually the case, the river flows through many localities). Indeed there are strong externalities with the upstream localities able literally to dump their trash on the downstream localities. If this is the case, why can't the externality be resolved through direct negotiations between the localities themselves?

More generally, the conventional wisdom has generally assumed that we need an authority that can order subordinate units to limit negative externalities, or encourage them to produce more positive externalities. There is no explanation of why we cannot apply a version of the reasoning in the Coase theorem, which states that in the absence of negotiation costs, bargaining will lead to optimal outcomes. One may acknowledge that the Coase theorem is more seductive at the theoretical level than as guide to reality, and one cannot expect a totally satisfactory solution to this problem. However, without at least some thought given to the discrepancy between theoretical and practical intuition, it is difficult to provide guidelines on the circumstances in which it would be better to let districts negotiate between each other (see Gatsios & Seabright, 1989, and Jack, 1992, for discussions of this point).

So far, then, the application of contract theory to the analysis of decentralization has yielded a somewhat nihilistic conclusion. Not only has it shown that the supposed advantages of decentralization are not really advantages; it has also shown that the supposed disadvantages of decentralization are not really disadvantages. In consequence, without further refinement it implicitly makes it impossible to discuss the allocation of responsibilities among the different levels of government at all. For example, the literature contains arguments for the decentralization of secondary schools to local governments as well as arguments why it should be run at a regional or national level. How would we use standard contract theory to study these two situations? In both cases, contracts, implicit or explicit, would be signed, and some parties would benefit from informational rents due to their superior "time and place" knowledge. There would really be no reason to have very different outcomes in one case and the other. Even if the objectives of the regional and the local governments were different, they would presumably be drawn to bargain together in such a way that the terms of the contract would represent both of their objective functions. The main difference would be in the identification of the party responsible for paying the informational rents to the other.

The implication of this reasoning is that studying the imperfections of contractual bargaining is not just the result of a pedantic desire for a baroque modelling strategy. On the contrary, it is absolutely central to understanding the strengths and weaknesses of decentralization in government. If contractual bargaining worked perfectly, the extent of decentralization in government would be an irrelevance. In section 4, therefore, we discuss three important aspects of the imperfections of contractual bargaining that are of particular importance: the endogeneity of information acquisition, the incompleteness of contracts, and the possibility of renegotiation.

## Contract Theory with Imperfections in Bargaining

Both the conventional wisdom on decentralization and first-generation contract theory treated the allocation of information as exogenous to the model. In reality the information possessed by agents depends on the cost of acquiring it and the cost of processing it, and therefore on the incentives that they have to incur these costs. A good allocation of responsibilities should give the proper incentives to agents to incur these costs.

For instance, the control of politicians by the electorate depends crucially on the information that the electors have on the performance of the different government entities to which they belong. As we discuss below, the allocation of responsibilities among levels of government affects this acquisition of information, by increasing the value of the information to voters in their efforts to control politicians.

The neglect of this point can also lead to underestimation of the cost of citizen participation in the running of government and can lead to recommendations for the creation of overly complicated administrative structures, with each citizen belonging to a multiplicity of districts, one by each type of public good.

### **The endogeneity of information acquisition**

Closer attention to the endogeneity of information acquisition is the first step in understanding whether and to what extent local jurisdictions enjoy any kind of informational advantage over central ones. Let us begin with an example. Should a public transportation system in a provincial city be run by a local agency or by a branch of a national agency? The received wisdom would answer that it should. Externalities between cities are negligible, and hence the informational advantages of proximity dominate. Upon reflection though, it is difficult to understand what these informational advantages are. A national transportation agency could and presumably would employ representatives living in the city, who would have access to the same sources of information as the representatives of a local agency.

There seem to be two common reasons why local authorities are assumed to be better informed about local conditions than national ones. First, there is direct observation. Because local politicians and civil servants live in the district, they have direct access to information (quality of service, traffic problems) which is not available to individuals who live far away. Furthermore, the information that they do not gather directly can easily be provided by acquaintances, family members, or simple citizens who have easy access to them. Second, there are formal mechanisms. Governments often put in place formal procedures through which they

collect information from their constituents: consultative assemblies, public hearings, advisory boards.

If local governments indeed have better information than central governments, it must be either because some of these techniques are available to them and not to the central government, or because they have better incentives to use them. However, it is clear that there is no reason why central government cannot use any of the techniques available to local government. Central governments do name representatives to local areas who collect information on their behalf (for instance, the French préfets); and they do use mechanisms by which citizens of a local area can express their views and provide information.

If anything, the balance of advantage as far as the availability of information gathering techniques is concerned probably lies with central government. There are economies of scope in the collection of information: a central agency which runs many transportation systems can transfer techniques acquired in one of them to the others at low cost; it can also afford to hire technicians in more specialized areas than can a local agency.

If central governments do not in fact use the techniques available to them as assiduously as local governments (a matter on which empirical evidence is unclear and which will differ according to the type of information in question), this must be because they have less incentive to use them.<sup>74</sup> In the city transportation case, it will be because local politicians, who live among and are up for re-election by local citizens, have more incentive to listen to what those local citizens say. National politicians could find out if they wished to the views and opinions of local citizens; but they will have less incentive to take them seriously. Understanding why this is so depends critically on appreciating the significance of the incompleteness of political contracts.

