Private participation in infrastructure has moved to the top of the political, economic, and social agendas of a growing number of countries. The focus of the debate is beginning to shift from the why to the how, fueling the demand for lessons on best practice in reform strategies, regulatory frameworks, institutional arrangements, and risk mitigation. For policymakers, private investors, and consumers alike, the key challenge is to use the lessons of positive and negative experience in other countries and sectors in devising arrangements for private participation in infrastructure that are fair, predictable, and sustainable and, above all, that deliver better services and greater efficiency.

This collection of policy briefs on private participation in infrastructure responds to this demand. Drawing on a wide range of experience in different countries and sectors, these briefs seek to broaden understanding on risk allocation, institutional arrangements, choice of regulatory rules, and the scope for competition in infrastructure provision.

Klaus Tilmes
Co-ordinator,
International Forum for Utility Regulation
# The Private Sector in Infrastructure

## Multisector

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Competition in Network Industries—Where and How to Introduce It</td>
<td>Michael Klein and Philip Gray</td>
</tr>
<tr>
<td>9</td>
<td>The Cost of Privatization Transactions—Are They Worth It?</td>
<td>Michael Klein, Jae So, and Ben Shin</td>
</tr>
<tr>
<td>13</td>
<td>Capital Market Pressures and Management Incentives—And the Implications for Sale Strategies</td>
<td>Timothy Irwin and Ian Alexander</td>
</tr>
<tr>
<td>17</td>
<td>Colombia’s Mixed Ownership Model for Privatizing Infrastructure</td>
<td>Philip Gray</td>
</tr>
<tr>
<td>21</td>
<td>Utility Regulators—The Independence Debate</td>
<td>Warrick Smith</td>
</tr>
<tr>
<td>25</td>
<td>Utility Regulators—Roles and Responsibilities</td>
<td>Warrick Smith</td>
</tr>
<tr>
<td>29</td>
<td>Utility Regulators—Decisionmaking Structures, Resources, and Start-up Strategy</td>
<td>Warrick Smith</td>
</tr>
<tr>
<td>33</td>
<td>Price Caps, Rate-of-Return Regulation, Risk, and the Cost of Capital</td>
<td>Ian Alexander and Timothy Irwin</td>
</tr>
<tr>
<td>37</td>
<td>Prices, Cross-Subsidies, and Competition in Infrastructure</td>
<td>Timothy Irwin</td>
</tr>
<tr>
<td>41</td>
<td>The Distribution of Gains from Utility Privatization and Regulation in Argentina</td>
<td>Omar Chisari, Antonio Estache, and Carlos Romero</td>
</tr>
<tr>
<td>45</td>
<td>Infrastructure Finance—The World Bank Group’s Financial Instruments</td>
<td>Philippe Benoit</td>
</tr>
</tbody>
</table>

## Telecommunications

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>Competition and Technology Change in Telecoms—Implications for Universal Service, Employment, and Regulation</td>
<td>Ben A. Petrazzini</td>
</tr>
<tr>
<td>55</td>
<td>Telecommunications Reform—How to Succeed</td>
<td>Björn Wellenius</td>
</tr>
<tr>
<td>59</td>
<td>Extending Telecommunications Service to Rural Areas—The Chilean Experience</td>
<td>Björn Wellenius</td>
</tr>
<tr>
<td>63</td>
<td>Liberalizing Telecommunications and the Role of the World Trade Organization</td>
<td>Carlos A. Primo Braga</td>
</tr>
<tr>
<td>71</td>
<td>The Private Sector and the Internet</td>
<td>Carlos A. Primo Braga and Carsten Fink</td>
</tr>
</tbody>
</table>
Power

77  The Restructuring and Privatization of the U.K. Electricity Supply—Was It Worth It?
    David M. Newbery and Michael G. Pollitt

81  Regulatory Lessons from Argentina's Power Concessions
    Antonio Estache and Martin Rodriguez-Pardina

85  The Real Possibility of Competitive Generation Markets in Hydro Systems—
    The Case of Brazil
    Antonio Estache and Martin Rodriguez-Pardina

Water

89  The Private Sector in Water and Sanitation—How to Get Started
    Penelope J. Brook Cowen

93  Getting the Private Sector Involved in Water—What to Do in the Poorest
    of Countries?
    Penelope J. Brook Cowen

97  Testing the Waters—A Phased Approach to a Water Concession
    in Trinidad and Tobago
    Helen Nankani

101 Water Privatization and Regulation in England and Wales
    Caroline van den Berg

105 Regulating Water Concessions—Lessons from the Buenos Aires
    Concession
    Claude Crampes and Antonio Estache

Transport

109 A New Method for Auctioning Highways
    Eduardo Engel, Ronald Fischer, and Alexander Galetovic

113 Designing Toll Road Concessions—Lessons From Argentina
    Antonio Estache and José Carbajo

117 A Retrospective on the Mexican Toll Road Program (1989–94)
    Jeff Ruster

125 Railway Concessions—Heading Down the Right Track in Argentina
    José Carbajo and Antonio Estache

129 Competing Private Ports—Lessons From Argentina
    Antonio Estache and José Carbajo

133 Summaries
Competition in Network Industries—
Where and How to Introduce It

Michael Klein and Philip Gray

If privatizing network industries is to bring lasting public benefits, governments should also attempt to introduce competition. Otherwise, the regulation required in areas with monopoly segments may become so intrusive that it undermines the reform. With increasing deregulation and technological innovation, the scope for such competition is growing. And as technology continues to improve, the use of “smart markets”—computer-assisted auction systems to clear competitive but complex markets—is likely to become feasible for an ever-expanding group of products and countries. This Note outlines the opportunities for introducing network competition—competition for the market, competition over existing networks, and competition among networks. It briefly considers in each case whether regulation will still be necessary and whether it will become easier or more complicated. It looks at how these opportunities could be realized in different networks. And it concludes with some basic guidelines for introducing competition.

**Competition for the market**

One way of bringing competitive forces to bear on natural monopoly segments of an industry is to delineate a monopoly franchise and auction it off to the bidder offering the lowest price to consumers. But monopoly franchises, especially long-term ones, still involve regulation—indeed, some commentators argue that this form of competition is simply a way of facilitating regulation. Prices and related terms of the franchise (often known as a concession) have to be adjusted in response to events. These adjustments can be complex, but there are basically two options for making them: rebidding the franchise periodically or using traditional price regulation. Only rebidding promises an escape from the old-style regulated monopoly. But if there are significant sunk investments involved, assets will need to be transferred at the end of the franchise, leading to complex exercises in asset valuation. Still, by placing time limits on the franchise and requiring some form of competitive rebidding, governments can ensure regular challenges to the incumbent, and the incentive to maintain reputation will reduce the temptation to slacken efforts during the duration of the franchise.

**Competition over existing networks**

There are three types of competition over existing networks, described here as open access, pooling, and time-tabling arrangements. Which type is suitable for a particular network industry depends on the technical characteristics of the goods and of the networks over which these goods are provided.

**Open access**

Open access regimes are found in many gas pipeline systems in Europe and the United States. Parts of telecommunications networks are also under open access regimes, including long-distance satellite communications, parts of the major carriers' long-distance networks, and the local loop in systems where there is competition in long-distance services. In essence, open access occurs when allowing competition in one segment of an industry requires ensuring access to the remaining natural monopoly bottlenecks, provided that there is available capacity. If the owners of a gas pipeline have no interest in supply, for example, it will always pay them to allow access to additional...
gas suppliers. When capacity constraints are binding, rationing of access (interconnection) to the bottleneck will be needed. This interconnection can be achieved efficiently without regulation, but the owners of the bottleneck facility may receive monopoly profits. If these profits are politically unacceptable, the access prices charged by the owners of the bottleneck facility and the prices for any other services they provide to final customers of the network industry will need to be regulated.

If the incumbent owns some of the competing supply facilities—for example, power plants, gas fields, or long-distance telephone transmission facilities—it may try to raise prices for network access to preclude competitors in the nonmonopoly segments of the network. To prevent such predatory behavior by owners of monopoly segments, regulators may impose access obligations and matching pricing principles, such as forcing the incumbent to pay a price for transport equal to the price it charges its competitors. If such limits cause the owner of the bottleneck facility to try to exploit market power in the competitive segments, there may be a case for imposing limits on vertical integration and separating ownership from other parts of the system.

**Pooling**

The open access approach attempts to allow competition over the network by selling rights to network capacity to competing firms on a nondiscriminatory basis. But it may be difficult to define, adjust, and enforce such rights in a way that allows effective competition. For example, in a power system, the capacity used or unused at any moment in any part of the system is a function of all physical flows throughout the system, not of bargaining or individual transport decisions, so it may not be practical to define capacity or access rights. An alternative is to use a central dispatch system that optimizes system flows, instantaneously matching supply and demand. This ensures open access in the sense that winning bidders will always and by definition be dispatched. Such “smart” pooling systems are being used in electricity systems throughout the world and in gas systems in the United Kingdom and the United States.

**Time-tabling**

In power or natural gas supply systems, the source of the electrons or molecules a customer receives does not matter because the product is sufficiently homogeneous. But for railways, airlines, or telecommunications, where freight, passengers, or callers need to reach a particular customer or point in the network, the requirements for network optimization are more complex than simply that total inflows match total outflows.

If rights to use railway tracks, for example, were defined and allocated to multiple parties, secondary trading should yield the optimal set of paths through the network—the set that maximizes welfare given producers' and consumers' valuations of the service. The optimal set of paths forms the optimal delivery schedule or timetable (delivery of person or good x to point y at time z). The issue is whether an optimal timetable can be generated through decentralized bargaining. Because the value of each right to use a segment of track at a particular time depends on what happens with all adjacent segments (all segments are indirectly adjacent to all others), a single, optimizing smart market may be needed. Sweden and the United Kingdom are investigating whether such smart markets can be established for railways. Another potential application is airport slots. For now, experiments with such smart markets have been limited to computer simulations.

**Competition among networks**

The discussion has suggested that the hard core of natural monopoly is the smart market, whether for dispatch or for optimizing time-tabling. But in some cases, competition among multiple networks may be desirable. For long-distance telecommunications networks, petroleum product distribution systems competing with natural gas systems, or railways competing with trucks, for example, the theoretical
benefits of complete and integrated scheduling are probably less important than the practical benefits of allowing competition among networks. Competition is most useful where the central planning problem is hardest because of great uncertainty or complexity. There are thus dynamic or informational benefits from incomplete scheduling, which allows competition on the basis of some duplication. This duplication is necessary to try out new things and to check monopolistic behavior. Centralized scheduling is likely to be inevitable only when temporary congestion is very costly—such as systemwide electricity blackouts.

**Industry guidelines**

How competition is introduced and how effectively and easily it is implemented will vary from one network industry to another, depending on the physical characteristics. Introducing competition is generally easiest in industry segments where sunk costs are unimportant, such as for many transport vehicles—ships, planes, trucks, and taxis. The policy solution here is free entry without economic regulation. Where economies of scale due to scheduling are important, such as in urban bus transport or solid waste collection services, awarding monopoly franchises competitively may be efficient. As long as sunk costs are not important, repeated franchise bidding can provide a good level of competition without a need for extensive regulation. There has been positive experience with competition in all these transport industry segments.

Where sunk costs are important, introducing competition becomes more complex. For electricity and natural gas systems, which produce and transport fairly homogeneous products, the best solution appears to be smart competitive pools wherever a sufficiently large market can be created to sustain workable competition. This argues, of course, for fostering international trade in energy services wherever possible. Although still at an experimental stage, competitive pools have shown clear promise.

Smart markets have yet to provide practical solutions for introducing competition in networks where goods and services are not homogeneous and where starting and end points of network flows matter, though possible solutions are being debated in the context of the Swedish and U.K. railway reforms. The currently preferred option for such networks is some form of open access or common carriage system with regulation of interconnection. This approach is particularly appropriate for telecommunications, but it is also used in such networks as railroads, airports, and natural gas pipelines.

One way to introduce unregulated competition is to rely on competition between networks, or intermodal or substitute competition. Railways, for example, often face competition from trucks. And competition from the petroleum products market can discipline pricing behavior in the natural gas market, as in Finland, Germany (for large users), and Hong Kong (China). An international comparison of regulatory regimes shows that countries are most likely to leave the rail and natural gas sectors unregulated, relying on substitute competition to provide pricing discipline.

In telecommunications, line-based networks are increasingly exposed to competition from wireless services and in many cases even from new line-based networks being established as the cost of such infrastructure falls. Further technical progress may obviate the need for regulation. Countries with limited regulatory capability can already rely on competition from wireless services to provide basic consumer protection.

The toughest regulatory challenges remain in electricity, water, airports, and roads. As previously indicated, in electricity, the solution may lie in competitive power pools. In water, competitive forces may be conceptually similar to power pools, but their effective introduction is a fair way off. In the roads sector, operations may soon be revolutionized if electronic traffic management in conjunction with congestion pricing becomes more widespread as a result of tests in such countries as Italy, Norway, Singapore, and the United States. In California, for example, a private toll lane has been financed by changing congestion tolls that are inversely
Competition in Network Industries—Where and How to Introduce It

proportional to the traffic on the free alternative. Auctions of airport landing rights still await the arrival of appropriate smart markets, which would also be instrumental in efficiently managing road networks and decentralizing investment decisions in these networks.

The key to finding new solutions for introducing competition is technical progress. In telecommunications, technical change offers hope for workable competition among networks. In other industries, such as transport and energy, new solutions will depend on advances in telemetry and telecommunications combined with computer-based smart markets.

Free entry or not?

Policymakers are sometimes reluctant to allow free entry for what sound like good reasons. An unsustainable or suboptimal outcome may result from the competition for a natural monopoly under a policy of free entry. Or regulation may provide incentives for excessive bypass of the system by suppliers—if vertically integrated incumbents try charging excessive access or interconnection fees. Or network externalities may create either excess inertia (too little investment while firms wait for others to invest in expanding the network) or excess momentum (too much investment as firms try to establish an advantage by moving first). These arguments for barriers to free entry in natural monopolies reflect concerns about undersupply or excessive costs of service delivery.

Some arguments for entry barriers have little foundation, however. Some parties will argue that entry barriers are required to maintain subsidies. Certainly, cross-subsidies can be sustained only if competition is somehow limited and cherry picking restricted. But the same subsidy can be provided explicitly, funded from competition-neutral sources. Some say barriers are necessary for financing—hence the call for exclusivity periods, long concession terms, and the like. Investors, investment bankers, and those in government who seek to maximize short-term revenue will naturally all argue for entry barriers to lower the cost of capital when privatizing infrastructure firms or issuing concessions to build new facilities. Monopoly rights do lower the cost of capital and make financing easier. But they do so by shifting risk to customers, not by reducing overall risk. In the last century, investments not protected by entry barriers were nevertheless funded. And today, new investments in competitive segments of network industries also are being financed, such as power plants in competitive markets in Argentina, Chile, and the United Kingdom.

The technological changes and new thinking discussed in this Note suggest the following guidelines for policymakers introducing competition:
- The more complex the network and the smaller the sunk costs, the more value there is likely to be in introducing competition from other networks.
- Where technical change is rapid, defining the bounds of natural monopoly will be more difficult and the dynamic benefits of competition will be large.
- Where government capacity to benevolently and efficiently recognize natural monopoly and establish barriers to entry is weak, entry probably should not be limited by policy.

But because there are so many questions about whether monopoly should ever prevail and whether government is capable of identifying the situations in which it should, there is a need for an underlying policy rule: In case of doubt, do not restrict entry—and if entry barriers are imposed, subject them to an automatic test after a set period and prolong them only if warranted by a cost-benefit review.


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The Cost of Privatization Transactions—Are They Worth It?

Michael Klein, Jae So, and Ben Shin

Although the number of private infrastructure projects continues to grow, tales of endless delays and exorbitant development costs still scare both developers and governments. These costs probably amount on average to some 5 to 10 percent of total project cost—or some US$2 billion to US$3 billion a year, assuming that investments worldwide exceed US$35 billion a year. Most of these costs ultimately will be borne by consumers and taxpayers, although investors may have to swallow the consequences of serious miscalculations. The question is whether the cost of developing private infrastructure projects undermines their very rationale—the cost-effective provision of service. To answer this question, this Note looks at the broad magnitude of the costs and the factors driving them.

The magnitude of transaction costs

Developing a private infrastructure project is a complex task requiring firms and governments to prepare proposals, market them, conduct bidding or negotiate deals, and arrange funding. (Box 1 sets out the steps in such transactions.) The costs incurred in these processes—transaction costs—include staff costs, financing costs such as placement fees, and advisory fees for investment bankers, lawyers, and consultants. Consistent and comparable data on the size of these costs are rare. Prominent developers are unable or unwilling to produce accounts showing detailed transaction costs by project. Nonetheless, it has been possible to piece together a broad picture of these costs by interviewing government officials, financiers, and developers and using data published in the media.

The first impression is one of great variation in costs across countries, sectors, and time. Developers’ transaction costs range from a relatively small 1 to 2 percent of project cost to well over 10 percent. These estimates exclude the cost of officials’ time. A few large projects have piled up development costs far exceeding US$100 million. Some large projects that never made it to
The Cost of Privatization Transactions—Are They Worth It?

**BOX 1 TRANSACTION PROCESS FOR DEVELOPING A PRIVATE INFRASTRUCTURE PROJECT**

<table>
<thead>
<tr>
<th>Framework</th>
<th>Feasibility studies</th>
<th>Bidding</th>
<th>Contract formulation</th>
<th>Financing arrangement</th>
<th>Project implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GOVERNMENT</strong></td>
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</tr>
<tr>
<td>• Establish privatization agency</td>
<td>• Market the opportunity</td>
<td>• Prequalify bidders</td>
<td>• Financial negotiations</td>
<td>• Consistent involvement and commitment</td>
<td>• Manage and adjust regulatory structure to create stable market conditions</td>
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<tr>
<td>• Pass enabling legislation</td>
<td>• Select advisers</td>
<td>• Evaluate bids</td>
<td>• Engineering negotiations</td>
<td>• Consistent involvement throughout financial engineering process</td>
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</tr>
<tr>
<td>• Establish regulatory agency</td>
<td>• Conduct economic studies</td>
<td>• Award bids</td>
<td>• Legal negotiations</td>
<td>• Due diligence</td>
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<tr>
<td>• Mobilize public support</td>
<td>• Conduct engineering studies</td>
<td></td>
<td></td>
<td>• Road shows</td>
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<tr>
<td>• Select and identify project</td>
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<tr>
<td>• Restructure state-owned enterprise</td>
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</tr>
</tbody>
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<table>
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</thead>
<tbody>
<tr>
<td>• Assess the market</td>
<td>• Conduct economic studies</td>
<td>• Assemble consortium</td>
<td>• Financial negotiations</td>
<td>• Financial engineering</td>
<td>• Operation of business</td>
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<tr>
<td>• For unsolicited bids:</td>
<td>• Conduct engineering studies</td>
<td>• Prepare bid</td>
<td>• Engineering negotiations</td>
<td>• Registration</td>
<td>• Ensure compliance with contractual obligations</td>
</tr>
<tr>
<td>• Carry out preliminary feasibility studies and project identification</td>
<td>• Legal consultation</td>
<td>• Prepare engineering proposal</td>
<td>• Legal negotiations</td>
<td>• GAAP compliance</td>
<td>• Ensure compliance with any legal or regulatory changes</td>
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<tr>
<td>• Identify primary decisionmakers in the government</td>
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<td>• Prepare financial proposal</td>
<td>• Intraconsortium negotiations</td>
<td>• Auditing</td>
<td></td>
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<tr>
<td>• Shepherd project through the government</td>
<td>• Intraconsortium</td>
<td>• Develop financing plan</td>
<td>• Legal negotiations</td>
<td>• Underwriting</td>
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<tr>
<td>• Conduct public relations efforts</td>
<td></td>
<td></td>
<td>• Intraconsortium negotiations</td>
<td>• Road shows</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Develop financing plan</td>
<td>• Negotiate with institutional investors</td>
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Factors driving transaction costs

Transaction costs are dominated by staff and travel costs, primarily reflecting the legal and financial complexity of reaching contractual agreements between numerous parties in essentially new and unique environments. The cost of technical studies appears less important than expenses incurred in dealing with governments. Project development time usually is counted in years. Initial optimism about the speed of progress has often been unfounded, and many firms have seen development times

closure left developers stranded with tens of millions of dollars in expenses. Interestingly, the scatter of observations of selected costs for thirty-three projects in figure 1 shows little relationship between project size and transaction costs, indicating that the technical characteristics of projects are not the main driver of transaction costs. Industry experts suggest that transaction costs vary mainly with familiarity with and stability of the policy environment. While costs are usually about 3 to 5 percent in well-developed policy environments, they may be 10 to 12 percent in pioneering projects.
double. For most projects, development time falls in the range of two to eight years.

Why is the development process so protracted and costly? Throughout the process, uncertainty is typically high. Developers and advisers may be “on hold” for long periods, for example, while the government prepares tender documents. When the tender is finally issued, they may have to go on all-night overdrive to complete bids, which suddenly must be submitted within a matter of weeks. A lack of definition and transparency and a cloak of secrecy over government process can greatly compound uncertainty and with it transaction costs.

These are the symptoms of a simple underlying fact: private infrastructure is a new way of doing business for most governments. Although many private firms are learning as well, government is the ultimate decisionmaker in most private infrastructure projects, given that these projects constitute a form of contracting out of public and private projects compare. While...

BOX 2 A FAMILIAR STORY

“Ciudad Progressiva,” a municipality in northern Mexico, urgently needs to upgrade its water supply by building a pipeline to a distant river, but is short of money. The mayor knows of private financing possibilities: French and British water companies have made numerous tempting presentations. Unwilling to antagonize the municipality’s water company, the mayor decides not to privatize the entire water system but only to contract for the new pipeline with a private investor under a build-operate-transfer concession.

The mayor soon learns that the path to private water is an obstacle course. The municipality’s water company, feeling threatened, is slow in providing adequate technical information. Drawing up contracts between the municipality and the private company turns out to be complicated, and local procurement practices make it difficult to hire expensive outside counsel. But the mayor somehow manages to hire a competent lawyer, who helps find ways around obstacles arising from current regulations and procurement procedures. After several iterations and almost two years, contracts satisfactory to all parties have been drawn up. The private sponsor, dependent on public monopolies for water supply and sales, has insisted on minimum revenue guarantees.

Discussions with potential lenders, meanwhile, have revealed that credit will not be made available unless the municipality obtains a guarantee that it and its water company will have money to meet the payments when they are due. After a trip to the capital and having obtained the governor’s approval, the mayor gains assurances that Banco Nacional de Obras y Servicios Publicos (Banobras) will issue a payment guarantee based on its recourse to future federal tax revenues due to the municipality under the revenue sharing system. Lenders now quote their terms. The best offers are seven- to eight-year loans carrying interest rates 10 percentage points above the federal government’s domestic borrowing rate.

The Ministry of Finance then points out that all the guarantees taken together amount more or less to a sovereign guarantee. In effect, future sovereign revenues are being pledged, and a call on them would increase the public borrowing requirement by an equivalent amount—everything else being equal. And still the banks want a spread of 10 percentage points. “No way,” is the ministry’s response. “So borrow directly on sovereign guarantee,” retort the banks. “But we want it off balance sheet,” replies the ministry. “Then pay an extra 10 percent.” As the discussion drags on inconclusively for several months, with the ministry trying to squeeze out a lower spread, the mayor’s three-year term ends, and the discussion starts over again from scratch.
details up front and may require more expensive advisers. To some extent, this greater attention to project parameters reflects the shifting of risks to private investors, while in public projects many risks are silently assumed by consumers and taxpayers. But a tentative comparison of public sector projects funded by the World Bank with projects funded by its private sector arm, the International Finance Corporation, suggests that private projects are more likely to be executed on time and within budget. The “average” public sector project suffered time overruns of 50 to 70 percent and cost overruns of 10 to 20 percent in dollar terms. Better monitoring in private projects may imply higher transaction costs, but it also means lower overall costs.

The way forward

Some of the higher costs in private projects are the costs of the transition to a new way of doing business. These costs will fall as governments and developers become familiar with new processes. But decisive government action on two fronts will reduce costs:

- Clarifying the new responsibilities and rules of the game in the government.
- Disseminating lessons of experience broadly within the government.

Some governments have already clarified responsibilities and rules for government officials through concession laws (Chile, Hungary, and the Philippines) or in general government guidelines (the United Kingdom and the State of Victoria in Australia). Just as important are building the necessary institutional capacity for handling these projects and improving learning from experience. As many governments have come to see, hiring experienced advisers is crucial. No less crucial is building a competent cadre of officials who understand the intricacies of private projects and project finance. Because these skills tend to be scarce and sought after, governments may need to adopt unbureaucratic solutions and salary mechanisms to attract and retain competent staff. The cost of greater remuneration should be offset by the savings from the declining need for outside advisers.

Equally unbureaucratic solutions are needed to allow lessons to flow from one project and sector to others. All too often staff in one agency or level of government fail to tap the knowledge of staff elsewhere and unnecessarily start from scratch. One way to improve the dissemination of lessons is to establish a single entity for private finance reporting to the minister of finance.

Conclusion

Although introducing private participation in infrastructure seems to increase the transaction costs in developing projects, this cost difference may be more apparent than real. Private participation may simply bring otherwise hidden public costs into the full light of day. Transaction costs seem to have more to do with the characteristics of the policy environment than with the characteristics of the project. Thus, they will naturally fall over time, declining more where governments adopt better policy and enforce proper conduct. And the available evidence suggests that, even with higher transaction costs, private participation means overall gains because of the improved incentives for efficiency and cost-consciousness.

Taking all the actions necessary to reduce costs is tough, though, and many governments will continue learning the hard way. But for those able to undertake thorough reform and to learn fast, the rewards are large—worldwide, they amount to several billion dollars. The Bank’s experience with private power in Pakistan is indicative of these rewards. The pioneering Hub River Power Project took some seven years to reach financial closure. After the policy framework was clarified in 1994, the second deal, for the Uch Power Project, took two to three years to reach financial closure. The next generation of projects is expected to take only one and a half to two years to reach closure.

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Capital Market Pressures and Management Incentives—And the Implications for Sale Strategies

Timothy Irwin and Ian Alexander

One of the arguments for privatizing infrastructure is that private ownership gives the managers of infrastructure firms better incentives to manage well: the new, private sector owners put stronger pressure on management to operate efficiently and profitably, and those who lend money to the firms monitor management more carefully. But privatization does not ineluctably improve management. The devil is in the details. The rules accompanying privatization determine how well new capital market pressures are brought to bear.

This Note examines how owners and lenders encourage managers to run private firms well and proposes some rules for privatizing infrastructure companies. While it draws mostly on the experience of the United Kingdom and the United States, two countries in which privately owned infrastructure has an established track record, the lessons are just as relevant to developing countries. In particular, the Note concludes that privatizing governments should:

• Seek, where possible, to have several different firms operating in industries that are local natural monopolies, such as water distribution, so that bankrupt firms can more easily be replaced by others.
• Allow concentrated share ownership, because large shareholders have the best incentives to monitor management.
• Allow foreign ownership and hostile takeovers, to increase new owners' leverage over managers by providing a wide range of potential subsequent buyers for their firms.
• Regulate privatized firms in ways that don't guarantee owners their profits, so owners have financial incentives to monitor managers.

The problem

In a competitive industry, managers come under pressure from four groups: customers, workers, owners, and lenders (figure 1). Customers want good products at low prices. Workers want competitive salaries. Owners want high profits. Lenders want their loans repaid. And if these groups don't get satisfaction, they can turn to other firms, run by other managers. The combined pressure means that managers must run their firms reasonably well.

The traditional infrastructure firm, however, has been run as a publicly owned monopoly, which radically changes the balance of these forces. Customers exert less pressure because they cannot choose among sellers, and governments typically don't demand the same financial return on their investments as private owners do. In the absence of pressure from consumers and owners, the demands of employees and lenders do not create good managerial incentives, for the easiest way for managers to satisfy these demands is to sacrifice the interests of customers and owners—rather than increasing their firm's efficiency. A bank's demand for loan repayments, for example, may be met at the expense of customer services or dividends paid to the owner.

The solution has two parts. First, governments should subject infrastructure providers to competition wherever possible, to strengthen customer pressure. And second, they should strengthen lender and owner pressure through privatization. Here we consider the second—the first is the subject of other Notes in this volume.
Pressure from lenders

Although privatization doesn’t always introduce new lenders, it does change the way lenders behave. Without implicit or explicit government guarantees of loan repayments, lenders worry more about a firm’s becoming insolvent. Thus, they have more to gain from monitoring the behavior of managers. They’ll take more care specifying, in the debt covenants that accompany loans, what the firm can and cannot do (what debt-equity ratio it must keep below, for example). And they’ll take more care ensuring that managers comply with the covenants. Further, if the firm defaults on its repayments, the lenders have to consider the possibility of taking control of it themselves, introducing new management, or even selling the assets and closing the business.

But getting the threat of bankruptcy to spur better management is tricky in infrastructure. The first problem is that regulated monopolists tend to be allowed to charge prices high enough to keep them in business. In the United Kingdom, for example, regulators are legally required to ensure that companies can finance their functions. The second problem is that infrastructure firms are monopolies supplying services that consumers cannot easily do without, such as water and electricity. In competitive markets, it may not matter to consumers if a firm disappears along with its products—they can switch to another brand. But what happens when a water monopoly goes bankrupt?

A new firm must somehow take over the assets of the old business without unduly disrupting service. In a country with only one water company, that may be difficult.

Nevertheless, regulated infrastructure firms can go bankrupt—and in the United States, they have. The Public Service Company of New Hampshire, an electric utility, filed for bankruptcy in 1988, and El Paso Electric in January 1992. Both had suffered unexpected increases in the cost of constructing nuclear power plants, and the regulatory authorities declined to allow them to pass on all the cost overruns to consumers in the form of price increases. The New Hampshire utility merged with Northeast Utilities; El Paso was taken over by the Central and South West utility company. Bankruptcy was an option in these cases partly because there were many utilities operating in similar circumstances in the United States, so other firms could take the place of their failed counterparts. (Also important was the fact that U.S. law allows companies to continue to operate while bankrupt.) When privatizing, then, there are advantages in not selling all the local electricity or water monopolies to one buyer. Argentina, to take just one example, followed this approach in privatizing its electricity sector: three private distribution companies now supply electricity in greater Buenos Aires.

Pressure from owners

Private owners put pressure on managers in three ways:

- By monitoring them.
- By linking their pay to their firm’s profitability.
- By being willing to sell the firm to new owners.

Monitoring management

The most direct way in which owners look after their interests is by appointing and then monitoring their firm’s top managers. In big companies, they usually do this through the
board of directors, which they appoint and which then appoints and monitors the management. But at annual or extraordinary general meetings, the shareholders may review and, if they want, overrule the directors’ proposals to, say, pay dividends or make major acquisitions. (The precise powers of shareholders vary according to such things as company law, the founding documents of the company, and the requirements imposed by stock exchanges.)

If a firm is owned by thousands of shareholders, each holding only a tiny proportion of the firm’s shares, no shareholder has a strong incentive to do the research and other work that’s necessary to monitor and influence managers. For small shareholders unhappy with a firm, it is easier to sell their shares than to take deliberate steps to improve the firm’s management. Selling can in itself be helpful—as the discussion of performance pay below suggests—but it is large shareholders who are most likely to put direct pressure on managers. They have an important financial interest in management’s performance—and the resources and voting power to influence management. Privatizations that permit concentrated ownership therefore tend to be good for efficiency.

In the United Kingdom, utility firms were privatized under a rule that, initially, no one shareholder could own more than 15 percent of a firm, to shelter management from takeover bids while it “adjusted to privatization.” This rule has probably weakened the incentives for managers to improve their firm’s performance. In electricity, the rule is in force until 2000—although it has been possible for a majority of shareholders to overturn the rule since 1995. In water, it applied only until the end of 1994. Since then, two water companies have been taken over, one by a subsidiary of a French water company, the other by a British electricity company. More takeovers are being discussed. The interest in takeovers shows that market participants believe they can increase efficiency now that they are permitted to own controlling interests in the firms. Any efficiency improvements they do make will benefit shareholders and, over time, consumers.

### Linking pay to performance

Besides directly monitoring management, shareholders, through the board of directors, can give managers performance-based pay packages. Consumers are sometimes angered by large bonuses paid to the managers of infrastructure firms, but well-designed performance pay can strengthen managers’ incentives to increase their firm’s efficiency—not only increasing shareholder returns but in the long run giving consumers lower prices or better quality.

Privatization, of course, is not a prerequisite for performance-related bonuses. The managers of publicly owned infrastructure companies can receive bonuses linked to, say, operating profits. But privatization permits a new type of bonus because it allows managers’ pay to be linked to their firm’s share price. As long as the firm’s shares are traded frequently, the link is useful because the share price will reflect better than any other indicator the firm’s value—which is what owners want managers to focus on. Basing a manager’s bonus solely on profit in the current year could, for example, encourage the manager to sacrifice the firm’s value for the sake of short-term profits. Schemes based on share prices can circumvent this problem, because well-informed shareholders will be on the lookout for managerial decisions that jeopardize future profitability.

The simplest share price scheme gives managers shares in their firm. If they manage well and increase the firm’s expected profitability, their wealth increases. The incentives can be further sharpened by giving the managers options rather than shares. Suppose, for example, that a firm’s shares are trading at $10. The owners could give the managers the right to purchase shares in the company in three years at a price of, say, $12 a share. If the share price is lower than $12 in three years, these options are worth nothing; there’s no point in buying shares at $12 when they can be bought for less on the stock market. But if the share price exceeds $12, the options are valuable.

There are many variations on the options approach. British Gas, for example, introduced a
more complex scheme, partly in response to public criticism that management pay was high and not clearly linked to performance. Under this scheme, British Gas awards its managers bonuses in the form of long-term share options. The market value of the options—at the time they are created—is between 33 percent and 125 percent of the managers' base pay, but the managers do not immediately receive the options; instead, the company holds the options for three years. At the end of the three-year period, the increase in the share price for British Gas is compared with those for the 100 biggest listed companies in the United Kingdom, and the managers are given a proportion of the options based on British Gas's ranking among these 100 companies. This ranking, or "benchmarking," helps to separate the effect of the managers' performance from other influences on the share price, such as the strength of the British economy.

Selling the shares

Another action owners can take to look after their interests is to sell their shares to someone else. When owners jointly sell a controlling interest in a firm to another group against the wishes of managers, the sale is called a hostile takeover. The incentive effect on managers is encapsulated in the term hostile: the incumbent managers feel hostile because the takeover can result in their being fired. If managers are doing their job poorly and the current owners cannot remedy the problem, the sagging share price provides an opportunity for other groups to buy the firm, fire the management, change the firm's strategy, and improve its profitability and thus its share price. If managers are doing their job well, the firm's assets should not be undervalued and no such opportunities should arise. The chance of a takeover bid arousing the hostility of management is smaller. Thus, owners' ability to sell their shares is one source of pressure on managers.

Governments can therefore help new private owners to improve the efficiency of their firm by not putting restrictions on who can subsequently buy the firm. In particular, they can ensure that they haven't placed any obstacles in the way of hostile takeovers or foreign ownership. Note, however, that takeovers are not always desirable, especially when they are friendly rather than hostile. If one firm buys out another so that the two no longer compete with each other, this takeover (or merger) reduces the intensity of customer pressure. In these cases, governments need to weigh the advantages of permitting takeovers against the benefits of competition.