### **The incompleteness of contracts**

*The notion of incompleteness.* Whether in economic or in political life, a contract allocating responsibility to various parties for the accomplishment of certain tasks can never cover all the eventualities that may occur. This may be because the parties simply do not foresee all relevant eventualities; it will certainly be because the cost of writing contracts to cover them all would be prohibitive; and more subtly, some eventualities, though foreseeable and describable, could not be verified by any agency capable of enforcing the contract. For example, suppose the national government tried to sign an undertaking with the citizens of the provincial city to indemnify them financially if the performance of their transportation system were inadequate. Even in circumstances where the citizens and the government both knew perfectly well that the performance of the system was inadequate, such a clause would be unenforceable.

---

<sup>74</sup> Note that the higher incentive of local politicians to use local information does not imply that corruption may be a lesser problem in decentralized governments. In fact, corruption may actually become a more serious problem if increased access to information is not matched by increased accountability of local authorities.

Thanks to Coase's (1937) insight that a good theory of the firm had to be built on a precise description of the costs of transactions, theorists of the firm have long focused their attention on the difficulties of writing contracts. If one can write explicit contracts for the delivery of some goods and services, this transaction can be conducted between firms without any loss of efficiency. When explicit contracts have limitations, there might be place for internal organization.

The first formal model of incomplete contracts is the model of the employment relationship due to Simon (1951).<sup>75</sup> Simon argued that an employer cannot predict accurately the tasks it would like a future employee to do; it is even impossible to write down explicitly a list of which tasks have to be accomplished under which circumstances. Under these conditions an employment contract specifies a salary and a set of tasks that the employer is allowed to ask the employee to do. Williamson (1975), who provided an essential link between this literature and the modern formal contracting literature, conducts a careful and exhaustive study of the difficulties of contracting.

Following Grossman and Hart (1986), this has been the subject of much recent work which shows that even relatively simple transactions necessitate very complex contracts. The sale of an airplane gives rise to a contract of several hundred pages. Redistribution of income among political districts necessitates formulae whose consequences are not always clearly anticipated by their designers. In practice, the complexity is reduced by writing contracts that do not discriminate as finely as ideally desirable between different circumstances. For instance, the proportion of the cost of a project to be paid by different levels of government will be dependent on the values of a subset of all the variables that economic theory would deem relevant. In practice it is important to discriminate between two types of variables:

- 1) those variables that depend on the actions of the parties. For instance, redistribution of funds between different areas should in principle depend on all the effort they make to provide services to the poorest segments of the population.
- 2) those variables that are exogenous to the actions of the parties. For instance, redistribution should depend on the relative prices of a number of internationally traded goods which influence the economic well being of the poor or the cost of providing them with services.

In both cases we observe real-life arrangements that take into account only some of the many variables that are potentially relevant.

*Implications for the theory of organizations.* This renewal of contract theory has had powerful implications for the theory of organizations. If it is impossible to specify fully in a contract what actions should be taken by which party, the best the contract can do may be to decide which party has the discretion to take the relevant decision. In other words, contracts

---

<sup>75</sup> Alchian and Demsetz (1973) present counterarguments to the thesis of Simon.

become less a matter of specifying particular actions and more a matter of allocating rights of control. By contrast, complete contracts would remove the need for discretion and thereby make redundant the notion of control.

The notion of control paves the way for decisions with a "0-1" or "yes-no" character in contract theory. This sheds light on issues of integration: organizations are or are not vertically integrated with each other. This type of sharp distinction is not easily available in standard contracting models.

The idea that parties to a contract will need to agree on allocations of control rights also helps to explain the power of incumbency in organizations. With a complete long term contract the only benefits of incumbency come from the accumulation of specific capital or other physical changes in the system. All the rents associated with these benefits can in general be extracted by the party who has the most bargaining power at the outset. With incomplete contracts, the situation changes. One must often leave some power ex-post to the agent, who may share in the rents associated with the contract even if there is no asymmetry of information.

*Implications for the theory of decentralization.* This insight can be applied to the problem of the difference between giving the right to control an agency to a local government or to a central government. The contract between the agency and its controlling body specifies certain actions that it must take, certain rights that it has, but also certain actions that the controlling government body is entitled to take. In order to understand the consequences of the contract, it is therefore crucial to understand the objectives of the controlling body, and hence to know its identity. So in the case of the city transportation authority, answering to a local controlling body will mean having its policy determined by strictly local considerations, which is desirable so long as spillover effects on and from other regions are small. Answering to a national controlling body would mean possibly benefiting from the national coordination of policy but also being run by those with many other priorities than the welfare of citizens of the city concerned. Centralization may be said therefore to improve coordination but reduce accountability.

Similarly, the contract between the electorate and a politician elected to office is very incomplete. The actions taken by the politician will depend on a number of factors, including the other tasks for which he is responsible. This is rather trite, but it is very difficult to integrate those considerations in a complete contract model, where the electorate can give sophisticated instructions to the politician and adjust precisely the reward to the action taken. Likewise, contracts between jurisdictions will be very incomplete, and there will consequently be limits to the extent to which externalities can be internalized purely by bargaining between jurisdictions.

A stylized model of political accountability that explicitly incorporates the incompleteness of contracts is presented in Seabright (1994). Essentially it is a model in which voters seek to provide politicians with incentives to act in their interests. However, the "performance" of the politicians depends on factors that are not verifiable and cannot be made the subject of an explicit

contract. Therefore the only way to provide politicians with the right incentives is to give voters the power to eject them if they are dissatisfied.