**Regulation**

Regulation affects private investors' interest in pressuring their managers to manage well. In particular, the more that regulation determines a firm's profit, the less need owners have to supervise, cajole, and threaten managers. Regulation should therefore let firms benefit from good management decisions and suffer the consequences of bad ones. Pure rate-of-return regulation sets the price a firm can charge and increases or decreases that price so as to keep the firm's rate of return constant. If the regulator's price reviews are too frequent (for example, every year), rate-of-return regulation takes the risk out of the business and weakens the incentives of managers. At worst, when private owners receive guaranteed profits, they may do no more to encourage efficiency than public owners. Indeed, studies of water and electricity utilities in the United States, where rate-of-return regulation is used, have often found private companies to be no more efficient than their public counterparts. The solution is to rely on competition, not regulation, wherever possible. Where competition isn't possible, the rate reviews in rate-of-return regulation can be made less frequent or price cap regulation can be introduced instead.

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Colombia's Mixed Ownership Model for Privatizing Infrastructure

How a gradualist approach creates complexity for regulation, operations, and investment

Philip Gray

Like the model adopted by many Asian countries, the Colombian approach to private participation in infrastructure aims to attract project financing for new facilities, leaving most existing assets in state hands. While the approach has been successful in attracting substantial private capital to Colombia, it has made private participation more complex and potentially less sustainable because of the lack of clarity over public and private roles in regulation, operation, and investment. Recently, Colombia has moved toward the model adopted by other countries in Latin America—privatizing existing assets—a policy likely to provide a more enduring basis for reform.

Three main factors have shaped the Colombian program. First, for many years, Colombia had the most stable economy in Latin America. A record of high growth and relatively low inflation earned the country an investment-grade credit rating, making it more attractive to foreign private investors (though lately the drug industry has undermined some of this stability). As a result, Colombia has had great success in attracting private investment in infrastructure, particularly through project finance. It led Latin America in project finance in 1995 and ranked fifth in the world, drawing US$1.56 billion of loan finance for infrastructure projects. Private financing has been coming in for new power projects, toll roads, gas pipelines, and telecommunications lines. Some of these projects have been very innovative. For example, at El Dorado airport in Bogotá, a private firm is building a second runway at the airport while operating the existing runway in return for landing fees.

Second, state enterprises and their trade unions have been effective at resisting large-scale privatization of existing assets. An abortive attempt to privatize the state-owned telecommunications company in 1992 led to a week-long disruption of telephone services, weakening the political will for the kind of “big bang” approach that the Argentine government had pursued. So the government has instead chiseled away at the edges of public monopolies by phasing in competition and privatization only gradually. Until recently, privatization was mostly confined to build-operate-transfer (BOT) contracts, although the government also set up private operating concessions in the rail sector and privatized the ports. Third, much of the country’s infrastructure is owned by municipal governments, and the central government has no legal authority to privatize these assets. As a result, it can only indirectly influence most of the privatization process, for example, through advice and financial support.

Colombia’s gradualist approach manifests itself in the three major features of its infrastructure program: the competitive framework, the different forms of private participation, and the development of the regulatory framework.

**Competitive framework**

The competitive framework within which infrastructure is provided is halfway between outright
liberalization and complete monopoly. In telecommunications, for example, the country opened the sector through a phased program, starting with three regional duopolies in cellular telecommunications (although the cellular market will be opened to further competition in 1999). In each of the three duopolies, one operator has mixed public and private ownership and the other is fully private. A “managed” opening of the long-distance sector has been repeatedly postponed and is now being relegated to further study. The introduction of competition in long-distance services was meant to bring in two new competitors for the incumbent, Telecom, with the entrants to pay a fee for entering the market. The planned policy is similar to the approach taken by the British government, which started with a duopoly in long-distance services and opened the sector to new entrants seven years later. By contrast, Chile opened the sector completely, attracting six new private entrants. The fierce price competition that followed allowed Chileans to enjoy international prices that for a time were cheaper than those in the United States.

In power, the government recently set up a market for generation similar in some respects to those in Argentina and Chile—though it is more open and transparent because it allows generators to bid prices at which they are willing to generate (rather than basing prices on audited costs) and it allows traders as well as generators to participate. The market has been in operation for just over a year. But most new private generation capacity has been sold through long-term power purchase contracts with public distribution companies at prices well above the prevailing power market price. Part of the reason for the low market prices is that most power is still sold through publicly owned and vertically integrated companies. Another factor contributing to the low prices has been the ample rainfall in the predominately hydro-based system. But the government has taken several steps to ensure that the market becomes more dominant in the future. It has refused to guarantee any future power purchase contracts and forced the distributors to purchase at least 40 percent of their power through the market. It has also adjusted the market rules to ensure that generators can receive a fixed capacity payment regardless of actual operation. This is meant to encourage new private entry into generation by reducing the market risks in the hydro-dominated market.

The shift to privatizing existing generation assets should also lead to more new investment as the new private owners become more comfortable with the market risks they face. Encouraging signs are also coming from new BOT generation deals. In the recent Termovalle project, for example, 20 percent of power generation has not been placed under long-term contracts and is available for sale through the market. Perhaps even more significant, the planned privatization of distribution, starting with the vertically integrated firm EPSA, should lead the way toward the creation of more credit-worthy purchasing entities, further promoting the sustainability of reforms.

In contrast to the telecommunications and power sectors, among privatized ports competition has been vigorous. Prices have fallen by some 50 percent a year since privatization, and the quality of port services has improved dramatically, with productivity increasing by 60 percent and handling times cut in half. Even here, though, intervention continues, and temporary price caps and floors have been imposed to prevent competition from completely undermining the position of the highest-cost ports.

Ownership framework

The Colombian approach to ownership is eclectic, using models ranging from joint ventures and leases to outright privatization, with varying success. An important feature of the ownership framework is the degree of municipal ownership, particularly in water and sewerage. Municipal ownership also extends to “multi-utilities,” such as the Empresa Pública de Medellín, which combine electricity, local telephone service, water and sewerage, and other utilities. As mentioned, the extent to which the central government can dictate a privatization strategy to the municipalities is limited—part of the reason for the eclecticism.
The central government can only provide a series of carrots and sticks to try to prompt municipal authorities to move in the direction it wants them to go.

One popular approach to infrastructure privatization among municipalities has been to create "mixed" companies jointly owned by the public and private sectors. This approach allows municipal authorities to involve the private sector without completely losing control of corporate actions. A recent example is the joint public-private company established to provide water and sewerage services in Cartagena under a lease contract. The private operator runs the system and collects revenues, but the municipality retains the responsibility for major new investments. This arrangement has improved operating performance. But experience in other countries shows that separating operations and investment can lead to difficult disputes between the public and private parties because it shares the commercial risks of the contract between the two.\(^1\)

Mixed companies are a popular transitional step in almost every privatization process. Governments argue that they can extract better value through phased privatization—selling shares in state-run companies in tranches—perhaps because the risk premium demanded by private investors diminishes as governments strengthen their credibility on the regulatory framework. But empirical studies of the performance of mixed companies suggest that they are less effective than either pure public or pure private ownership in the long run, possibly because of the potential conflicts of interest between the owners.\(^2\) It is thus unclear whether experiments such as Cartagena will succeed in the long run unless more efforts are made to limit the political interference inherent in the ownership structure.

Another interesting feature of the Colombian system has been the "subconcessions" by public companies of parts of their services to the private sector. The public entity maintains the main interface with consumers, and the private sector provides a specific input under a contract with the public entity. Examples of such arrangements include the subconcessioning of rail services, the creation of subconcessions known as joint ventures in telecommunications (with equipment providers installing new lines), and the BOT contracts in electricity generation.

Although these subconcessions have had great success in achieving physical targets, they may be the least sustainable part of the program. For example, in the joint ventures set up to install new telecommunications lines, the contracts share the revenue risk associated with each line between Telecom and the private equipment provider, although the private firms receive minimum revenue guarantees. These contracts have been criticized as simply a means for Telecom to avoid budgetary restrictions and as an expensive form of financing. They do not increase competition or private ownership of the system.

In the rail sector, the provision of track and services has been separated, with the public sector retaining responsibility for the track through Ferrovias and private rail concessions providing services. This arrangement has led to disputes between Ferrovias and the private concessionaires over their responsibilities. The condition of the rail infrastructure has declined, and each has blamed the other for the sector's poor performance. Following the reorganization of the sector, freight declined from 900,000 tons to 300,000 between 1989 and 1992, and passengers from one million to 125,000. The government is now creating a new arrangement allowing vertically integrated concessions of both track and services, which it hopes will overcome the problems in the current arrangement by placing responsibility more clearly in the hands of the private operators.

The electricity generation sector has attracted new generation capacity and private financing, but the government worries that it has been at the cost of excessive guarantees. In the future, new capacity will have to come onstream without extensive government support, relying more on the creditworthiness of the off-takers and revenue streams from the electricity market.
Regulatory framework

Like other countries, Colombia has developed a series of regulatory commissions to regulate the private infrastructure providers. It now has regulatory commissions for energy, telecommunications, and water and sewerage. Although initially these commissions were to be essentially independent of the government, political fears of lack of control over the sectors led to the establishment of quasi-independent regulatory bodies with ministers sitting on the boards. Most of the commissioners appointed to the boards are independent of the government, however. Because most private participation has been through upstream contracts relatively unaffected by regulation, the actions and decisions of these regulatory bodies have not yet affected private firms significantly.

In the water and sewerage sector, the commission’s role is ill defined because of the dispersed public ownership, with more than 1,000 municipalities remaining the dominant service providers. Until there is greater private participation in water and sewerage, the commission’s functions are unlikely to become any clearer. In fact, unless regulatory decisions come to have a greater impact on private operators, the regulatory system is unlikely to be sustainable: with the regulators acting primarily to discipline public providers, conflicts of interest will arise as sector ministers continue to be both owners and regulators.

As in Chile, there is a division of labor in regulation between the regulatory commissions, which are responsible for developing the pricing and other regulatory rules under which companies provide services, and the Superintendency of Public Services (SPS), which was given a broad mandate in the 1991 constitution to ensure that the rules are adhered to and that the companies provide services efficiently. In practice, the roles of these agencies have not been closely defined, and a turf war could well ensue. Moreover, it is not clear whether such a division of labor makes sense. In describing a similar situation in the United Kingdom, John Kay, director of the Oxford University Business School, said that “separation between policy and administration could never work very well because, in any but the simplest of cases, it was impossible to make sensible decisions about what to do without being involved in doing it and difficult to do it well without some knowledge of and sympathy for the reasons it needs to be done.”

Only as more private providers come under the purview of the regulatory agencies is it likely that strong pressure will be exerted to ensure that the regulatory agencies work efficiently, with greater independence from the line ministries, and that the division of work between the superintendency and the regulatory commissions is clarified.

Conclusion

Colombia has attracted large amounts of private capital into its infrastructure sectors, primarily through project finance, an approach made possible by the country’s investment-grade rating. It has avoided the “big bang” route of outright privatization taken by Southern Cone countries such as Argentina and Chile. But in doing so it has made private participation more complex and potentially less sustainable because of the lack of clarity surrounding the public and private roles in regulation, operation, and investment. These problems have been recognized, however, and Colombia is now moving to privatize electricity generation and distribution and to set up rail concessions that give the private sector full responsibility for sector performance.

1. See, for example, Penelope J. Brook Cowen, “The Guinea Water Lease—Five Years On” (Private Sector, June 1996).
Utility Regulators—The Independence Debate

Warrick Smith

The global trend of utility privatization has pushed regulatory issues to the fore, among them the role of regulatory agencies. These agencies have a long history in the United States, and creating or strengthening them has become a central goal of reforms around the world. But many issues remain contentious, particularly the notion of agency independence. Some governments are reluctant to surrender political control over regulatory decisions. And even those who agree on the desirability of independent agencies may question whether they are feasible or appropriate in all country settings. This Note considers the debate over the independence of utility regulators, focusing on the position of developing countries.

Independence—What and why?

*Independence* is subject to different interpretations. Some use it interchangeably with autonomy; others perceive greater or lesser differences in meaning between the terms. This Note defines independence for utility regulators as consisting of three elements:

- An arm’s-length relationship with regulated firms, consumers, and other private interests.
- An arm’s-length relationship with political authorities.
- The attributes of organizational autonomy—such as earmarked funding and exemption from restrictive civil service salary rules—necessary to foster the requisite expertise and to underpin those arm’s-length relationships.

The rationale for giving regulators independence as broadly defined here lies in the special challenges posed by utility regulation, including the critical role of regulatory discretion.

Regulatory challenges

Utility regulation has three main aims: to protect consumers from abuse by firms with substantial market power, to support investment by protecting investors from arbitrary action by government, and to promote economic efficiency. While there is growing recognition that competition can reduce the need for regulation in utility industries, most industries contain some areas of monopoly where the benefits of regulation potentially outweigh the costs.

Regulating utilities is complicated by three related considerations. First, prices for utility services are usually political. There are no votes in raising utility prices, and history is replete with examples of justifiable price increases being withheld at the expense of investors and the long-term interests of consumers.

Second, investors are aware of these pressures and of the vulnerability of their usually large, long-term, and immobile investments. Unless a government has made a credible commitment to rules that ensure an opportunity to earn reasonable returns, private investment will not flow. Weak credibility will be reflected in higher capital costs and thus higher tariffs. In privatization, this translates into smaller proceeds from sales of existing enterprises and higher financing costs for new projects.

Third, the long-term nature of most infrastructure investments makes creating credible commitments difficult. Highly specific rules, if considered sustainable, can provide assurance to investors and lower the cost of capital. But they make it difficult to adjust regulation to unforeseen developments, including changes
in technology and market conditions. They also make it difficult to tailor responses to situations and to provide incentives for efficiency. There is thus an important tradeoff between reducing the risk of expropriation, and with it the cost of capital, and retaining the flexibility to pursue efficiency and other objectives.

In designing regulatory systems, then, policymakers need to resolve two fundamental challenges: How much discretion should regulatory systems contain? And how should that discretion be managed to reduce the risk of misuse and thus the cost of capital?

**How much discretion?**

The discretion in regulatory systems differs widely among countries and industries. At one extreme, U.S. laws typically delegate broad discretion to regulators, often vaguely defining pricing standards as “just and reasonable” and limiting other powers only by reference to broad public interest criteria. At the other end of the spectrum, some countries implement regulation through tightly specified laws or contracts that seek to eliminate discretion. They attempt to deal with all contingencies foreseen at the time an arrangement is finalized, usually relying on detailed cost-based formulas for tariff adjustments. This approach—sometimes called “regulation by contract”—is often favored by investors who perceive a high risk of misuse of discretion by the government or regulator. Adjustments to the initial arrangement will require renegotiation, which can be difficult if the bargaining power of the parties changes once the investment is made.

Most regulatory systems lie somewhere between these extremes. Key policies and principles tend to be defined in laws, licenses, or contracts, which carefully delimit residual discretion through reference to criteria, factors, and objectives. Greater flexibility and discretion are usually more important in industries in which there is rapid technological change, in which the introduction of competition requires continuous adaptation of rules to changing market conditions, and in which high priority is placed on providing incentives for efficient operation. Discretion is thus typically more important for telecommunications than for toll roads. Another consideration is a country’s stability and reputation for respecting private property rights: the higher a country scores on these criteria, the more discretion it can retain without significantly increasing the cost of capital. This consideration is especially relevant for reforming and developing countries, many of which lack a long track record of good performance in these areas.

**How to manage discretion?**

When discretion is retained on tariffs or other issues of concern to investors, the challenge is to manage it in a way that minimizes the risk of misuse. The exercise of discretion needs to be insulated from short-term political pressures and other improper influences and to be based on competent analysis.

Entrusting discretion to ministers will not meet these tests, particularly when the state continues to own utility enterprises. In this case, there will be no arm’s-length relationship between the regulator and the firm, and there may be concerns that, in exercising discretion, ministers will favor the state enterprise over rival private firms. But even if the state has no ownership role, ministers will still be subject to short-term political pressures, and changes in government can lead to abrupt changes in regulatory policy. Restrictive civil service salary rules in many countries also make it difficult for ministries to attract and retain well-qualified professional staff. What is required is an agent at arm’s length from political authorities, utilities, and consumers. Organizational autonomy helps to foster the requisite expertise and preserve those arm’s-length relationships.

**The quest for independence**

Creating an independent agency, no easy task in any setting, is even more challenging in countries with a limited tradition of independent public institutions and limited regulatory experience and capacity. The two main elements of independence—insulation from improper influences and measures to foster the
development and application of technical expertise—are mutually supporting: technical expertise can be a source of resistance to improper influences, and organizational autonomy helps in fostering (and applying) technical expertise.

There is strong consensus on the formal safeguards required:

- Providing the regulator with a distinct legal mandate, free of ministerial control.
- Prescribing professional criteria for appointment.
- Involving both the executive and the legislative branches in the appointment process.
- Appointing regulators for fixed terms and protecting them from arbitrary removal.
- Staggering terms so that they do not coincide with the election cycle, and, for a board or commission, staggering the terms of the members.
- Exempting the agency from civil service salary rules that make it difficult to attract and retain well-qualified staff.
- Providing the agency with a reliable source of funding, usually earmarked levies on regulated firms or consumers.

Formal safeguards of this kind are especially important in countries with a limited tradition of independent public institutions. But they are not enough. Persons appointed to these positions must have personal qualities to resist improper pressures and inducements. And they must exercise their authority with skill to win the respect of key stakeholders, enhance the legitimacy of their role and decisions, and build a constituency for their independence.

Some argue that governance traditions in some countries make independence illusory—"If the Palace calls, the regulator will comply." Certainly, adopting even the most sophisticated law will not magically transform the basic institutional environment. Nevertheless, for several reasons, creating such agencies is worth the effort, even in more challenging environments.

First and foremost, independence must be understood as a relative rather than an absolute concept. In any system, the goal can only be to reduce the risk of improper political interference, not to provide ironclad guarantees. Progress must be measured at the margin—and relative to the outcome of ministers retaining direct control over regulatory decision-making. Second, the ability of independent agencies to sidestep civil service salary restrictions and to have access to earmarked funding makes it possible to recruit and retain better-qualified staff and to hire external consultants. This can improve the technical quality of decisions and thus enhance the agency’s authority. Adequate salaries can also help to reduce concerns about corruption. Finally, even if there are reasons to doubt that an agency will exercise truly independent judgment in the short term, that may change in the longer term. Concentrating expertise in a body with a specialist mandate sharpens commitment to professional norms, which can be an important source of resistance to improper influences. And as the regulator enters the fray, it will have the opportunity to build a constituency of its own, increasing insulation from political interference.

**Reconciling independence with accountability**

Independence needs to be reconciled with measures to ensure that the regulator is accountable for its actions. Checks and balances are required to ensure that the regulator does not stray from its mandate, engage in corrupt practices, or become grossly inefficient. Striking the proper balance between independence and accountability is notoriously difficult, but the following measures to do so have been adopted by a growing number of countries:

- Mandating rigorous transparency, including open decisionmaking and publication of decisions and the reasons for those decisions.
- Prohibiting conflicts of interest.
- Providing effective arrangements for appealing the agency’s decisions.
- Providing for scrutiny of the agency’s budget, usually by the legislature.
- Subjecting the regulator’s conduct and efficiency to scrutiny by external auditors or other public watchdogs.
- Permitting the regulator’s removal from office in cases of proven misconduct or incapacity.
Possible paths of transition

Resistance to independent agencies is breaking down. Ministers once adamant about maintaining political control over tariffs and other regulatory matters increasingly see the benefits of creating such agencies, which include improving offers from investors, helping to sustain reforms, and shifting responsibility for unpopular decisions to someone else. But what if the government resists?

The choice can be stark. Governments can reduce discretion by adopting highly specific rules, forfeiting flexibility and other advantages. Or they can retain discretion, pay investors risk premiums, and accept reduced proceeds from privatization, higher tariffs or both. In either case, ministerial structures will usually make it difficult to develop expertise to deal with regulatory problems arising after privatization.

But several options lie between the traditional ministerial model and the delegation of broad discretionary authority to a fully independent agency. These options can form a path of transition to greater independence and delegation of discretionary authority. First, a dedicated regulatory unit can be created within a ministry, to coordinate regulatory activity and foster the development of technical skills and professional norms. The autonomy of the unit can often be enhanced by placing it under the responsibility of a minister other than a sectoral minister—particularly important if there is potential for conflict between private firms and state enterprises under the purview of the sectoral minister. Once such a unit has been created, governments can increase the transparency of regulatory processes and approximate an independent agency in other ways. Exempting staff from civil service salary rules will usually be more problematic, but concerns about technical competence can be addressed by contracting out certain tasks to consultants.

Second, an agency can be created with many of the attributes of an independent agency, but with one or more ministers taking part in decisionmaking (as in Colombia). This approach can improve the technical quality of regulatory decisionmaking, particularly compared with the first option. But as long as ministers retain significant influence, the risk of misuse of regulatory discretion remains.

Third, a more truly independent agency can be created, but with some or all of its powers limited to making recommendations to the minister (as in Hungary). A variant is to give the agency decisionmaking authority but have appeals go to the minister rather than another independent authority (as in Argentina). This approach reinforces the separation of professional and political considerations in decisionmaking and usually provides the agency with greater insulation than under the second option. Political considerations are not excluded from the regulatory process, but the agency can build a reputation for professionalism and balanced judgment, enhancing its authority and reducing the likelihood of being overruled. Models can also be devised in which the minister is permitted to depart from the agency’s recommendations or decisions only in narrowly defined circumstances.

Even where the minister has withdrawn completely from regulatory decisions, a transition strategy may still be appropriate. Delegating broad discretionary powers to an untested agency poses risks, particularly in countries with limited regulatory experience and capacity. The broader the agency’s authority, the more enticing a target it will be for those with incentives to undermine its independence. And lack of detailed standards—like those that have taken more than a century to develop in the United States—can create uncertainty and risk for investors. The prudent course is to take the time to carefully define a new agency and ensure that it has access to adequate resources and other support. These issues are examined in two companion Notes.

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Utility Regulators—Roles and Responsibilities

Warrick Smith

Creating independent regulatory agencies has become a key element of utility sector reforms around the world. As discussed in a companion Note, these agencies are intended to insulate decisionmaking from improper pressures and foster technical expertise. This Note focuses on defining the responsibilities of such agencies, particularly in developing countries. It considers the scope of agencies' industry coverage, their role relative to ministers, and their role relative to other regulatory objectives and bodies.

Industry coverage

Specialist utility regulators can be organized on three main bases:

- Industry-specific, in which there is a separate agency for each industry—such as gas, power, water, and telecommunications—as in the United Kingdom.
- Sectorwide, in which there is an agency for each more broadly defined sector, such as the energy regulator in Colombia and the transport regulator in Canada.
- Multisector, in which there is a single agency for all or most utility industries, such as the state-level regulators in Brazil and the United States and the national regulators in Costa Rica and Jamaica.

Advantages of multi-industry agencies

Making an agency responsible for more than one industry offers several potential advantages.

Sharing resources. Economists, financial analysts, and other professionals can work across industries and administrative staff and facilities can be shared. This is particularly important in countries where regulatory expertise is scarce.

Facilitating learning across industries. All utility industries have unique features, but the main issues in their economic regulation are substantially the same: administering tariff adjustment rules, managing the introduction of competition into traditionally monopolistic industries, and managing relationships with stakeholders. Having a single agency aids the transfer of insights and experience between industries.

Reducing the risk of industry capture. A key challenge in utility regulation is to guard against the agency's capture by the regulated industry. If the industry and the regulator develop too close a relationship, the industry may be able to divert regulatory effort to promote its own interests rather than the public's. The broader responsibilities of a multi-industry agency help to reduce this risk.

Reducing the risk of political capture. Agencies intended to operate at arm's length from political authorities remain vulnerable to interference from them. Placing responsibility for several industries in one agency may make it a more attractive prize for political authorities. But there are two reasons why a multi-industry agency might be exposed to less risk of political capture rather than more. First, the agency's broader constituency raises the stakes of political interference: interfering in a decision on, say, water tariffs will be seen as a threat to all industries regulated by the agency. Second, an agency responsible for more than one industry can develop greater independence from sectoral ministries. Political pressures are unlikely to have effect unless they come from higher-level authorities, who can consider the repercussions of short-term actions from a broader perspective.
Reducing the risk of economic distortions. All industries compete for investment capital, and there is direct competition between some utility industries in meeting consumer needs, such as between gas and power or among different transport modes. Some regulatory issues are unique to specific industries and thus warrant different approaches. But many issues, such as the valuation of capital and the treatment of inflation, are common to all industries. Inconsistent approaches to these issues in competing industries can create economic distortions. Having a single agency makes it easier to adopt consistent approaches.

Dealing with blurred industry boundaries. Traditional boundaries between utility industries are rapidly blurring. Gas, power, water, and railway firms are entering telecommunications markets. Gas utilities are entering the power industry, and water and power utilities are merging. Such developments can pose important regulatory challenges. A firm involved in several industries may be able to exploit differences in the rules that apply to its activities in different industries. And regulatory decisions on one industry can affect other industries. Multi-industry agencies can deal with these challenges in a coordinated way.

Offsetting disadvantages?

Proponents of industry-specific agencies often argue that multi-industry agencies have weaknesses or limitations that offset their advantages. One concern is that a multi-industry agency may lack sufficient industry-specific expertise or focus. This concern can be addressed in several ways. Industry-specific departments can be created within the agency, but with a cross-sectoral decisionmaking body and cross-sectoral departments for pooling expertise and managing shared resources (figure 1). The agency can also draw on advice from industry-specific advisory groups.

A second concern is that placing responsibility for several industries in one agency is tantamount to “putting all your eggs in one basket”—the agency’s failure would have costs for all industries. Although industry-specific agencies help to diversify this risk, they do so at the expense of the strength of a single agency, increasing the risk of failure.

A third argument is that having a number of agencies allows experimentation with different approaches. However, industry-specific experiments are still possible in multi-industry agencies.

Finally, it is sometimes suggested that multi-industry agencies are appropriate only for very small economies. Certainly, the arguments for such agencies are especially strong in these cases. Yet California’s Public Utilities Commission is responsible for gas, power, water, transport, and telephony in an economy with a population of more than 30 million, a GDP and utilities that dwarf those of most countries, and no evident shortage of trained professionals.

Creating multi-industry agencies

The preferred approach to creating a multi-industry agency is usually to set it up as one from the outset, adding industries to its jurisdiction as they undergo reform. If an industry-specific agency already exists, it may be possible to expand its mandate to cover additional industries.

The alternative strategy—creating a series of industry-specific agencies and later merging them—has disadvantages. It delays such benefits of a multi-industry agency as fostering learning between industries, which are particularly important during an agency’s early years. And the obstacles to later merger should not
be underestimated. Industry-specific regulators will have incentives to resist merger, not least because of the implications for their jobs. Regulated firms may also resist, often out of concern that they will have less influence over a multi-industry agency. Mergers thus usually require substantial political will and effort.

The main challenge in creating multi-industry agencies is to ensure an effective coordinating mechanism during their design and establishment. Because advisers with industry-specific responsibilities have little incentive to propose multi-industry approaches, leadership usually must come from a central ministry.

**Role relative to ministers**

One of the most sensitive relationships for a regulatory agency is that with the relevant ministers. It is sometimes suggested that the ministry is responsible for policy and the agency for regulation. But this distinction is unhelpful in practice, because the dividing line between the concepts is fuzzy at best, and agencies with significant discretion clearly have a policy role.

Four main considerations generally determine the allocation of responsibilities between agencies and ministries. The first is whether the matter in question is judged to be appropriate for decision on political or technical criteria. Such judgments can change over time. For example, while political control over tariffs was once considered the norm, there is now growing recognition that, once the key policy principles or rules are established, society's interests are best served by delegating responsibility to an independent agency. Tax and subsidy issues, by contrast, are still widely regarded as the province of political rather than independent bodies.

The second consideration is whether colocation of particular functions could create significant conflicts of interest. For example, responsibility for actively promoting investment in a sector often conflicts with a regulatory agency's role as an impartial arbiter of investor and consumer interests, as well as dilutes its focus.

The third consideration is which body has the expertise for a task and whether having related tasks performed by the same body yields any economies. Once created, an agency usually becomes the main repository of public sector expertise on the industries it regulates. If the ministry is subject to restrictive civil service salary rules and the agency is not, the ministry may find it difficult to maintain expertise. This often justifies giving the agency an advisory role on matters remaining under ministerial control.

The fourth consideration is the degree of confidence political authorities have in the agency. Agencies tend to be given greater authority once they have proved their reliability.

Based on these considerations, there is general consensus that ministers should retain responsibility for broad sector policy, including public investment, privatization, sector restructuring, taxation, subsidies, intergovernmental relations, and the legislative framework. But even in these areas, agencies may be given advisory roles.

There is less consensus on where responsibility for granting licenses or concessions should lie. Much depends on the criteria governing the award of licenses: the more objective and technical the criteria, the stronger the case for delegating the responsibility to an agency.

Most systems give agencies responsibility for administering tariff adjustment rules, elaborating detailed standards, monitoring compliance with norms, and facilitating the settlement of disputes. In some systems, the power to impose sanctions for noncompliance with norms is reserved for the courts. In most, however, the agency performs this role, although major sanctions—such as cancellation of licenses—may require ministerial decision.

**Role relative to other regulators**

Utility regulators' main focus is economic regulation of firms with monopoly power. But utilities, like other firms, are subject to regulation to meet a raft of other objectives, including safety,
Utility Regulators—Roles and Responsibilities

antitrust, and environmental aims. How should a utility regulator’s role be defined in relation to these objectives and to other regulators?

A sound general rule is to avoid a proliferation of agencies. Forming numerous agencies can dissipate expertise, forgo the economies in having one entity perform related tasks, create coordination demands, and introduce additional complexity. But as with most general rules, there are exceptions. Separate agencies may be required to avoid significant conflicts in the mandate of a single agency. When an existing agency responsible for, say, environmental regulation is performing well, immediately transferring its responsibilities in utilities to a new utility regulator is usually inadvisable. And there are inescapable tradeoffs between cultivating expertise, economies of scale, and coordination in utility regulation and doing the same in environmental or other regulation for the economy as a whole.

There is one rule that should have no exceptions: If more than one agency is involved in regulating utilities, the role of each should be defined as clearly as possible to avoid duplication, jurisdictional uncertainty, and turf disputes.

Service quality issues

Customer service standards are usually the province of the utility regulator. The allocation of responsibility for safety and environmental regulation can vary widely, even between sectors in a single country. Two main issues warrant consideration.

Standard setting. Quality standards have a direct impact on utilities’ costs and thus on prices. If the utility regulator is not responsible for determining standards, it may have a role in providing advice to the agency that is responsible.

Tariff adjustment. Because changes in quality standards affect costs, they may require tariff adjustments. When different agencies are responsible for regulating tariff and quality parameters, coordination issues can arise. These issues can be addressed in several ways, including through tariff rules that permit certain cost increases to be passed on automatically.

Antitrust matters

Antitrust regulation includes prohibitions on certain anticompetitive agreements and mergers and on the misuse of market power. In countries with modern antitrust regimes, these matters are usually entrusted to a specialist agency with economywide jurisdiction. How should a specialist utility regulator’s role be defined relative to the antitrust agency? There are two main issues.

Clarifying the interaction between regimes. There may be overlap between utility and antitrust regulation in some areas—for example, between industry-specific regimes governing access to networks and economywide rules governing the misuse of market power. The interaction between the two regimes should be defined clearly from the outset.

Exploiting complementary expertise. Utility regulators and antitrust agencies have complementary expertise. Both agencies may be involved in reviewing proposed mergers or allegations of anticompetitive conduct in utility industries. In some cases, a member of the antitrust agency is also made a member of the utility agency, or the agencies make formal submissions to proceedings conducted by the other. Antitrust agencies may also be given special roles in utility regulation, such as hearing appeals of decisions by the utility regulator.

Decisions on the responsibilities of a utility regulator have important implications for other aspects of the agency’s design, including its decisionmaking structure, its resources, and the start-up strategy. These and related issues are considered in a companion Note.

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Governments creating specialized regulatory agencies must make decisions on a wide range of issues. Questions relating to the independence and responsibilities of such agencies are considered in two companion Notes. This Note focuses on a third set of issues, relating to decisionmaking structures, resources, and start-up strategy. Like the other two Notes, it emphasizes the situation of developing countries.

**Decisionmaking structure**

The design of an agency's decisionmaking structure encompasses issues relating to the number of decisionmakers, the basis for selecting them, the roles accorded to stakeholders, and the regulatory and appeals processes.

**Number of decisionmakers**

Many countries entrust decisionmaking authority to a commission or board of three to five members; others prefer a single individual. Each approach has its strengths and weaknesses, and the choice often depends on a country's traditions and conditions (table 1). Agencies responsible for several industries usually choose a commission.

**Selection of regulators**

When agencies are to be independent, the goal should be to select regulators with the personal qualities needed to exercise independent judgment and resist improper pressures or inducements. The selection is critical, particularly for new agencies that have yet to establish a reputation for competence and reliability.

Qualifications and disqualifications for appointment are usually set out in the law establishing the agency. Disqualifying factors generally include having a financial interest in regulated firms, which creates a conflict of interest and, in some countries, being related to the president or ministers. A common qualification required is significant experience or training in economics, finance, law, public administration, or industry.

It is sometimes suggested that some or all appointees should have industry-specific technical expertise or long experience in the regulated industry. But this requirement is unnecessary and

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Individual</th>
<th>Commission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed of decisionmaking</td>
<td>☑</td>
<td>☐</td>
</tr>
<tr>
<td>Accountability for decisions</td>
<td>☑</td>
<td>☐</td>
</tr>
<tr>
<td>Resource demands</td>
<td>☑</td>
<td>☐</td>
</tr>
<tr>
<td>Predictability of decisions</td>
<td>☑</td>
<td>☐</td>
</tr>
<tr>
<td>Invulnerability to individual preoccupations</td>
<td>☐</td>
<td>☑</td>
</tr>
<tr>
<td>Invulnerability to improper influences</td>
<td>☐</td>
<td>☑</td>
</tr>
<tr>
<td>Potential to reflect multiple perspectives</td>
<td>☑</td>
<td>☐</td>
</tr>
<tr>
<td>Potential to stagger terms to enhance stability and weaken links with particular governments</td>
<td>☐</td>
<td>☑</td>
</tr>
</tbody>
</table>

Note: The / indicates which structure is stronger on each characteristic.
in some cases undesirable. It is unnecessary because such technical expertise will be available from agency staff or consultants. It is undesirable if it ends up excluding professionals with broader perspectives relevant to economic regulation or if it unduly restricts the pool of candidates. It is particularly inappropriate for multi-industry regulators, because requiring expertise in each industry be represented on the commission could crowd out appointees with broader perspectives. It could also result in the expert for each industry becoming the de facto regulator for that industry and thus the loss of the potential benefits of a commission approach.

Another view is that the decisionmaking body should be composed of representatives of consumers and regulated firms rather than technical experts. Although it is important for stakeholders to participate in the regulatory process, there are several reasons why including them on the decisionmaking body is inadvisable:

- In most industries, attempting to identify single representatives of consumers and the industry is not feasible. Residential, industrial, and rural consumers all have different and sometimes conflicting interests, and interests are likely to vary within these groups across regions or income classes. Regulated firms can also have different and sometimes conflicting interests in regulatory decisions. So, a representative approach can result in pressures to create very large decisionmaking bodies, which would increase delays and reduce individual accountability.

- Decisions of representative bodies hinge on their composition and voting rules. If the composition and voting rules favor one interest over another, decisions can be expected to be biased accordingly. If the interests of consumers and utilities are equally balanced, and the casting vote is left to a representative of the government, short-term political considerations can be expected to dominate regulatory decisionmaking.

- Representative bodies internalize bargaining and the exchange of concessions between interests, at the expense of a more open and transparent evaluation of competing social interests.