Centralization in this model involves two features. Its advantage is that by allowing the central government to control more levers of policy it internalises any externalities between the regions. Its disadvantage is that any one region loses its ability to eject the government purely according to its own preferences; it faces the risk that in some circumstances a government will be re-elected whom it would have wished to eject, because of the preferences of other regions.

### **Renegotiation of contracts**

A federal government promises support for the construction by a local government of an irrigation system if a certain number of conditions are met: a design made by a reputable engineering firm, a cost benefit analysis which proves the desirability of going ahead, and a public hearing of the users. The local government complies with the first two conditions, but not with the third, which it feels politically dangerous. If it has been smart enough to keep the design of the system within acceptable bounds it can, explicitly or implicitly, propose to the federal government the following deal: "Why don't you accept to fund the project, even though some conditions have not been met? You will be better off than if you did not fund it, and so would we." Under the general principle that bygones are bygones, the federal government should accept this deal.<sup>76</sup> The original contract is not "renegotiation proof." The awareness of this fact will weaken the incentives of the local government to respect the terms of the original agreement.

The general idea is straightforward: if during the execution of a contract it becomes clear that it can be modified to increase the utility of all the parties involved, the original contract will be modified at this point. Foreseeing this modification, the parties may modify their behavior in previous periods.

This has important policy consequences, and makes it possible to understand policy choices that seem mysterious. For instance, penalties for delay in large projects are often renegotiated away when the contractor is late. The expectation of this renegotiation encourages delay. However, this is often unavoidable. Once the project is late, the client will often prefer not to impose the penalty so as to keep carrots with which to encourage not too untimely completion (see Crémer and Seabright (1994, forthcoming)).

*Unresolved issues.* In the excitement of new discovery, it is easy to underestimate the number and importance of topics which are important on applied grounds and on which the literature has difficulty progressing. We mention four.

<sup>76</sup> We are ignoring some important real world considerations, such as the desirability for the federal government to appear "tough" in possible subsequent negotiations.

*Dynamics and transitions.* We do not understand well the dynamics of organizations. There is informal evidence that transitions between one line of activity and another, between one industry and another, between one organizational form and another are difficult and require time. Analytical treatment of these phenomena is very difficult.

*The constitutional framework.* The contracts, implicit or explicit, that govern the life of an organization have different statuses. Some are more fundamental than others, rather as, in the legal realm, clauses of constitutions have a higher status and are more difficult to change than ordinary laws. This hierarchy of rules, important in private firms and even more so in governments, is poorly understood.

*Multidimensional uncertainty.* Most of current theory has been developed in settings where uncertainty bears on the value of one real variable. The extension to multidimensional uncertainty creates very difficult technical problems, and has been successfully completed only in very special cases. It is difficult to give precise advice on methods to circumvent the problem, but one should be aware of this fact when using the insights of the theory.

*Networks of contracts.* Recently a number of authors have stressed the fact that firms should be thought of as networks or nexuses of contracts or of treaties (see Crémer and Riordan, 1987; Aoki, Gustafson & Williamson, 1990). However, very little formal work has been done on the interrelationships between different contracts signed by the same agent. For instance, a provincial government will be party to contracts signed with the federal government, with the districts at a lower level, with the unions representing its employees, implicitly with the voters, etc. We do not understand very well how these contracts interact with each other.

### **What is a Jurisdiction and Where Should Its Boundaries Lie?**

Traditional micro economic theory takes the definition of the firm and its objectives as given. The theory of the firm began making substantial progress by asking the seemingly very abstract question: "what is a firm?" Even though the answers we have are still imperfect, the work done to find them has yielded lessons that have very concrete policy implications. It is therefore a reasonable strategy to try to ask the question: "what is a political jurisdiction?"

#### **Coordination**

One important aspect of the definition of the firm is that it groups together numerous types of activities. Similarly, if we are to develop a good understanding of political jurisdictions, we need to take seriously the notion that they integrate the power to make decisions in different domains. Indeed, jurisdictions can be thought of as organizations that group together the power to take political decisions, and we can ask what determines the grouping of activities by analogy with the grouping of activities within a firm.

Simon (1973) has argued that what determines the grouping of activities is the necessity of coordination of activities in the short run. Crémér (1981) has analyzed formally this coordination. The following example, drawn from this paper, provides the necessary intuition.

The allocation of responsibilities for transportation within a country is usually done by mode of transportation. This seems to neglect the fundamental nature of the good. From the point of view of consumers, a plane trip between Paris and Lyons has more similarity with a train trip between the same two cities than with a plane trip between Paris and Toulouse. Yet, it is the two train trips that are the responsibility of the same agency, not the two trips between Paris and Lyons. Why is that? In the day to day management of the transportation system, the decisions to be taken are decisions that involve the planes and the crews that will flow between all towns. Very few short run decisions involve planes and trains at the same time. It is true that for planning purposes one should weigh carefully the options of plane and train transportation one against the other. These decisions are made in circumstances where time is not a crucial factor, and hence the extra difficulty of coordination between agencies is not very important.

For the management of infrastructure, this might have some important consequences. For instance, one could think that main irrigation channels could be, let us say, a provincial responsibility, whereas smaller branches could be a municipal responsibility. This can only be true in circumstances where there is no necessity to coordinate rapidly the management of the two parts of the system.