The executive branch usually plays the dominant role in the appointment process, but the legislature often also has a role, such as in confirming appointments. Involving both branches of government is especially important in systems in which the executive does not necessarily control the legislature; it provides a check against partisan appointments and helps to legitimize regulators’ authority.

**Stakeholders’ roles**

To ensure that a regulatory agency makes decisions that are well informed and accepted as fair and legitimate, consumers, regulated firms and other stakeholders must have the opportunity to present their views. For the reasons noted above, their participation in the decisionmaking body is inadvisable. But there are several other options.

**Open regulatory processes.** Those with a significant interest in a regulatory decision are usually permitted to present their views to the agency before the decision is made. In the United States, the process for doing so is usually formal hearings, often criticized for being too legalistic, costly, and slow. Regulators in the United Kingdom initially adopted much more informal processes, but the trend now is toward greater formality. Countries such as Argentina and Bolivia are experimenting with open processes that more closely reflect local traditions.

**Consultative or advisory bodies.** Some countries have created special consultative or advisory bodies, usually organized on an industry-specific basis, to advise the regulator and other public authorities. These bodies are usually part-time and composed of representatives of consumers, utilities, and industry experts. Special consumer councils can be especially important in countries that lack effective advocacy of consumer interests.

**Regulatory process**

Decisionmaking processes range from formal hearings, as in the United States, to more informal processes, such as those in the United
Kingdom. Wherever the balance is struck, the focus should be on transparency in decision-making, which reduces opportunities for improper influences and underscores the fairness and legitimacy of decisions.

The regulatory process usually involves three main steps: providing people with an interest in a decision opportunity to present their views, publishing the decision and the detailed reasons for reaching that decision, and providing stakeholders an opportunity to challenge the decision through an appeals process.

The appeals process is important to ensure that the regulator does not stray from its mandate and that it remains accountable. Two closely related issues need to be considered in designing an appeals process.

Appellate body. If the regulatory agency is to be independent, the appellate body should also be independent. In most countries, appeals of regulatory decisions go straight to the courts. But, in some countries, there is an intermediate step in which appeals go to a body that is expected to have more technical expertise than the courts and that may also be able to respond more quickly. In the United Kingdom, for example, the antitrust agency hears appeals relating to license amendments. In Bolivia, a special superintendent hears appeals from sector regulators.

Grounds of appeal. The grounds of appeal are usually limited to errors of fact or of law, including failure to follow a required process. Appellate bodies are generally not permitted to reconsider the merits of the decision and substitute their own judgment.

Resources

An agency’s effectiveness is determined largely by the adequacy of its resources, both human and financial.

Human resources

Utility regulation requires personnel with a mix of skills in such fields as economics, finance, law, and engineering, and the character and integrity to resist improper pressures and inducements. People with these attributes are scarce in many reforming countries, and those who do have them will often receive attractive job offers from privatized utilities. So, to attract and retain well-qualified staff often requires exempting agency staff from restrictive civil service salary rules.

There is no magic formula for determining the number of staff required by an agency. It all depends on the responsibilities of the agency, the climate in which it must discharge those responsibilities, and its strategies for performing those tasks. In the United States, staff size ranges from less than 40 in the public utilities commissions responsible for multiple industries in the smaller states to more than 1,000 in the Federal Energy Regulatory Commission. As a general proposition, “small is beautiful.” Overstaffing can dilute an agency’s professional focus and increase the direct costs of regulation. It can also increase the indirect costs of regulation if staff make unnecessary demands on utilities to justify their jobs. For these reasons, a sound general principle is to keep the permanent agency staff as small as possible, engaging consultants to assist with specialized tasks.

Regulatory agencies increasingly contract out tasks to private firms or consultants, such as the analytical work underpinning tariff adjustment and similar decisions and the compliance audits of regulated firms. But the agency must retain—and be seen to retain—responsibility for its decisions, to avoid undermining the legitimacy of its actions. It must also ensure that the contractor is not subject to improper influences or inducements from regulated firms or other sources.

Funding

Regulatory tasks, like other government functions, were traditionally funded from general tax revenues. Now, most regulatory agencies obtain their income from levies on consumers. These levies may be charged to consumers directly, but are more often collected indirectly
by imposing a levy or license fee on regulated firms and allowing them to pass the cost on to consumers through tariffs. In OECD countries, this approach is usually seen as part of a cost-recovery strategy: it reduces demands on general tax revenue and imposes the financial costs of regulation on the primary beneficiaries (consumers). In many developing and transition economies, by contrast, earmarked funding is often viewed primarily as a means of ensuring that agencies have a reliable source of income and thus as a safeguard of agency independence.

To prevent levies from becoming too burdensome, the law establishing the agency usually sets a cap on levies, often defined by reference to industry turnover or some other indicator. The cap is 0.5 percent for telecommunications regulators in Argentina, Peru, and Venezuela; 1.0 percent for the energy regulator in Colombia; and 2.0 percent for the water regulator in Peru. The cap establishes the maximum levy, and actual levies are set each year to cover a budget approved by the legislature. When an agency is responsible for more than one industry, a different levy is usually set for each industry that covers the costs of its own regulation and contributes to costs shared across industries.

**Start-up strategy**

Utility regulators should be established as long before privatization as possible, even if their formal powers do not come into effect immediately. This allows regulators time to familiarize themselves with their new responsibilities, to establish their offices, and to undertake any necessary training. It also provides assurance to consumers that their interests will be protected after privatization and gives potential investors an opportunity to assess the regulatory system before formulating proposals.

Most new regulatory agencies can expect a challenging infancy. Besides mastering complex technical issues, regulators must define new and often difficult working relationships with political authorities, regulated firms, consumers, and other stakeholders. In countries in which the requisite skills are scarce, regulatory experience is limited, and there is little tradition of independent public institutions, the challenges can be daunting. And life is not made easier for a regulator if privatization remains politically contentious and if the first public evidence of its effects is a price increase allowed by the regulator.

To meet these challenges, regulators must have adequate training—not only in such traditional disciplines as law, finance, and economics, but also in negotiation analysis, media relations, and the like. Regulators may also need technical support during the first months in office. Such support is often provided by consultants acting to some degree as "shadow" regulators.

No less important, newly appointed regulators benefit from contacts and exchanges with more experienced regulators from other countries. Some of these contacts occur on an ad hoc basis, through visits and participation in conferences. But there is also an encouraging trend toward systematizing such contacts, for example, through a "twinning" arrangement between a new regulator and a more experienced foreign regulator. These arrangements can provide a basis for exchanging staff and materials or providing other forms of support and advice. There has also been a recent trend toward creating "networks" of regulators, such as the International Forum for Utility Regulation sponsored by the World Bank.

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1 Warrick Smith, "Utility Regulators—The Independence Debate" (page 21 in this volume) and "Utility Regulators—Roles and Responsibilities" (page 25 in this volume).

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Price Caps, Rate-of-Return Regulation, Risk, and the Cost of Capital

Ian Alexander and Timothy Irwin

This Note compares the effects of price cap and rate-of-return regulation on the risks borne by regulated utilities. It presents evidence that price cap regulation subjects firms to greater risks and therefore raises their cost of capital. This result has one clear implication: firms regulated by price caps must be permitted to earn higher returns. If they are not, they will be unable to attract new investment capital and the quality of their service will decline.

Price caps and rate-of-return regulation

There are two main approaches to preventing monopolistic infrastructure firms from charging excessively high prices: price cap regulation and rate-of-return regulation. The rate-of-return approach is used in Canada, Japan, and the United States, where regulatory agencies fix the rate of return that a utility can earn on its assets. They set the price the utility can charge so as to allow it to earn the specified rate of return—and no more. The regulated price can be adjusted upward if the utility starts making a lower rate of return, and it will be adjusted downward if the utility makes a higher rate.

Over the past decade or so, the price cap approach has become increasingly common internationally because it is thought to give firms stronger incentives to be efficient. Under this approach, the regulated price is adjusted each year by the rate of inflation plus or minus some predetermined amount and without regard to changes in the firm’s profits. In the United Kingdom, for example, utilities are permitted to increase their prices by the change in the consumer price index plus or minus a specified amount. In gas and electricity, the price setting rule is called \( RPI - X \), where \( RPI \) is the retail price index and \( X \) represents the expected annual gain in the utility’s efficiency. In water, the rule is \( RPI + K \), where \( K \) represents both expected productivity gains and a permitted annual increase in the real price of water to allow for quality improvements (think of it as \( RPI - X + Q \), where \( Q \) stands for the quality improvement). Since 1989, price caps have also been used in the United States to adjust the prices charged by the long-distance telephone company AT&T. In New Zealand, a price cap is used to adjust Telecom New Zealand’s rental charge for a residential phone line. Price caps are also used in some developing countries. Malaysia, Mexico, and Peru, for example, use them for telecommunications, and Argentina uses them for gas and electricity as well.

In practice, price cap and rate-of-return regulation are less different than they might seem. First, a rule like \( RPI - X \) considers only how prices should be changed from year to year; it doesn’t tell a regulator how to set them in the first year. A regulator wanting to use price cap regulation for a new service would need to set the initial price in some way, and one obvious option is to consider the price the firm needs to charge to earn a satisfactory rate of return. Second, a price cap needs to be periodically reviewed: a regulator cannot reliably predict what changes in productivity will be possible in, say, ten years. In the United Kingdom, price caps typically are reviewed every five years. And during a review,
the regulator naturally takes into account the regulated utility’s rate of return. If it is high, the price cap is likely to be reduced; if it is low, the price cap may be relaxed.

But as long as price cap reviews are sufficiently infrequent (say, every five years), price cap and rate-of-return regulation should have different effects on regulated firms. In particular, a price cap subjects businesses to more risk. For example, under price cap regulation, if a firm’s costs rise, its profits will fall because it cannot raise its prices to compensate for the cost increases—at least until the next price review, which may be several years away. Under rate-of-return regulation, however, the business would seek—and typically be granted within a year or so—a compensating price rise, so its profits would not change much. But if the firm’s costs fall, price cap regulation is more advantageous to the firm than rate-of-return regulation, because it would retain more of the resulting benefits as profits. Thus, under rate-of-return regulation, consumers bear some of the risk that firms bear in price cap systems. This difference in impact means that firms subject to price cap regulation have a stronger incentive to lower their costs because they keep more of the cost savings than they would if they were subject to rate-of-return regulation. But the increased risk they bear tends to raise their cost of capital.

### Empirical evidence on risk and the regulatory system

The risk that affects a firm’s capital cost can be measured by a statistic called the firm’s beta. Betas are used by investors worldwide and are an important factor in their decisionmaking. A firm’s beta measures the extent to which the firm’s returns vary relative to those of a diversified portfolio of equity holdings. It indicates whether an investor with a diversified portfolio would take on more risk by investing in a particular firm. The higher the beta, the bigger the increase in the riskiness of the investor’s portfolio.

Several studies that compared the betas of British firms subject to price cap regulation with those of U.S. firms subject to rate-of-return regulation found that the U.S. firms have lower betas, as expected. But the results leave room for doubt because it is unclear whether it is the difference in regulation that’s at work or something else, such as a difference in the degree of competition in the British and U.S. markets. But new empirical work done by Oxford Economic Research Associates for the World Bank tends to confirm the earlier conclusions. This study measured the betas of more than 100 infrastructure firms in many countries. Table 1 summarizes the results of the study, by country, for companies subject to price cap or rate-of-return regulation. (Some countries in the study have

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**TABLE 1** AVERAGE INFRASTRUCTURE FIRM BETAS, BY COUNTRY, SECTOR, AND TYPE OF REGULATION, 1990–94

<table>
<thead>
<tr>
<th>Country</th>
<th>Electricity</th>
<th>Gas</th>
<th>Combined gas and electricity</th>
<th>Water</th>
<th>Telecoms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regulation</td>
<td>Beta</td>
<td>Regulation</td>
<td>Beta</td>
<td>Regulation</td>
</tr>
<tr>
<td>Canada</td>
<td>——</td>
<td>—</td>
<td>ROR 0.25</td>
<td>—</td>
<td>ROR 0.31</td>
</tr>
<tr>
<td>Japan</td>
<td>ROR</td>
<td>0.43</td>
<td>——</td>
<td>—</td>
<td>——</td>
</tr>
<tr>
<td>Sweden</td>
<td>——</td>
<td>—</td>
<td>Price cap 0.84</td>
<td>—</td>
<td>Price cap</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>Price cap</td>
<td>0.84</td>
<td>——</td>
<td>—</td>
<td>——</td>
</tr>
<tr>
<td>United States</td>
<td>ROR</td>
<td>0.30</td>
<td>ROR 0.20</td>
<td>ROR 0.25</td>
<td>ROR 0.29</td>
</tr>
</tbody>
</table>

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Not available or not applicable.

Note: The betas are asset betas that control for differences in debt-equity ratios between firms. ROR is rate-of-return regulation.

been omitted from the table because they use discretionary regulatory regimes that do not follow a price cap or rate-of-return rule, or because the data were not comparable.) The results show that price cap regulation is associated with higher betas than rate-of-return regulation in Canada, Japan, and Sweden, as well as in the United Kingdom and the United States. Rate-of-return regulation is associated with betas ranging from as little as 0.2 in the U.S. gas industry to 0.62 in Japanese telecommunications, while price cap regulation is associated with betas ranging from 0.5 in Swedish telecommunications to 0.87 in British telecommunications. Overall, and as explained below, the differences in betas imply that firms subject to price cap regulation have to pay about an extra percentage point for their capital.

**Why betas matter**

To understand why betas matter, note that different firms face different costs of capital. Some firms must offer an expected rate of return of, say, 20 percent to attract investors, while others can get all the money they need by offering only 15 percent. Although the precise reasons for these discrepancies are not known with confidence, one critical factor is risk. Investors tend to be risk averse: other things equal, they prefer safer investments to risky ones. That means that firms have to compensate them for taking on more risk.

Investment risk, in the sense in which it is used here, relates only to bottom-line profits—the net impact on a firm’s profits of all the separate risks facing the firm, such as operating risk, inflation risk, interest rate risk, foreign exchange risk, and political risk. Investment risk is not all downside. Risky projects are both those with a higher-than-average chance of turning out exceptionally badly and those with a higher-than-average chance of turning out well. Thus, when investors say they want to be compensated for taking on risk, what they mean is not just that they prefer an investment with a certain return of 10 percent to one that will probably make 10 percent but might make less. They mean that they prefer the safe 10 percent return to an investment offering, say, equal chances of 5 percent and 15 percent returns. Investment risk, then, has to do with the variability of returns.

Much investment risk can be eliminated by diversification. To see why, consider a racetrack analogy. Suppose you have no information on how fast the horses can run. You could bet all your money on one horse, or you could bet a little on each horse in the race. The two strategies have about the same expected, or average, return: two people, each using one of the two strategies for, say, a thousand races, would probably end up with roughly the same amount of money. For any one race, however, the two strategies pose different degrees of risk. The strategy of betting on just one horse is riskier: you could do well, but you’re more likely to lose everything you bet. But when you bet on every horse, you almost certainly will lose a little, because the racetrack has to make a profit.

As with betting on horses, investing in many firms eliminates much risk without significantly reducing the expected return. Thus, professional investors do not worry about the sort of risks that can be eliminated by portfolio diversification. But the risks of professional investment are different from those in racetrack betting. At the racetrack, you can eliminate almost all investment risk by betting on every horse. The same isn’t true of investing in firms. Some years are good, and in these years, most firms do well. In other years, most firms do badly. So, on average, firms’ returns tend to move in the same direction, and even if you’ve invested in every firm, the return on your portfolio is uncertain. This risk that remains after diversification is the risk that professional investors are most concerned about.

Professional investors are particularly interested in the likelihood that a firm’s returns will move
with the returns on a completely diversified portfolio—that is, a portfolio that includes investments in enough firms so that further diversification would not significantly reduce risk. In one possible scenario, a firm’s returns might be expected to vary in equal proportion to the diversified portfolio, so that, for example, when the returns on the portfolio increase by 10 percent, the returns on the investment also are expected to increase by 10 percent. In this scenario, beta equals 1, and the investment neither increases nor reduces the total riskiness of an investor’s portfolio. As a result, investors will demand a moderate rate of return when investing in the firm, and the firm’s cost of capital will be moderate.

In another scenario, a firm’s returns might vary disproportionately with those of the diversified portfolio, so that a 10 percent increase in the portfolio’s returns would be associated with, say, a 20 percent increase in the firm’s returns, and a 10 percent decrease in the portfolio’s returns with a 20 percent decline in the firm’s. Here, beta equals 2. Because investing in such firms increases total risk, investors demand an above-average rate of return as compensation, and capital costs these firms more than it does the average firm.

In a third scenario, a firm’s returns might vary less strongly with those of the diversified portfolio, with a 10 percent increase in the portfolio’s returns associated on average with, say, a 5 percent increase in the firm’s returns. Here, beta equals 0.5. Because investing in such firms reduces total risk, investors are willing to give up some return to invest in them. For these firms, the cost of capital is lower than average.

**Betas and regulation revisited**

Equipped with this measure of investment risk and the cost of capital, consider the returns available from investing in a utility subject to rate-of-return regulation. Because prices are adjusted each year to keep the rate of return roughly constant, investments in the firm are subject to little risk, particularly the market-related risk that investors worry about. If returns in the market as a whole rise, the regulated utility’s returns won’t rise much (though they can rise a little in the period before the regulator requires a price cut). But if the market turns bad and returns fall, the utility’s returns won’t fall below the target set by the regulator for long. Thus, firms subject to rate-of-return regulation tend to have low betas and a lower-than-average cost of capital.

Price cap regulation doesn’t have the same effect. Because in the short run the regulator sets no target rate of return, the regulated company’s return can vary from period to period and is free to vary with the returns on the market. Even under price cap regulation, utility firms often have a fairly safe business, with returns that are affected less by economywide shocks than are those of other firms. As shown in table 1, their betas are still lower than 1, the average for all firms. But they are higher than the betas of firms subject to rate-of-return regulation. So investors will demand a higher return for investment in a firm subject to price cap regulation.

**Conclusion**

This does not imply that price caps are less desirable than rate-of-return regulation. It simply means that regulators need to take account of the effect of regulation on the cost the regulated firm has to pay investors for capital. Regulators using rate-of-return regulation can set the target rate of return lower than that earned by the average firm and still expect investors to be interested, because the returns are subject to less risk than those of an average firm. Regulators using price cap regulation need to give firms under their jurisdiction the opportunity to make somewhat higher returns, because those returns are riskier. If they don’t, the firms will be unable to attract new investment capital, and the quality of their service will eventually suffer.

This Note is based on work by Ian Alexander at Oxford Economic Research Associates.

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Prices, Cross-Subsidies, and Competition in Infrastructure

How to mitigate the social and political costs of rate rebalancing

Timothy Irwin

Governments often regulate not only the overall level of prices charged by infrastructure firms but also the relationship between prices for different services or customers. Thus, government-controlled telephone monopolies may keep prices low for local calls and charge more for long-distance calls. Power monopolies may keep prices low for residential customers by pushing up prices for businesses. And a postal monopoly may charge one rate for both rural and urban deliveries, even though rural deliveries cost it more.

Such pricing structures could, but do not necessarily, involve cross-subsidies. Prices can differ among different types of customers, for example, even when no customer can be said to be subsidizing another. In particular, when one asset is used to supply a service to two or more groups of customers—as, for example, one generator might be used to supply power to both business and domestic users—it isn’t possible to say exactly what part of the cost of the common asset is attributable to each group. As a result, one customer group can pay more than another without necessarily subsidizing the other. In some cases, charging different customers different prices for the same service is actually efficient.

Price structures designed to favor one group over another usually will not survive competition—if they contain true cross-subsidies (as defined in box 1), they almost certainly will not. New firms will undercut high-priced services, denying the former monopolist the revenue to fund low-priced services. Thus, one of the hurdles that governments must overcome in introducing competition in infrastructure is dealing with the social and political implications of changing price structures—or rate rebalancing, as it is often called. Of course, competition should reduce overall costs in the sector, lessening the need to compensate groups hurt by price increases resulting from rate rebalancing. But if the efficiency gains are not enough to offset the price increases for some groups and the government is worried about the political and social costs of rate rebalancing, it has three basic options:

- Preserving the old price structure in a way that ensures neutrality among competitors by requiring one firm, such as the former monopolist, to continue offering low prices for some services while obliging the firm’s competitors to contribute their share to the cost of those services.
- Funding price subsidies from general tax revenue rather than from transfers within the firm or industry.
- Relying on social safety nets rather than price subsidies.

Whichever option a government chooses should stand up to the following four tests:

- Do subsidies reach the people the government most wants to support?
- Are the costs clear and measurable?
- Are the administrative costs as low as possible?
- Is the revenue raised from the source that entails the least cost to the economy?

This Note looks at the three options in practice and reviews how they measure up against the four criteria. It concludes that governments should eliminate price subsidies if politically feasible. But even if they cannot, they can still reap the benefits of competition.
Charging different customers different prices for the same product does not always imply a cross-subsidy. Consider a firm producing just two goods, A and B. A cross-subsidizes B if and only if the price of A is greater than its stand-alone cost and the price of B is less than its incremental cost. The stand-alone cost of A is the cost that the firm would incur producing A but not B. The incremental cost of B is the additional cost of producing B given that the firm is already producing A.

Consider as an example a diesel generator, costing $1,000 a year to lease, that supplies electricity to two firms. Suppose that the only other cost of supplying power is the cost of diesel fuel consumed by the generator and that firm 1 uses electricity whose production consumes $500 of diesel a year, and firm 2 electricity whose production consumes $200 of diesel a year. If firm 1 pays only $600 a year, is it being cross-subsidized by firm 2, which, if costs are covered, must be paying $1,100? No. Although firm 1 appears to be getting a good deal, it is paying more than its incremental cost (its fuel cost), while firm 2 is paying less than its stand-alone cost (the generator plus its fuel). The arrangement may even be in firm 2’s interest: charging firm 1 a higher price might cause it to stop buying any electricity; perhaps, for example, it has the opportunity to buy enough natural gas to meet its needs for only a little more than $600. If firm 1 did switch to natural gas, firm 2 would have to pay all the costs of the generator as well as of its fuel—$1,200 rather than the $1,100 it paid before.

In general, when there are common fixed costs of production to be allocated among customers, economic efficiency requires that prices vary according to customers’ sensitivity to price changes. And when a customer’s price sensitivity changes over time, efficiency requires that the customer pay different prices at different times (for example, at peak and off-peak times). But as long as all prices fall between the stand-alone and the incremental cost, the price differences do not contain cross-subsidies.

Under a strict economic definition of cross-subsidy, then, not everything that looks like a cross-subsidy is one. Still, introducing competition can lead to changes in price structures even when the old prices contained no cross-subsidies. Prices may still rise for one group while falling for another, as competition drives firms to allocate a larger share of the common costs of production to consumers less likely to be deterred by price increases. The policy options discussed in this Note can be applied in any case in which competition would lead to price increases for one group—not just in cases in which true cross-subsidies are being eliminated.

**Option 1: Preserving the old price structure**

The government can preserve the old price structure after the advent of competition by requiring one firm to charge low prices for certain services while permitting it to recover a share of the resulting losses from its competitors. Most schemes of this type are in telecommunications, because it is there that competition has put old price structures under the most pressure. But many of the telecommunications schemes, such as those in existence or under consideration in Australia, the United States, and the United Kingdom and other European Union countries, could be transplanted to other sectors.

In Australia, the government has given Telstra, the former monopolist telecommunications company, a universal service obligation requiring it “to provide reasonable access to the standard telephone service (STS) and payphones, on an equitable basis, for all Australians, wherever they reside or conduct a business.” This obligation keeps the price of telephone services low in Australia’s remote rural areas, where it might otherwise be very high. Telstra used to make up the cost of the universal service obligation through revenue from other services, but the entry of Optus and Vodafone into long-distance and mobile telephony in the early 1990s has limited its ability to do so. To prevent this obligation from handicapping Telstra relative to its competitors, the telecommunications regulator, Austel, each year estimates how much the universal service obligation costs Telstra and then allocates that cost among the three firms according to their share of the telecommunications market. Optus and Vodafone pay their share into a fund that is used to pay Telstra.
The Australian scheme has succeeded in its principal aim of reconciling competition with price subsidies, and it fares well on two of the four criteria: it is reasonably simple to administer, and the process for allocating the costs of the subsidy among the three firms helps to make those costs transparent. But its targeting might not suit all governments: rich and poor alike benefit from subsidized rural telephone lines.

In addition, the economic costs of raising the revenue in the Australian scheme may be higher than necessary. Any scheme that preserves cross-subsidies funds the consumption of one good with revenue raised from what is effectively—if not in name—a tax on another good in the same industry. Adding a universal service tax to consumers’ utility bills, rather than levying the firms and having them pass on the cost to consumers, would make this clear. But there is no obvious reason that the cheapest source of funds for subsidizing, say, local telephone calls would be a tax on another telecommunications service, rather than a tax on other products.

A government looking for the cheapest source of revenue for a subsidy needs to take into account all the possibilities—and all the costs—of raising the revenue. This means looking at the costs businesses incur in hiring lawyers and accountants to calculate their tax obligations and prepare forms, the costs that government incurs in collecting the taxes and dealing with lobbyists, and the indirect economic costs that result from discouraging the use of the taxed product. Tax experts generally believe that an economywide value added or income tax raises revenue more cheaply than an assortment of taxes on different products, each with its own tax rate and collection mechanism.

**Option 2: Funding price subsidies out of general tax revenue**

The reform of the Chilean water supply industry replaced cross-subsidies with price subsidies funded from existing, economywide taxes while also carefully targeting the subsidy to the poor. Tariff reforms raised prices to levels that covered costs, which meant much higher prices for residential customers. Concerned that poor households would be unable to pay the higher bills, the government introduced a subsidy program funded out of the central government’s revenue but administered by city governments. Under this program, the city government pays part of each eligible household’s water bill (40 to 75 percent of the charges for the first 20 cubic meters of consumption), with

*A government would specify the service it wants to provide at subsidized prices and award the contract to the firm requiring the smallest subsidy.*

The Chilean policy was not a response to the introduction of competition. But it would work in such a case, and it stands up well against most of the evaluation criteria. Although determining household eligibility may be administratively costly, the scheme uses low-cost general taxes as the revenue source for the subsidy, and because the subsidy is funded from the budget, its cost is transparent. Although the targeting is theoretically precise, there were problems at first in getting eligible families to enroll. But enlisting the water companies to help inform potential beneficiaries of the program appears to have solved this problem.

In some cases, governments could employ a variant of the Chilean scheme—one that uses competitive bidding to secure the subsidized service at the lowest possible price, thus further lowering the tax costs of the subsidy regime. A government would specify the service it wants to provide at subsidized prices and award the con-
tract to the firm requiring the smallest subsidy—much as commuter rail concessions in Buenos Aires were awarded to the bidder seeking the lowest subsidy to operate them. Governments wanting to offer electricity to previously unserved areas at prices below cost could use the same mechanism. Or governments could harness the benefits of competition by giving customers vouchers and permitting them to choose among providers.

Option 3: Relying on social safety nets rather than price subsidies

Governments could also end service-specific subsidies, as New Zealand is doing in its reform of the electricity sector. Before the government allowed competition in electricity supply in the early 1990s, businesses typically paid much more for power than households did. Competition has made that price difference difficult to sustain. Because switching suppliers requires installing new meters whose cost can be justified only for large electricity consumers, electricity retailers have been obliged to offer lower prices to businesses, while commercial circumstances and deregulation have allowed them to raise prices for households. Between 1991 and 1995, the inflation-adjusted price of electricity, including fixed charges, rose by an estimated 16 percent for small households and fell by 12 percent for large commercial users. The two groups now pay about the same price for power. The government has not put in place a scheme to offset these price increases for households, relying instead on existing social welfare policies to channel support to low-income people.

Although the price increases so far do not appear to have stirred up enough opposition to jeopardize the New Zealand reform, not targeting aid explicitly linked to the infrastructure service to those who lose from rate rebalancing entails political risks—especially when the necessary price increases are large. When the politics of the situation allows it, however, there are advantages in using antipoverty programs not linked to infrastructure services: they typically use low-cost forms of taxation; they can easily be made transparent; and because of their size, the administrative costs are likely to be low as a proportion of the aid given. But their biggest advantage is that they are better at targeting aid to the poor.

Perhaps the most interesting evidence of the redistributional ineffectiveness of cross-subsidies comes from a study by David Newbery that looked at pricing reforms in Hungary and the United Kingdom. Both the British government’s reforms and the Hungarian government’s introduction of a market economy were more wide-ranging than simply removing cross-subsidies in a single infrastructure industry. Yet Newbery’s study found that the resulting relative price changes by themselves did not affect the relative welfare of the rich and the poor. Newbery notes that the findings are “consistent with the view that the original set of subsidies and taxes were poorly targeted on distributional grounds” (p. 862).

In developing countries, governments cannot easily use infrastructure cross-subsidies to help the very poor because that group tends to lack access to gas, power, telephones, and piped water. In Ecuador, for example, the electricity subsidy was estimated to be US$500 a year for the (probably rich) households using the most electricity and US$36 a year for the (probably relatively poor) households using the least—but most of the poorest households receive no subsidy at all because they have no access to electricity. So, if it is politically feasible to end price subsidies, that may be the best thing to do.

2. See José Carhejo and Antonio Eatsche, “Railway Concessions—Heading Down the Right Track in Argentina” (page 125 in this volume).

Timothy Irwin (timirwin@worldbank.org), Private Sector Development Department
One of the most common arguments in favor of privatizing infrastructure services is that private operators and owners use resources more efficiently than do public ones. While the theoretical debate is far from settled, empirical tests of this assumption have generally focused on privatization's effect on sector performance. Are consumers paying less? Is the quality of service better? Has investment increased?

Although useful for practitioners or sector specialists, these "minimalist" tests tend to ignore the potential effects of changes in the privatized sectors' performance on the rest of the economy. Yet some of the main arguments against privatizing infrastructure services are that it can hurt the rest of the economy, increase unemployment, and make the poor poorer and the rich richer.

Empirical tests of these opposing arguments are not straightforward, since infrastructure privatization is typically only one of many items on the reform agenda of governments undertaking major structural adjustments. That was the case in Argentina, whose agenda included major macroeconomic reforms as well as privatizing infrastructure services.

**Isolating the macroeconomic and distributional effects**

A recent study shows that isolating the net economic and social effects of privatization from the overall effects of structural reform is difficult but possible. The study's use of a computable general equilibrium model offers new insights on the macroeconomic effects of Argentina's privatization of gas, electricity, telecommunications, and water and sanitation services, on the distribution of the gains from these effects, and on the importance of regulation to their distribution. This model tracks the direct and indirect effects of changes in tariffs, productivity, and service quality in each utility on all other sectors (including the other privatized utilities) and on the capital and labor markets. It divides the economy into twenty-one sectors and five income classes to reveal which gain the most from the changes.

The study assesses the impact of privatization by simulating the effects on the economy of the changes in privatized utilities' performance between 1993, the first year by which all the major privatizations had taken place, and 1995, the latest year for which a database is available on each privatized utility.

The study approximates the costs of ineffective regulation by comparing results from model simulations in which the gains from reform spread throughout the economy—equivalent to what an effective regulator would achieve—with simulations where the gains are withheld as a rent by the owners of privatized utilities—equivalent to what an ineffective regulator would achieve.

**The reform**

Although the privatization of Argentina's utilities is still incomplete, most notably in electricity and water distribution, almost all the companies whose privatization could be expected to have the most important macroeconomic effects were privatized between 1992 and 1995. Some restructuring took place in each sector before the transfer to private operators.

The transfer of the telecommunications company to private operators was the first, concluded in November 1990. For this first concession, the...
The Distribution of Gains from Utility Privatization and Regulation in Argentina

TABLE 1  CHANGES IN PERFORMANCE OF PRIVATIZED UTILITIES BETWEEN 1993 AND 1995
(percent)

<table>
<thead>
<tr>
<th>Performance indicator</th>
<th>Electricity distribution</th>
<th>Gas distribution</th>
<th>Water distribution</th>
<th>Telecoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency</td>
<td>6.26</td>
<td>8.84</td>
<td>4.86</td>
<td>11.28</td>
</tr>
<tr>
<td>(intermediate input costs as a percentage of total sales)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labor productivity</td>
<td>17.59</td>
<td>4.79</td>
<td>-27.58</td>
<td>21.25</td>
</tr>
<tr>
<td>(GWh for electricity, 000 m³ for gas, population served for water, lines in service for phones—all relative to staff)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment</td>
<td>-</td>
<td>4.56</td>
<td>75.97</td>
<td>28.1</td>
</tr>
<tr>
<td>(in concession contracts for gas and actual investments for other sectors)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td>10</td>
<td>27.8</td>
<td>6.12</td>
<td>4.56</td>
</tr>
<tr>
<td>(ratio of losses to production for electricity and gas, of water unaccounted for to production for water, of lines in repair to lines in service for phones)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real average tariffs</td>
<td>-9.5</td>
<td>-0.5</td>
<td>7.2</td>
<td>28.4</td>
</tr>
<tr>
<td>(ratio of total sales value to production)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

.. Not available.


The restructuring of gas took place at the end of 1992, when transport and distribution were separated into two transport and eight regional distribution concessions. As in electricity, regulation of tariffs and quality is incentive-based.

In water and sanitation, competition has been introduced through a bidding process, and the resulting concession contracts are the main regulatory instrument. The contracts spell out service obligations, investment requirements, and quality standards, which are monitored by the national sector regulator. Tariff adjustments are generally based on a cost-plus rule. The first water and sanitation contract was the Buenos Aires concession, awarded in 1993.

Changes in performance

The study uses changes in efficiency, labor productivity, investment, quality, and tariffs as indicators of utility performance under private operation. According to these indicators, performance is improving under private management (table 1). These results probably underestimate the total performance change resulting from privatization because the really dramatic changes in labor productivity occurred immediately af-
TABLE 2 DISTRIBUTION OF ESTIMATED GAINS FROM PRIVATIZATION AND EFFECTIVE REGULATION OF INFRASTRUCTURE SERVICES, 1993–95

<table>
<thead>
<tr>
<th>Income class</th>
<th>Gains from private operation</th>
<th>Additional gains from effective regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total (millions of 1993 US$)</td>
<td>As percentage of income class expenditure on utilities</td>
</tr>
<tr>
<td>1 (poorest)</td>
<td>197</td>
<td>29</td>
</tr>
<tr>
<td>2</td>
<td>259</td>
<td>31</td>
</tr>
<tr>
<td>3</td>
<td>373</td>
<td>37</td>
</tr>
<tr>
<td>4</td>
<td>403</td>
<td>32</td>
</tr>
<tr>
<td>5 (richest)</td>
<td>1,047</td>
<td>59</td>
</tr>
<tr>
<td>Total</td>
<td>2,279</td>
<td>41</td>
</tr>
</tbody>
</table>


The private takeover of operations (in 1992–93 for all sectors except telecommunications) and so are not reflected in table 1. In other words, these indicators do not measure the performance changes that occurred with the change in ownership but those that occurred in a two-year period under private sector management. The results should be interpreted with care, as they reflect the interaction of many different elements and a relatively short comparison period. In the water sector, for example, labor productivity initially increased tremendously as employment was reduced by 47 percent. Since then, the investment requirements the company faces have compelled it to recruit workers, but there has been no short-run increase in water production, which explains the deterioration in labor productivity shown in table 1.

The simulations of the distributional and macroeconomic effects discussed below assume that the changes in these indicators can be extrapolated to the yet-to-be privatized utilities.