### **Control by voters**

The theory of the firm has spent much energy trying to understand the mechanisms through which managers of corporations are controlled. Stockholders have bounded rationality, and both the acquisition of information and the exercise of the right to vote on corporate matters have relatively large costs. Furthermore, the benefits of any improvement in corporate performance generated by such activities are shared with all the other stockholders. It would seem therefore that corporations are undercontrolled. The mechanisms used to remedy this situation are of two kinds. First, the control of the day to day management of the firm can be delegated to specialists (i.e. the board of directors). Second, underperforming firms will be targets for takeovers if outsiders believe that they can run the firm in ways that increase its profits. There is general consensus that the question of control affects considerably the structure and the behavior of organizations.

Different forms of grouping together activities affect considerably the nature of the control that is exercised on political managers. First, relying on cooperation between layers of government often blurs responsibility for the execution of particular projects, and hence might have negative effects on efficiency. This is a common problem in water projects in some parts of Latin America for instance where coordination efforts become a highly time consuming part of

project management. Second, even where responsibilities are separate it makes sense to divide them according to principles that are easy to remember. For example, allocating responsibility for different types of road to different levels of government sometimes results in difficulties in identifying who is in charge of what.

Because voters invest in information gathering about the performance of local governments, there is some organizational capital invested in the quality of participation in public life at different levels. For instance, in a system where municipal governments are powerful, voters will pay attention to the actions of the mayor, newspapers will develop sources in townhalls, and so on. Under these conditions there will be strong benefits to allocate new responsibilities to townhalls, rather than to weaker, and therefore less controlled, political entities. One can expect a certain stability of the allocation of power in the system.

If these intuitions resist further analysis, and if they are as important in practical terms as we suspect that they are, the consequences for the organization of the public sector are striking. Because one cannot determine the optimal level of government for specific tasks in isolation, it does not make sense to study the decentralization of decisions about infrastructure in isolation from the allocation of other public responsibilities. For instance, landfill management will be assigned to the municipalities, because they are responsible for garbage collection, and they are responsible for garbage collection because they have better information about the use of land, having gathered this information in order to collect property taxes.

Note that there is a cost to pushing too much responsibility onto one level of government. If the central government, for instance, is responsible for too many activities each of them will have relatively little weight in the decisions of the voters, and hence it will be easier to run some of them for private rather than public benefits.

### Some Applications

*The optimal size of a jurisdiction.* Decentralization below the national level is relatively systematically promoted in the literature. Very often, one sees lists stating that this decision is to be taken at the federal level, this other at the state level, and yet another at the local level. Why would the efficiency criterion be a certain number of levels below the national level? Some countries have a smaller national population than states or municipalities in other countries. It would seem that population, or area, or some other measure of the services to be rendered would be a more logical criterion, and if this is the case, it does not make much sense to push decentralization on smaller countries.

On the other hand, the notion of control might help explain why the optimal number of levels might vary in such a way that the smaller district is larger in large countries than in smaller countries. The bounded rationality of voters prevents them from exercising adequate control over

more than a certain number of governmental identities, a number which is independent of the size of the country.

*Does decentralization promote democracy?* It is often argued that decentralization will promote democracy: local governments are more sensitive to local needs, hence an individual has more possibilities to influence decisions that affect his life and his welfare under greater decentralization. This statement can be made more precise in two ways. First, under decentralization, there is a greater responsiveness of decisions with respect to the changes of preference of a single agent or group of similar agents. Second, under decentralization, there is a higher probability that a given agent or group of agents is pivotal, and hence determines the choice of a solution between two alternatives.

However, these generalizations will hold, if they do, only when all other factors are equal. In particular, it is important to notice that decentralization might lower the political power of the poorest citizens (see Seabright, 1994, section 3). Under decentralization, government will indeed be more sensitive to local needs, but it will still be local needs as perceived by the local political system. Hence, the groups that find it easier to organize political activity at the local level will be favored by decentralization. Organization of political forces is easier for groups where the benefits of influencing public policy is shared among a small number of agents. Groups that have more difficulty organizing will in general prefer larger political districts so that organizing is easier. Some political backing comes from the fact that political forces that have favored income equality have generally favored centralized governments.

*Why should decentralization lead to more experimentation?* The argument is often made that decentralization promotes experimentation: free from the strictures of central administration, local governments can try out new ideas and methods. Decentralization of decisions in water supply matters for instance has led Fortaleza in the North East of Brazil to adopt cheaper technological solutions such as community water pumps not yet tried in the South of the country where traditional large utilities have typically been the norm. The diversity of experiences in urban transport in France or in India for instance also illustrates what municipalities can do when given the freedom to choose.

However, one must be careful with this argument. If the regions of the country are very different, it does indeed seem likely that local control will lead to more diversification. On the other hand, experimenting with a new technique creates positive externalities for other districts: they do not suffer the consequences of potential failures but benefit from the information generated.

It might seem that one could have the best of both worlds: use a decentralized system to benefit from local adaptation, and have the central government fund experimentation. But note that it is very difficult to write a contract that will indeed incite a district to experiment with a different institutional arrangements. It is difficult to define precisely what is the innovation;

typically, institutional innovations are refined during implementation. It is also difficult to check whether it has indeed been implemented.

*Earmarking because of the incompleteness of contracts.* In many East Asian and Latin American countries, earmarking is or has been a common way for subnational governments to finance some of their major infrastructure expenditures and hence deserves a careful assessment in a discussion of decentralization. McCleary (1991) provides a useful survey of the arguments for and against earmarking of revenues. Defining earmarking as "the practice of assigning revenue --- generally through statute or constitutional clause --- from specific taxes or groups of taxes to specific government activities or areas of activity", he develops a number of criteria that allow identification of the cases when it is justified. These criteria reflect the lessons of experience but some lessons from standard welfare economics. They can be revisited in the language of incomplete contracts.

McCleary recognizes that earmarking is a second best solution: in the absence of imperfections in the government budgetary system it should not be used. For instance, in some countries taxes on fuels and vehicles are earmarked for a road construction fund. This practice has been defended as a mean to provide "more stable funding (that) would encourage competition". Translated into our framework, this argument goes as follows:

- 1) Entrepreneurs will enter the road construction industry only if they can be relatively confident that the government has a long run commitment to the building of roads so that they have a reasonable probability of recovering their investments.
- 2) The complete contract approach to this problem would have the government make a contract with entrepreneurs defining conditions under which roads would be built, the prices which would be paid, and the penalties that the government is willing to incur if it does not pursue this program. Such contracts are not feasible.
- 3) Therefore, a second best approach is for the government to commit itself through a second best, albeit imperfect contract: the resources coming from a specific source should go to a specific use.

This way of stating the problem allows a few refinements of McCleary's analysis. For instance, McCleary argues that "when money is tight, earmarked funds may be temporarily frozen (as happened in Ghana) or diverted to other uses (as in Mali), or the government and public enterprises may stop paying their fuel bills and hence fuel taxes (as they did in Zaire)". This shows that a commitment to earmarking is not fully credible; this might imply that earmarking cannot achieve what it sets out to achieve and that it would be better not to attempt it. However, it is also recognized that "the more reliable funding has made it easier to use private contractors through competitive bidding". Ex-ante, the earmarking was recognized by private entrepreneurs as a way to increase government commitment.

We believe that an approach that takes into account from the outset the fact that all contracts are incomplete should be able to weigh better the costs and benefits of earmarking. It does not work perfectly, because commitment to earmarking is sometimes reversible and because it potentially distorts government allocation of funds. But if we can understand exactly how and in what circumstances it increases the cost to government of reversing its expenditure commitments, this will help to quantify the benefits it can provide.

The incomplete contracts approach can also guard against certain misconceptions. For instance, McCleary argues that earmarking should only take place when there is "an appropriate investment program and a clear set of rules to regulate investment decisions, the mix of spending on capital, maintenance and rehabilitation, and administrative overheads".

Notice that if there did exist a clear set of rules, and a credible investment program, there would be no need for earmarking. It would be possible to write a rather explicit set of rules that the government should follow. This approach seems to be in contradiction with the recognition that it is the difficulty of writing contracts that makes earmarking necessary. To see this, consider a country where the federal government has responsibility for road building but states have responsibility for maintenance. Presumably, the federal government has responsibility for the construction of roads because there are externalities and the state governments would not of their own volition build enough. If this is the case, left to their own they would also underinvest in maintenance. The federal government should therefore find some technique to encourage the local government to conduct more maintenance (we assume for the moment that state governments have a comparative advantage in maintenance, perhaps because local monitoring of road quality is easier).

If there were clear cut indicators of the quality of maintenance undertaken by state governments, the federal government could easily sign a contract with them linking a payment to the quantity and quality of the maintenance that had been done, as well as to factors over which they did not have control. It is because such indicators are not available that other techniques must be found. Earmarking may be one of them since it can be reasonable to order the local government to earmark all the receipts from local gasoline taxes and from tolls to maintenance. Its has the advantage of providing an automatic link between the usage of the transportation network and maintenance. It can also have a high opportunity cost in terms of other decentralized expenditure needs (education, health,...) when local resources constraints are important.

### **Concluding Remarks**

This paper has done no more than scratch the surface of a literature rich in both theoretical and practical insights. Its key messages are the following:

- 1) The modern theory of the firm provides many insights into political organization, for political jurisdictions can be thought of as pseudo-firms that provide services and which group together decision-making activities of various kinds.
- 2) Questions about decentralization in government are about the allocation of rights of control. If contractual relations were complete it would not matter whether power were decentralized or not, since contracts would specify everything to be done at each level of government and there would be no need for discretion.
- 3) The appropriate degree of decentralization depends upon which level of government will have the most incentive to act to bring about the desired outcomes. In particular, centralized governments can reap benefits of coordination, but tend to be less accountable than decentralized ones, though there are important exceptions to this general rule.
- 4) The organizational design of government affects not only incentives to take decisions but also incentives to gather the information on which those decisions will be based.

## References

- Akerlof, George A. 1970. "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism." *The Quarterly Journal of Economics*, 84:3, 488-500.
- Aoki, M., B. Gustafsoon, and O.E. Williamson. 1990. *The Firm as a Nexus of Treaties*. London: European Stage.
- Coase, Ronald. 1937. "The Nature of the Firm." *Economica*, 4, 386-405.
- Crémer, Jacques. 1981. "A Partial Theory of the Optimal Organization of a Bureaucracy." *The Bell Journal of Economics*, 11:2, 683-93.
- Crémer, Jacques. 1993. "Arm's Length Relationship." mimeo.
- Crémer, Jacques. 1993. "A Theory of Vertical Integration Based on Monitoring Costs." mimeo, forthcoming.
- Crémer, Jacques and Michael H. Riordan. 1987. "On Governing Multilateral Transactions with Bilateral Contracts." *Rand Journal of Economics*, 18:3, 436-51.
- De Groot, Hans. 1988. "Decentralizing Decisions in Bureaucracies as a Principal-agent Problem." *Journal of Public Economics*, 37, 323-37.
- Estache, Antonio and Kangbin Zeng. 1992. "Managing Pollution Control in Brazil: The Potential Use of Taxes and Fines by Federal and State Governments." World Bank Working Paper 929, Washington, D.C.: World Bank.
- Grossman, Sandford J. and Oliver D. Hart. 1986. "The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration." *Journal of Political Economy*, 94:4, 691-719.
- Groves, Theodore. 1973. "Incentives in Teams." *Econometrics*, 31:6, 617-63.
- Jack, William. 1992. "Power Sharing and Pollution Control: Coordinating Policies among Levels of Governments." World Bank Working Paper 887, Washington, D.C.: World Bank.
- Lange, O. 1938. "On the Economic Theory of Socialism," in *On the Economic Theory of Socialism*. eds. O. Lange and F.M. Taylor, Minneapolis: University of Minnesota Press, 57-143.