The impact of private operation

The simulation of the effect of private operation (assuming in the simulation that regulation is ineffective) shows that all income classes gain from the efficiency improvements due to privatization even if the owners of the privatized utilities get to keep much of the economic benefit (table 2). The performance improvements directly affect the welfare of income groups by reducing the consumer (residential) prices of the privatized services and by increasing wages and salaries. But they also have indirect effects—by reducing the input costs of the industries using utility services and through the reduction in prices of the inputs purchased by the privatized utilities.

The efficiency gains are equivalent to about 0.9 percent of GDP. For households, on average, the gains equal 41 percent of typical spending on utility services. But they are significantly higher for the highest income class (59 percent) than for the poorest (29 percent). This disparity is explained by the fact that when regulation is ineffective, the gains from privatization are captured as a quasi rent by the rich, who are the largest domestic owners of capital in infrastructure services.

The impact of effective regulation

The study’s most interesting result is its estimation of the gains from effective regulation. These gains total US$915 million (1993 dollars), or 0.35 percent of GDP. They average 16 percent of household expenditure on these services. Although all income classes gain from effective regulation, the poorest gain relatively more—the gains from regulation represent 20 percent of expenditure by the poorest on utilities, compared with 17 percent for the richest.

The importance of effective regulation for macroeconomic performance is even more
obvious. Privatizing utilities will boost industrial production and GDP whether regulation is effective or not, but the gains will be much larger if it is effective.

**The impact on employment**

Recent riots in some of Argentina’s provinces have made privatization’s effect on unemployment an important social concern. But what is that effect? Under the assumptions made in the model, privatization will reduce unemployment somewhat if regulators are effective. But it may increase unemployment if they are not effective, since some of the stimulus to the rest of the economy that would stem from a wider distribution of the gains would disappear.

This finding is a strong argument in favor of strengthening provincial regulatory capacity in Argentina. But it may not satisfy readers familiar with unemployment trends in Argentina—unemployment increased from 9.3 percent in 1993 to more than 18 percent in 1995. Yet according to the model, in the worst case—that is, if all regulators are assumed to have performed terribly—the changes brought about by the utility privatizations could account for only 2.35 percentage points of the increase. How can this be?

The answer can be found by including in the model the “tequila effect” that hit Argentina in late 1994 and early 1995. As the crisis led to a loss of confidence among international investors, international interest rates rose rapidly, leading to a deterioration in the net debt position of all sectors and income groups. Taking into account this effect, the model predicts the sharp increase in unemployment that occurred. The gains from privatization were not sufficient to offset the negative tequila effect.

**The impact by utility**

The simulations indicate that the poorest stand to gain the most from improvements in gas and electricity, which are major items in their consumption basket. They also tend to gain relatively more than other income classes from improvements in water and sanitation, although their main source of gain—improved access—is not modeled in the study because of insufficient data. The middle class stands to gain from improvements in telecommunications, but only if the regulator is effective. If it is not, they will pay a large rent to the private operators.

**Conclusion**

The study’s results suggest very high rates of return for the privatization and regulation “projects” in Argentina. The gains from the private operation of utilities are about US$3.2 billion or 1.25 percent of GDP per year and all income classes benefit. Total gains are equivalent to about 80 percent of investments in the privatized utilities in 1993 (US$4 billion) or more than 60 percent in 1995 (US$5 billion). Ineffective regulation cuts the gains from reform by nearly US$1 billion or 0.35 percent of GDP. This represents an implicit tax of 16 percent on the average consumer, paid directly to the owners of the utilities. If regulators are effective the poorest income groups tend to gain relatively more than the higher income groups, improving the distribution of income. Thus, rather than illustrating a trade-off between efficiency and equity, the study shows that privatization can deliver on both counts. In other words, privatization can be a positive sum game. Moreover, these results are a lower bound estimate of the gains, and the distributional gains in particular. The study models only the effects of operational gains arising from changes in productivity, tariffs, and service quality. Because of data and allocation problems it does not include the gains arising from investment to improve access—the main source of gains to low income groups.

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Infrastructure Finance—The World Bank Group’s Financial Instruments

Philippe Benoit

The World Bank Group provides a variety of support to public and private infrastructure projects in developing and transition economies. The Group provides policy advice to help governments build credible, stable policy and regulatory frameworks that support infrastructure projects generally. And it offers different types of finance for specific projects, including loans, guarantees, equity investments, and political risk insurance.

This Note provides an overview of the main financial instruments offered by the Group’s financial organizations—the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA), together referred to as the World Bank; the International Finance Corporation (IFC); and the Multilateral Investment Guarantee Agency (MIGA). It describes the basic financial and contractual structures of these instruments and illustrates their role through a hypothetical project to construct a power plant in a host country. The project involves (1) a power generation company, PowerCo, that will own and operate the power plant, (2) equity investors in PowerCo, and (3) commercial loans to PowerCo to finance the plant.

The World Bank’s loans and guarantees

The World Bank provides financing for both public and private sector projects—IBRD for middle-income and IDA for poorer developing countries—but always with the financial backing of the host country, represented by its government. Historically, the World Bank has provided most of its financial support through loans, but IBRD has established a guarantee program that is expected to take on increasing importance in financing infrastructure projects. IDA too can provide guarantees but has not yet done so. IBRD and IDA lending also can be used by governments to finance equity, guarantees, and other forms of financial support.
**IBRD loans.** IBRD makes loans on favorable market terms, at interest rates close to those available to AAA-rated borrowers. IBRD can provide loans under two structures:

- IBRD can lend directly to PowerCo, but, as required by IBRD’s Articles of Agreement, the loan must be guaranteed by the host country. This structure involves two basic agreements: a loan agreement between IBRD and PowerCo and a guarantee from the host country to IBRD (figure 1). The structure was used in the Nigeria Oso Condensate Field Development Project (1991), in which IBRD provided a US$220 million loan, guaranteed by the government, to Nigeria’s oil parastatal to finance the development of the Oso petroleum fields.

- Alternatively, IBRD can provide a loan to the host country, which can then on-lend the funds to PowerCo. This structure involves a loan agreement between IBRD and the host country and a subsidiary loan agreement between the host country and PowerCo. It also typically involves a project agreement establishing a direct contractual relationship between IBRD and the company implementing the project—in this case, PowerCo—regarding project implementation (figure 2).

**IBRD guarantees.** IBRD offers two types of guarantee for private lenders: a *partial risk guarantee* protecting lenders against payment defaults arising from breaches of sovereign contractual undertakings to a project, and a *partial credit guarantee* covering certain debt service payments against all risks—typically for later maturities. In accordance with IBRD’s Articles of Agreement, all its guarantees must be counterguaranteed by the host country.

A structure in which IBRD provides support for the PowerCo project through a partial risk guarantee would involve the following (figure 3):

- Loans by commercial lenders.
- Host country contractual undertakings to PowerCo to support the project.
- An IBRD partial risk guarantee covering the loans against PowerCo debt service defaults arising from host country breaches of contract.
- A host country counterguarantee to IBRD.
A project involving such a partial risk guarantee is the Pakistan Uch Power Project (1996), a private sector independent power producer project. Pakistan has undertaken to make compensatory payments to the Uch power company in the event of such specified contractual defaults as a failure by its petroleum parastatal to supply gas to the project or by its power utility to purchase the electricity generated. The US$75 million IBRD guarantee protects lenders to the Uch power company against debt service defaults resulting from the government’s breach of this obligation, and Pakistan has provided a counterguarantee to IBRD.

Alternatively, IBRD could provide a partial credit guarantee to the commercial lenders to protect them against default by PowerCo on debt service payments, for example, beginning with the tenth year on fifteen-year PowerCo bonds. This structure would involve the same basic agreements as the partial risk guarantee, but would not require contractual undertakings from the host country to PowerCo. A US$50 million partial credit guarantee was issued in the China Ertan Power Project (1995) covering the later maturities of commercial loans to finance the expansion of a public sector hydroelectric power plant.

**IBRD financing in IDA-only countries for enclave projects.** IBRD financing generally is not available for projects in poorer developing countries not considered creditworthy enough to pay IBRD’s market lending rates and thus eligible only for concessional IDA lending (referred to as IDA-only countries). But in a few cases, IBRD has provided loans in IDA-only countries for discrete projects that generate substantial foreign exchange revenues (referred to as enclave projects). In addition to the structural elements of an IBRD loan, these projects typically include an offshore escrow account for debt service payments and a guarantee to IBRD from a creditworthy third party, such as the project’s private shareholders (figure 4). Enclave projects could also be eligible for an IBRD guarantee.

**IDA credits.** IDA lends on highly concessional terms, with maturities of thirty-five to forty years and a 0.75 percent interest rate. In part to reflect this concessional character, IDA loans are referred to as credits. IDA always provides credits to the country, which can then on-lend the funds to the project company. An IDA credit to support the PowerCo project would involve the following basic agreements: a credit agreement between IDA and the host country, a subsidiary loan agreement between the host country and PowerCo, and, typically, a project agreement between PowerCo and IDA (see figure 2). This structure was used in the Ghana Thermal Power Project (1995). In that project,
IDA provided a US$170 million credit to Ghana, which on-lent the funds to its parastatal power producer to finance construction of a thermal power plant.

**Financing equity.** Neither IBRD nor IDA makes equity investments, but they can provide loans or credits to a country to finance its equity investment, or the investment of a parastatal, in the project company. In the PowerCo project, the host country could obtain an IBRD loan or an IDA credit to finance the equity stake of its parastatal power company, ParaCo, in a PowerCo joint venture. This structure could involve a loan agreement between IBRD and the host country, a subsidiary loan agreement between the host country and ParaCo, and a shareholder-equity contribution agreement relating to ParaCo’s investment in PowerCo (figure 5).

**Financing guarantees and debt refinancing.** IBRD can also provide a loan—and IDA a credit—to a country to finance a guarantee issued by or at the behest of the government. For example, a loan or credit to a country could finance a loan guarantee issued by an independent guarantor mandated by the government (as in the 1995 Moldova Pre-Export Guarantee Facility Project) or provided by a special-purpose facility established by the government (as in the 1994 Argentina Capital Market Development Project). The structure would be similar to the illustration in figure 6. Alternatively, IBRD can provide a loan to finance a government take-out commitment—an obligation to a project company to refinance the company’s debt—as it did in the 1994 Jamaica Rockfort Private Power Project.

**Financial intermediaries, investment funds, and facilities.** IBRD and IDA can lend to a country to finance a financial intermediary or an investment fund or other facility that would provide loans, equity guarantees, take-out financing, or other financial support for several discrete projects (figure 6). In the Pakistan Private Sector Energy Development Project II (1994), IBRD provided a US$250 million loan to Pakistan to finance a government-sponsored fund that lends to selected private sector energy projects.

**IFC’s loans, loan syndication, equity, and quasi equity.**

IFC provides loans for and makes equity and quasi-equity investments in private ventures only. In contrast to the World Bank, IFC provides financing with no direct government guarantees of repayment. Its loans are at market rates. IFC also has an extensive loan syndication program (known as B-loans) under which it extends its lender-of-record umbrella to participating banks, mitigating currency transfer and other political risks for these lenders. B-loans are always coupled with loans funded from IFC’s own resources (A-loans).

**MIGA's political risk insurance**

MIGA provides political risk insurance under contracts of guarantee for foreign equity and related debt investments. It can issue coverage for war and civil disturbance, expropriation, and currency transfer risks. It can also cover breach of contract where the claimant is denied appropriate judicial or arbitral relief. MIGA provides insurance with no host country counter-guarantee. MIGA insurance for equity and debt investments in PowerCo could include coverage of equity and shareholder loans for PowerCo (and any other loans guaranteed by the shareholders) and coverage of the commercial loans to PowerCo (figure 8). For example, MIGA issued coverage for equity investments and commercial loans provided for a power project in Honduras (1995).

**Group support**

The organizations of the World Bank Group increasingly work together in providing financial support to the same projects, combining their comparative advantages to catalyze private investment. For the PowerCo project, the Group could provide support through IFC equity and A- and B-loans, MIGA political risk insurance, and an IBRD partial risk guarantee (figure 9). The Pakistan Uch Power Project involved, besides the IBRD partial risk guarantee, an IFC A-loan, an IFC B-loan, and a loan from a government investment facility funded by an IBRD loan.

Competition and Technology Change in Telecoms—Implications for Universal Service, Employment, and Regulation

Ben A. Petrazzini

Governments in many emerging economies have been reluctant to open their domestic telecommunications markets to competition, despite the access it would bring to new technology and global trade and production. Domestic services are largely restricted to basic voice provided by a monopoly carrier, and this basic telephony is still out of reach for most of the population. The reluctance to open monopoly markets to competition arises from fears about what it means for universal service, employment, and the viability of the incumbent national carrier. This Note argues that these concerns are misplaced. The experience of reform so far suggests that competition in emerging economics can promote network expansion and increase employment. Moreover, the advent of new technologies and services means that governments have little choice but to liberalize. The challenge they face is how it should be done.

**Universal service**

In practice, there is little evidence that competition puts universal service at risk. A number of studies point to an increase in network penetration and service availability with competition. For example, competition in cellular services, which has been introduced more widely and for longer in developing countries than competition in wireline services, clearly has led to much greater network penetration than monopolies. In Asia and Latin America, for example, tele-density—the number of main lines per 100 inhabitants—has risen more rapidly in competitive markets (figure 1). In OECD countries, competitive cellular markets have achieved a teledensity three times higher than that in monopoly markets, and cellular teledensity in markets with competition in both cellular services and the public switched telephone network (PSTN) is twice that in those with competition only in cellular services (OECD 1996b). Cellular service has had a positive side effect on wireline teledensity: in countries with cellular service, the indirect competition has promoted greater wireline network penetration than in countries without it (Petrazzini and Clark 1996).
Even the threat of competition in developing countries has an impact on monopoly carriers. Several countries have set a precise date for the end of the licensed public operator's market exclusivity. Where that date is less than three years in the future, there is a strong statistical correlation between the threat of competition and the increasing rates of teledensity growth (Petrazzini and Clark 1996).

Among developing countries, there are numerous examples showing the positive effect of competition on universal service. In China, the entry of a second carrier into the market has dramatically improved the rate of network and service deployment. In 1990, the network growth rate was 25.7 percent. In 1993, after the announcement of competition, the network growth rate skyrocketed to 58.9 percent. In the same year, ten national fiber-optic backbones were completed and a new high-speed communications system (ChinaDDN) was launched. In mobile telephony services, prices dropped by 30 percent and customer subscription grew by 261 percent. And the waiting period for new wireline connections shrank for both business and residential customers, by as much as 50 percent. In the Philippines, the announcement of competition in 1993 led to a 1,530 percent increase in the annual installation of main lines.

A similar pattern occurs in new technologies such as the Internet. In OECD countries, for example, growth in the number of Internet hosts is five times faster in competitive markets than in monopoly markets (ITU 1995 and OECD 1996a). There is nothing to indicate that the same pattern would not occur in developing countries.

Privatization has also enhanced the prospects for universal service. Developing countries that have privatized their telecommunications systems have experienced much faster growth in their networks than those that have retained a state monopoly. This is particularly true in Asia and Latin America, where teledensity has grown twice as fast in countries with privatized telecommunications than in nonprivatized markets during each of the five years following privatization. In Africa and the Pacific Basin too, the evidence shows that privatized systems have achieved much faster teledensity growth than their state-owned counterparts.

**Employment**

There is a widespread belief that competition triggers significant labor cuts, but the evidence suggests that this is not the case in developing countries. A comparative analysis of twenty-six countries in Asia and Latin America shows that during 1990–94 employment in markets with varying degrees of competition increased by 20.73 percent, while in monopoly markets employment grew by only 3.13 percent (figure 2). A more detailed analysis of the sample shows that while employment grew in all competitive markets, monopoly markets had an uneven performance: in traditional public operators, employment grew by 5.6 percent, while in privatized monopolies it dropped by 9 percent. But among the public operators, employment rose in only 40 percent of the companies, and declined in 60 percent (Petrazzini and Clark 1996).

It turns out that network modernization accounted for only 29 percent of all telecommunications investments in developing countries in the mid-1990s, while the installation of new lines—a task that boosts employment opportunities—accounted for almost 71 percent. In developing countries, where teledensity was as low as 5.2 in 1994, network expansion creates a demand for labor that outweighs the trend toward workforce reduction generated by network modernization. This trend is stronger in industrial countries, where teledensity was 52.3.

**Incumbent public operators**

After decades of unchallenged exclusive rights that have allowed employees to build up important welfare benefits, many public telecommunications operators strongly resist the opening of domestic markets. But recent ex-
periences in competitive markets suggest that former monopoly operators are not as vulnerable to the entry of competing service providers as initially expected. In most cases, new entrants have had difficulties in taking any significant share of the market, let alone growing large enough to gain market power and become a serious threat to the former public operator.

In Malaysia, for example, which introduced competition in long-distance and international services in 1993, none of the new entrants had chipped away any significant share of the market from Telekom Malaysia Berhad, the former monopoly operator, even after three years. In China, the licensing of China United Telecommunications (China Unicom, or Lian Tong) in late 1993 as a second operator raised concerns for the incumbent carrier, the Ministry of Posts and Telecommunications. But China Unicom still faces an uphill battle to establish a significant market presence. In the United Kingdom, after more than ten years of long-distance competition, British Telecom continues to hold more than 90 percent of the market.

There are some cases, however, as in Chile, where the interconnection requirements along with competition can cut significantly into the incumbent’s market share. Chile’s multicarrier system in long-distance and international telecommunications allows users to access any carrier at any time by simply dialing a code before the desired number. The ease of this system enabled one of the new service providers to claim 16 percent of the Chilean international service market after only seven months of operation. In such cases, the absence of costs associated with switching operators makes the price of service the major and probably the only factor guiding customers’ choice of operator. Market share under these conditions can shrink or expand rapidly.

**New technology**

Much of the debate about the effects of competition has focused on the entry of new operators in the domestic market. But technological innovation means that, increasingly, competition will come from international sources.

Until quite recently, governments and public operators were fairly effective at blocking international competition out of their domestic telecommunications markets. But by the mid-1990s, new and difficult-to-control sources of competition had emerged, and they are spreading rapidly. Although these new technologies and services operate on different platforms and through different media, they have one thing in common: they can all bypass incumbent operators or regulators, providing services that are difficult to shut down. Callback services, Internet phone, low-earth-orbit satellites, and global operators are among the most significant challenges to domestic public telecommunications operators in developing countries.