- McCleary, William. 1991. "The Earmarking of Government Revenue: A Review of Some World Bank Experience." *World Bank Research Observer*, 6:1, 81-104.
- Oates, Wallace F. 1969. "The Effects of Property Taxes and Local Public Spending on Property Values: An Empirical Study of Tax Capitalization and Tiebout Hypothesis." *Journal of Political Economy*, 77:6 957-71.
- Seabright, Paul. 1994. "Accountability and Decentralization in Government: An Incomplete Contracts Model." CEPR Discussion Paper 889.
- Simon, Herbert A. 1973. "Applying Information Technology to Organization Design." *Public Administration* 33:3, 268-78.
- Spence, Michael. 1973. "Job Market Signalling." *The Quarterly Journal of Economics*, 87:3, 561-72.
- Weitzman, Martin L. 1974. "Prices Versus Quantities." *The Review of Economic Studies*, 41:4?, 477-91.



# Distributors of World Bank Publications

<b>ARGENTINA</b> Carlos Hirsch, SRL Galeria Guemes Florida 165, 4th Floor-Ofc. 453/465 1333 Buenos Aires	The Middle East Observer 41, Sherif Street Cairo	<b>KENYA</b> Africa Book Service (E.A.) Ltd. Quaran House, Mfangano Street P.O. Box 45245 Nairobi	<b>SINGAPORE, TAIWAN, MYANMAR, BRUNEI</b> Gover Asia Pacific Pte Ltd. Golden Wheel Building 41, Kallang Pudding #04-03 Singapore 1334
<b>OFICINA DEL LIBRO INTERNACIONAL</b> Alberti 40 1082 Buenos Aires	<b>FINLAND</b> Akateeminen Kirjakauppa P.O. Box 128 SF-00101 Helsinki 10	<b>KOREA, REPUBLIC OF</b> Pan Korea Book Corporation P.O. Box 101, Kwangwhamun Seoul	<b>SOUTH AFRICA, BOTSWANA</b> <i>For single titles:</i> Oxford University Press Southern Africa P.O. Box 1141 Cape Town 8000
<b>AUSTRALIA, PAPUA NEW GUINEA, FIJI, SOLOMON ISLANDS, VANUATU, AND WESTERN SAMOA</b> D.A. Information Services 648 Whitehorse Road Mitcham 3132 Victoria	<b>FRANCE</b> World Bank Publications 66, avenue d'Iéna 75116 Paris	Daejon Trading Co., Ltd. P.O. Box 34, Youido Seoul	<i>For subscription orders:</i> International Subscription Service P.O. Box 41095 Craigall Johannesburg 2024
<b>AUSTRIA</b> Gerold and Co. Graben 31 A-1011 Wien	<b>GERMANY</b> UNO-Verlag Poppendorfer Allee 55 53115 Bonn	<b>MALAYSIA</b> University of Malaya Cooperative Bookshop, Limited P.O. Box 1127, Jalan Pantai Baru 59700 Kuala Lumpur	<b>SPAIN</b> Mundi-Prensa Libros, S.A. Castello 37 28001 Madrid
<b>BANGLADESH</b> Micro Industries Development Assistance Society (MIDAS) House 5, Road 16 Dhanmondi R/ Area Dhaka 1209	<b>GHANA</b> Greenwich Mag. and Books Rivera Beach Hotel PO Box 01198 Osu-Accra	<b>MEXICO</b> INFOTEC Apartado Postal 22-860 14060 Tlalpan, Mexico D.F.	Liberaria Internacional AEDOS Consell de Cent, 391 08009 Barcelona
<b>BELGIUM</b> Jean De Lannoy Av. du Roi 202 1060 Brussels	<b>GREECE</b> Papasotiriou S.A. 35, Stourmara Str. 106 82 Athens	<b>NETHERLANDS</b> De Lindeboom/InOr-Publikaties P.O. Box 202 7480 AE Haaksbergen	<b>SRI LANKA AND THE MALDIVES</b> SRI LANKA AND THE MALDIVES
<b>BRAZIL</b> Publicacoes Tecnicas Internacionais Ltda. Rua Peixoto Gomide, 209 01409 Sao Paulo, SP	<b>HONG KONG, MACAO</b> Asia 2000 Ltd. 46-48 Wyndham Street Winning Centre 7th Floor Central Hong Kong	<b>NEW ZEALAND</b> EBSNZ Ltd. Private Mail Bag 99914 New Market Auckland	Lake House Bookshop P.O. Box 244 100, Sir Chittampalam A. Gardiner Mawatha Colombo 2
<b>CANADA</b> Le Diffuseur 151 A Boul. de Mortagne Boucherville, Québec J4B 5E6	<b>HUNGARY</b> Foundation for Market Economy Dombovari Ut 17-19 H-1117 Budapest	<b>NIGERIA</b> University Press Limited Three Crowns Building Jericho Private Mail Bag 5095 Ibadan	<b>SWEDEN</b> Fritzes Customer Service S-106 47 Stockholm
Renouf Publishing Co. 1294 Algoma Road Ottawa, Ontario K1B 3W8	<b>INDIA</b> Allied Publishers Ltd. 751 Mount Road Madras - 600 002	<b>NORWAY</b> Narvesen Information Center Book Department P.O. Box 6125 Eiterstad N-0602 Oslo 6	Wennergren-Williams AB P. O. Box 1305 S-171 25 Solna
<b>CHINA</b> China Financial & Economic Publishing House 8, Da Fo Si Dong Jie Beijing	<b>INDONESIA</b> Pt. Indira Limited Jalan Borobudur 20 P.O. Box 1181 Jakarta 10320	<b>PAKISTAN</b> Mirza Book Agency 65, Shahrah-e-Quaid-e-Azam P.O. Box No. 729 Lahore 54000	<b>SWITZERLAND</b> Librairie Payot Case postale 3212 CH 1002 Lausanne
<b>COLOMBIA</b> Infoenlace Ltda. Apartado Aereo 34270 Bogota D.E.	<b>IRAN</b> Kowkab Publishers P.O. Box 19575-511 Tehran	<b>OXFORD UNIVERSITY PRESS</b> P.O. Box 13033 Karachi - 75350	Van Dierman Editions Techniques - ADECO P.O. Box 465 CH 1211 Geneva 16
<b>COTE D'IVOIRE</b> Centre d'Edition et de Diffusion Africaines (CEDA) 04 B.P. 541 Abidjan 04 Plateau	<b>IRELAND</b> Government Supplies Agency 4-5 Harcourt Road Dublin 2	<b>PERU</b> Editorial Desarrollo SA Apartado 3824 Lima 1	<b>TANZANIA</b> Oxford University Press Maktaba Street P.O. Box 5299 Dar es Salaam
<b>CYPRUS</b> Center of Applied Research Cyprus College 6, Diogenes Street, Engomi P.O. Box 2006 Nicosia	<b>ISRAEL</b> Yozmot Literature Ltd. P.O. Box 56055 Tel Aviv 61560	<b>PHILIPPINES</b> International Book Center Suite 1703, Cityland 10 Condominium Tower 1 Ayala Avenue, H.V. dela Costa Extension Makati, Metro Manila	<b>THAILAND</b> Central Department Store 306 Silom Road Bangkok
<b>CZECH REPUBLIC</b> National Information Center P.O. Box 668 CS-11357 Prague 1	<b>R.O.Y. International</b> P.O.B. 13056 Tel Aviv 61130	<b>POLAND</b> International Publishing Service Ul. Piekna 31/37 00-677 Warszawa	<b>TRINIDAD &amp; TOBAGO</b> Systematics Studies Unit #9 Watts Street Curepe Trinidad, West Indies
<b>DENMARK</b> SamfundsLitteratur Rosenørns Allé 11 DK-1970 Frederiksberg C	<b>Palestinian Authority/Middle East</b> P.O. Box 19502, Jerusalem	<b>PORUGAL</b> Livraria Portugal Rua Do Carmo 70-74 1200 Lisbon	<b>UGANDA</b> Gusto Ltd. 1st Floor, Room 4, Geogiadis Chambers P.O. Box 9997 Plot (69) Kampala
<b>DOMINICAN REPUBLIC</b> Editora Taller, C. por A. Restauración e Isabel la Católica 309 Apartado de Correos 2190 Z-1 Santo Domingo	<b>ITALY</b> Licoso Commissionaria Sansoni SPA Via Duca Di Calabria, 1/1 Casella Postale 552 50125 Firenze	<b>SAUDI ARABIA, QATAR</b> Jaric Book Store P.O. Box 3196 Riyadh 11471	<b>UNITED KINGDOM</b> Microinfo Ltd. P.O. Box 3 Alton, Hampshire GU34 2PG England
<b>EGYPT, ARAB REPUBLIC OF</b> Al Ahram Al Galaa Street Cairo	<b>JAMAICA</b> Ian Randle Publishers Ltd. 206 Old Hope Road Kingston 6	<b>SLOVAK REPUBLIC</b> Slovak G.T.G Ltd. Krupinska 4 P.O. Box 152 852 99 Bratislava 5	<b>ZAMBIA</b> University of Zambia Bookshop Great East Road Campus P.O. Box 32379 Lusaka
	<b>JAPAN</b> Eastern Book Service Hongo 3-Chome, Bunkyo-ku 113 Tokyo		<b>ZIMBABWE</b> Longman Zimbabwe (Pvt) Ltd. Tourle Road, Ardbennie P.O. Box ST 125 Southerton Harare



## **Recent World Bank Discussion Papers (*continued*)**

- No. 256 *Women's Health and Nutrition: Making a Difference.* Anne Tinker, Patricia Daly, Cynthia Green, Helen Saxenian, Rama Lakshminarayanan, and Kirrin Gill
- No. 257 *Improving the Quality of Primary Education in Latin America and the Caribbean: Toward the 21st Century.* Lawrence Wolff, Ernesto Schiefelbein, and Jorge Valenzuela
- No. 258 *How Fast is Fertility Declining in Botswana and Zimbabwe?* Duncan Thomas and Ityai Muvandi
- No. 259 *Policies Affecting Fertility and Contraceptive Use: An Assessment of Twelve Sub-Saharan Countries.* Susan Scribner
- No. 260 *Financial Systems in Sub-Saharan Africa: A Comparative Study.* Paul A. Popiel
- No. 261 *Poverty Alleviation and Social Investment Funds: The Latin American Experience.* Philip J. Glaesner, Kye Woo Lee, Anna Maria Sant'Anna, and Jean-Jacques de St. Antoine
- No. 262 *Public Policy for the Promotion of Family Farms in Italy: The Experience of the Fund for the Formation of Peasant Property.* Eric B. Shearer and Giuseppe Barbero
- No. 263 *Self-Employment for the Unemployed: Experience in OECD and Transitional Economies.* Sandra Wilson and Arvil V. Adams
- No. 264 *Schooling and Cognitive Achievements of Children in Morocco: Can the Government Improve Outcomes?* Shahidur R. Khandker, Victor Lavy, and Deon Filmer
- No. 265 *World Bank-Financed Projects with Community Participation: Procurement and Disbursement Issues.* Gita Gopal and Alexandre Marc
- No. 266 *Seed Systems in Sub-Saharan Africa: Issues and Options.* V. Venkatesan
- No. 267 *Trade Policy Reform in Developing Countries Since 1985: Review of the Evidence.* Judith M. Dean, Seema Desai, and James Riedel
- No. 268 *Farm Restructuring and Land Tenure in Reforming Socialist Economies: Comparative Analysis of Eastern and Central Europe.* Euroconsult and Centre for World Food Studies
- No. 269 *The Evolution of the World Bank's Railway Lending.* Alice Galenson and Louis S. Thompson
- No. 270 *Land Reform and Farm Restructuring in Ukraine.* Zvi Lerman, Karen Brooks, and Csaba Csaki
- No. 271 *Small Enterprises Adjusting to Liberalization in Five African Countries.* Ron Parker, Randall Riopelle, and William F. Steel
- No. 272 *Adolescent Health: Reassessing the Passage to Adulthood.* Judith Senderowitz
- No. 273 *Measurement of Welfare Changes Caused by Large Price Shifts: An Issue in the Power Sector.* Robert Bacon
- No. 274 *Social Action Programs and Social Funds: Review of Design and Implementation in Sub-Saharan Africa.* Alexandre Marc, Carol Graham, Mark Schacter, and Mary Schmidt
- No. 275 *Investing in Young Children.* Mary Eming Young
- No. 276 *Managing Primary Health Care: Implications of the Health Transition.* Richard Heaver
- No. 277 *Energy Demand in Five Major Asian Developing Countries: Structure and Prospects.* Masayasu Ishiguro and Takamas Akiyama
- No. 278 *Preshipment Inspection Services.* Patrick Low
- No. 279 *Restructuring Banks and Enterprises: Recent Lessons from Transition Countries.* Michael S. Borish, Millard F. Long, and Michel Noël
- No. 280 *Agriculture, Poverty, and Policy Reform in Sub-Saharan Africa.* Kevin M. Cleaver and W. Graeme Donovan
- No. 281 *The Diffusion of Information Technology: Experience of Industrial Countries and Lessons for Developing Countries.* Nagy Hanna, Ken Guy, and Erik Arnold
- No. 282 *Trade Laws and Institutions: Good Practices and the World Trade Organization.* Bernard M. Hoekman
- No. 283 *Meeting the Challenge of Chinese Enterprise Reform.* Harry G. Broadman
- No. 284 *Desert Locust Management: A Time for Change.* Steen R. Joffe
- No. 285 *Sharing the Wealth: Privatization through Broad-Based Ownership Strategies.* Stuart W. Bell
- No. 286 *Credit Policies and the Industrialization of Korea.* Yoon Je Cho and Joon-Kyung Kim
- No. 287 *East Asia's Environment: Principles and Priorities for Action.* Jeffrey S. Hanmer and Sudhir Shetty
- No. 288 *Africa's Experience with Structural Adjustment: Proceedings of the Harare Seminar, May 23-24, 1994.* Edited by Kapil Kapoor
- No. 289 *Rethinking Research on Land Degradation in Developing Countries.* Yvan Biot, Piers Macleod Blaikie, Cecile Jackson, and Richard Palmer-Jones



**THE WORLD BANK**  
A partner in strengthening economies  
and expanding markets  
to improve the quality of life  
for people everywhere,  
especially the poorest

**Headquarters**

1818 H Street, N.W.  
Washington, D.C. 20433, U.S.A.

Telephone: (202) 477-1234  
Facsimile: (202) 477-6391  
Telex: MCI 64145 WORLDBANK  
MCI 248423 WORLDBANK  
Cable Address: INTBAFRAD  
WASHINGTONDC

**European Office**

66, avenue d'Iéna  
75116 Paris, France

Telephone: (1) 40.69.30.00  
Facsimile: (1) 40.69.30.66  
Telex: 640651

**Tokyo Office**

Kokusai Building  
1-1, Marunouchi 3-chome  
Chiyoda-ku, Tokyo 100, Japan

Telephone: (3) 3214-5001  
Facsimile: (3) 3214-3657  
Telex: 26838

13335

9 780821 333358

ISBN 0-8213-3335-6