Callback operators, which have thrived because of the differences in tariffs between industrial and developing countries, have quickly grabbed a big chunk of the market in many developing countries. In Argentina, there were until recently twenty-three callback providers offering tariffs as low as a quarter of the regular prices. Teleintar, the international service operator, estimates that it has lost more than 30 percent of its market share to callback operators. Public operators in developing countries have attempted to limit competition from callback providers through court decisions (the Philippines), government orders (China), and tariff reductions (Argentina), but there is no clear-cut way for them to block callback services without hurting their own business.

Internet phone has just joined callback services as a significant potential threat to established public operators. Until recently, Internet services had been limited to data transmission. But in 1994, software was developed that allows voice communication among computers connected to the Internet. Now, new developments in Internet phone software allow computers connected to the Internet to call telephones in the public switched telephone
network, and these services will be extended to phone-to-phone communication based on new Internet gateways. This will allow telephone users to communicate over the PSTN at Internet prices—a prospect that will no doubt put considerable pressure on the tariff structure for long-distance and international services.

Mobile satellite services provided over low-earth-orbit satellites present both opportunities and challenges to public operators in developing countries. Mobile satellite service providers can offer services that complement the national PSTN, but they can also bypass the public network by providing direct global services to large customers at very low cost. With large customers generally accounting for only 3 to 5 percent of a public operator’s customer base, but more than 50 percent of its revenues, the migration of even a small number of these customers to mobile satellite services could significantly erode the public operator’s profits.

This rapid expansion of global services creates serious pressures for small public operators in developing countries. Sooner or later, on their own initiative or forced by events, they will have to compete with large operators based in large foreign markets. Of course, developing countries could attempt to contain these pressures through regulatory mechanisms. But there are no technological or economic constraints on the expansion of these global forces into local markets in the developing world. Unprepared public operators will find it hard to compete against the commercial and technological sophistication and dynamism of international operators.

**Challenges and opportunities**

There is little doubt that new information technologies and services will progressively and irreversibly erode the market position of telecommunications monopolies along with their high profit margins. As a result, the financial value of these companies will deteriorate, making them less attractive to future investors. To make the best of the situation, governments could consider two proactive reform strategies.

If a government believes that its national carrier can withstand the challenges of competition, it should consider corporatizing the state-owned operator and gradually lowering entry barriers in both value added and basic services. Several developing countries (including China, India, Malaysia, the Philippines, and Vietnam) have chosen this approach as a way to strengthen the entrepreneurial capabilities of their public operators. But since the organizational and cultural transition from a public utility operation to a commercial venture takes time, governments should begin early to expose their telecommunications operators to competition.

If a government believes that its national carrier will not be able to stand up to competition or if fiscal considerations are a priority, privatization may be a good alternative. Just as in introducing competition, timing is important, not so much because the company has to be prepared for privatization but because the declining value of monopoly markets over time can erode the price that would be paid for the company.

This Note is based on previous work by the author (Petrazzini 1996).

**References**


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Telecommunications Reform—How to Succeed

Björn Wellentius

Today, more than sixty emerging economies—some twenty-five in Sub-Saharan Africa alone—are at some stage of transformation from a state telecommunications monopoly to private-led, competitive markets. When well done, such reforms can be positive-sum games in which all stakeholders gain—customers, existing and new operators, employees, domestic and foreign investors, and the government. Faster market growth, new and better services, lower costs, and, eventually, lower prices follow. This Note outlines the key factors in successful telecommunications reform.

Get support at the top

Reform is most likely to succeed if it is led at the highest level of political authority. That is usually the head of government, who then allocates responsibility for the reform to a single person with direct access to senior government officials, freedom to cut red tape, and resources to assemble a small support team and hire the necessary experts. Such was the case in the privatization of Mexico’s telecommunications company, Telmex. The president announced the reform in August 1989, appointed the minister of finance chairman of the board and gave him overall responsibility for the privatization, and handed over the chief executive’s job to an experienced public administrator with a clear reform mandate. Privatization was completed in December 1990. By contrast, Brazil’s attempts at reform beginning in the early 1980s did not muster the necessary political muscle. Not until 1997 has real progress been made.

Sort out conflicting objectives early

The primary purpose of reform is to get consumers more, better, new, and less costly services. Pressures from interest groups—incumbents wanting continued protection, new entrants seeking special deals, treasury officials expecting to use sale revenues to reduce budget deficits, financial advisers earning success fees tied to transaction prices—can steer reform off this track. In particular, sale strategies that drive up the prices for existing companies or new licenses can repress growth, reduce the funding available to invest in the companies, or result in high tariffs. The Mexican government, for example, concluded that the six-year long-distance monopoly granted to Telmex in 1990 had led to higher consumer prices and slower growth than would have resulted under competition. So, in 1996, it chose to forgo the high fees it could have obtained by tendering one or two new licenses and instead opted for unrestricted entry. In India, the exorbitant prices bid for second fixed operator licenses in 1996, combined with modest revenue projections (based on the low per capita income), are making it difficult to raise debt financing for investment. By contrast, the government of Bolivia privatized Entel in 1996 by issuing new shares for which the winning bidder paid US$600 million—funds immediately available for investment in the company. In Brazil, the consortium that won the cellular license in São Paulo in 1997 with a US$2.5 billion bid—four times the government’s asking price and 60 percent more than the second-highest bid—is likely to pass on the cost to customers through much higher tariffs than those proposed by rival bidders.

Sale strategies that place less emphasis on cash up front can, moreover, yield substantially more cash to the government later. For example, awarding a cellular license to the bidder that offers the largest build-out plan—rather than the one offering the highest license fee—can
increase tax revenue for years to come by creating more business. And initially selling only the minimum number of government shares needed to effectively transfer control of the state company to the new owners (usually 20 to 30 percent) allows the government to float the balance later and obtain much higher prices, once the company appreciates under private management. In the Telmex privatization, for example, the government initially sold 20 percent of the shares to a strategic investor in 1990 for US$1.8 billion, then sold 31 percent more through public offerings in 1991 and 1992 for US$4.5 billion—70 percent more per share.

**Set clear policies, rules, and procedures**

The business offered to investors must be clearly defined in the laws, regulations, and main transaction documents (licenses, contracts of sale). The most critical policy issues relate to pricing, competition, and interconnection. In pricing, governments must bite the bullet early and rebalance tariffs. The price an operator is allowed to charge its customers is the most important determinant of profitability and ability to finance growth. Existing tariffs are often way out of line with costs—far too high for international calls, too low for local calls and fixed charges, and somewhere in between for domestic long-distance calls and initial connection (sometimes tariffs are also too low overall). Including rebalancing plans in licenses or contracts often delays further reforms; new owners tend to defer raising some prices to avoid the public fallout, yet later expect the licensing of competitors to be delayed because tariffs remain unbalanced. In setting new tariff structures, calculating the actual costs of each operator is seldom a viable method. Rather, tariffs observed in competitive markets probably offer the best guidance on efficient prices. Some cost elements (land, labor, taxes) vary considerably among countries, but the main costs (equipment, capital) are determined in global markets and international benchmarks are thus relevant. As the market becomes more competitive, pricing can increasingly be left to the operators.

The interconnection obligation of the dominant operators, the principles under which terms of interconnection will be negotiated, and the process and timetable for a regulatory decision if the parties fail to reach agreement must be clearly spelled out. A new operator's ability to reach (and be reached by) customers of the existing operator and to use parts of existing networks on reasonable technical and price terms (rather than building complete new facilities) plays a big part in determining not only its own viability but also the economic efficiency of the sector. In Poland, failure to sort out interconnection with the incumbent meant that of some 200 licenses issued to independent operators since 1990, only about twelve were in use in 1996. Licensees cited the main impediments as unfavorable terms for sharing revenues with the dominant state operator, limited access to its network, slow negotiation of interconnection agreements, and a prohibition on setting up their own transmission facilities.

Reforms should follow clearly defined processes that are open to participation and review by all interested parties. The public should be kept informed. Market mechanisms, not individual negotiations, should be used to select partners and determine the right sale prices. And the award of licenses and contracts should strictly adhere to the evaluation criteria announced at the outset. Once a window of political opportunity for reform opens, time is of the essence—but that should not be used as an excuse to cut corners or strike deals behind closed doors.

Clear rules and processes must also be applied to the regulatory function. The locus and functions of regulatory authority and the basic procedures that will govern its relationships with operators and customers must be defined, preferably by law. That does not mean that a full regulatory capability must be in place before major reform steps can be undertaken. Initial regulatory decisions can be written into licenses and contracts of sale. A core decision-making capability in the form of a commission, say, and a secretariat with processing capability, supported by outsourcing of expertise, can handle essential tasks in the first two or three
years, such as issuing licenses, managing conflicting demands on the radio spectrum, and resolving interconnection disagreements. Other areas of competence can be gradually developed as needed. Chances are that successive problems will arise, peak, and then decline to a low simmer, so that a permanent, comprehensive in-house capability may never be needed. Moreover, in most emerging economies, anything beyond a minimalistic regulatory institution is not feasible.

Open all markets to competition

Without competition, the benefits from increased private participation will not be fully realized. In Latin America, for example, countries that granted monopoly privileges of six to ten years to privatized state enterprises saw connections grow at 1.5 times the rate under state monopolies—but at only half the rate in Chile, where the government retained the right to issue competing licenses at any time (table 1). Rural areas, too, can become an attractive business under liberal entry and pricing policies. In Chile, government subsidies equivalent to less than 0.5 percent of total telecommunications revenue, allocated through competitive bidding in 1995, mobilized twenty times as much private investment to extend basic telephone access to rural areas. The program brought service to about a third of the rural population lacking it.

Contrary to views often expressed by financial advisers, investors are not opposed to competition—as long as they are not also burdened with regulatory uncertainty, unrealistic service obligations, and rigid tariffs and employment rules. This is true even in small, low-income markets. Ghana Telecom was successfully privatized in late 1996 at the same time that a license was awarded for a second full-service national operator and three other cellular companies were already in place—and the price per line was similar to that paid for the monopoly in neighboring Côte d’Ivoire. But lack of clarity regarding competition policy does drive investors away. Partial privatization in 1996 of Svyazinvest, the Russian holding company of eighty-five regional telecommunications companies, failed shortly before closing when the winning bidder realized that the government did not intend to grant Svyazinvest a license to build its own long-distance network.

Enhance credibility and stability

Even if a government gets all the policies, rules and procedures right, operators and investors will come and remain only if they believe that the government will stay the course. Governments can do several things to enhance credibility and stability. To safeguard reforms against political changes, governments should develop the reforms with the support of major stakeholders—various branches of government, public and private sector users, chambers of commerce, consumer groups, large enterprises (including state-owned firms) that could become alternative network providers, local banks and investors, and the staff and management of existing operating companies.

In emerging economies, most with strong growth potential, the concerns of labor can be readily accommodated. Most workers stand to gain from higher salaries, improved career prospects, and new opportunities as employees or entrepreneurs in a rapidly expanding market. Growth allows major gains in labor productivity with little reduction in personnel. As Ghana Telecom prepared to privatize in 1996, some 500 workers (14 percent of the telecommunications and postal workforce) agreed to leave with severance packages that cost the government less

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**TABLE 1 FASTER GROWTH IN OPEN, PRIVATIZED MARKETS**

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<td>Argentina, Mexico, Venezuela</td>
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<td>Chile</td>
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Source: Pyramid Research data and World Bank data.
than 3 percent of the initial proceeds from privatization. After privatization, potential labor problems largely disappeared as a result of management’s promises of no forced redundancies, the introduction of training programs, and expectations of growth. By contrast, labor unions whose concerns—and political clout—had been ignored brought Sri Lanka’s reform program to a halt in the mid-1980s. In the restructuring of state telecommunications enterprises in Latin America, an additional enticement has been offered—employee stock option plans that transfer about 5 percent of shares to employees on favorable terms.

Essential for reducing investor risk is limiting the opportunity for discretionary government or regulatory intervention in business, especially in the early years. In Uganda, initial decisions on tariffs, service obligations, and default interconnection terms are being written into licenses and contracts (as was also done in Ghana). Numbers that will remain firm for, say, five years—subject if necessary to automatic adjustment, based on simple formulas, for inflation, foreign exchange, or other factors—are more effective at reducing risk than are rules for calculating these numbers.

Telecommunications reforms gain credibility when coupled with broader programs in which the government has a large stake. The privatization of ENTel in Argentina was the flagship of President Menem’s multisectoral public enterprise reform program in the early 1990s, and everyone knew that a failure by the government to stick to the rules it had set for telecommunications would have undermined the whole program. More generally, telecommunications reforms benefit from a healthy overall business climate—political stability, sound macro-economic management, and policies favoring a private-led, competitive, open economy.

Anchoring key elements of reform in international frameworks also adds credibility. Every World Trade Organization (WTO) member country that subscribes to the telecommunications agreement of 1997 enters a binding international commitment to implement aspects of the country’s own reform targets, abide by a common set of regulatory principles, and recognize the WTO as an instance of intergovernmental appeal. All this is likely to provide comfort to investors worried about regulatory risk. Similarly, loans, credits, and guarantees from multilateral agencies such as the World Bank Group involve government obligations that can be tailored to help offset such risks as failure of the government to abide by the terms of licenses (on pricing, for example) or ensure access to foreign exchange for debt service or dividend payments. A 1993 investment of US$90 million by the International Finance Corporation and the European Bank for Reconstruction and Development in the Hungarian state telecommunications company mobilized US$1.2 billion in foreign funds at the time of privatization.

Investors, operators, and customers will be reassured by a telecommunications law that establishes broad principles and rules governing the sector. But a law with a narrower objective, such as establishing a regulatory authority, may suffice. The timing of amending or replacing a dated law must weigh the potential delays and political cost. Telmex was privatized in 1990 in the framework of a 1938 transport and communications law—but passage of a new law in 1995 was essential to open the market for competition in 1996.

**Conclusion**

Major transactions such as a privatization or the issuance of new licenses tend to drive the reform agenda, but change continues well beyond these transactions. Following the rules and honoring commitments help consolidate an environment for sustainable growth. Also critical are to build a regulatory capability to suit changing needs, take every opportunity to enhance competition, and address any persistent gaps between development and commercial objectives.

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Extending Telecommunications Service to Rural Areas—The Chilean Experience

Awarding subsidies through competitive bidding

Björn Wellentius

Private sector–led, competitive markets are replacing traditional public telecommunications monopolies in emerging and mature economies alike. As operators focus on the most profitable market segments, some policymakers worry that the government will be left to shoulder the burden of providing service to rural areas. But there is growing evidence that under liberal entry, investment, and pricing policies, rural telecommunications can be good business. New technologies are making it easier to reach low-density and remote localities. Still, pockets of population may remain without service because of the exceptionally high cost and low revenue potential of providing service to them. How large is this gap, how can it be bridged, and who pays? Recent experience in Chile suggests some answers.

Chile’s Telecommunications Development Fund

Chile’s telecommunications market is one of the most open and competitive in the world. Following privatization of the main telecommunications companies in the late 1980s, the number of telephone lines quadrupled to more than 2 million today. Competition introduced in the late 1980s in data, value added, and cable television services and in private networks, and since 1994 in domestic and international long-distance telephony, has brought about rapid network modernization, new services, and prices that are among the world’s lowest. Competition in local services is intensifying, mainly from long-distance carriers starting wireline and wireless local service and from combined voice and cable television offerings.

Nonetheless, about 1.5 million people—10 percent of all Chileans—live in localities that do not have even a public telephone. Some 500,000 households—a sixth of those without service—will not be able to afford telephone connections in the foreseeable future. To increase access to public telephones in rural and low-income urban areas, the Chilean government set up a special fund in 1994 that subsidizes projects to provide public telephone service. The fund, with a limited life and due to expire in 1998, is financed by the national budget and administered by a council chaired by the telecommunications minister. The council decides on the annual program of projects eligible for subsidy and awards the projects and subsidies through competitive bidding.

Eligible projects

The council’s secretariat, the sector regulator Subsecretaría de Telecomunicaciones (Subtel), compiled a first roster of about 2,300 rural localities needing public telephones based on a survey of provincial and local authorities, neighborhood associations, telephone companies, and the general public. Subtel then grouped these localities into projects according to geographical proximity and technical solutions likely to be cost-effective and did a cost-benefit analysis to estimate the subsidy needed, if any, to install one public telephone in each locality. Projects that looked commercially viable without subsidy were brought to the attention of telecommunications operating companies and the business community; existing and new operators can apply for licenses to serve these localities. Projects that had a positive social net
present value (NPV) but were not commercially viable were ranked by social NPV per unit of subsidy needed to make them viable and by other factors.

The fund's first round, initiated in 1995, consisted of the forty-six highest-ranked projects, whose estimated subsidy requirements added up to the fund's 1995 budget of US$4.3 million. These projects cover 1,285 localities throughout the country. The localities typically have fewer than 1,000 inhabitants—the average is 360—and are located within roughly 50 kilometers (30 miles) of existing telecommunications facilities. Once complete, these projects will provide access to basic telecommunications services for about 460,000 people, a third of the population now without access.

Terms

The bidding documents set the terms and conditions for all projects: the service obligations, tariffs, interconnection principles, requirements for bidders, bidding procedures, and rules for awarding bids. The documents also list the projects, giving for each one the location, the number of public telephones required, and the maximum subsidy available. The winning bidder for each project is granted a nonexclusive operating license within sixty days and must provide at least one public telephone in each locality for ten years, available to the public every day, twenty-four hours a day. Service must begin six to twenty months after the license has been granted.

The choice of technology, network structure, and location of the public telephones is left to the licensee. Subtel processes applications for any radio frequencies required concurrently with the operating license. The installations must comply with the technical and interconnection standards applicable to all telecommunications networks. The licensee is free to set the call charges subject to a maximum (specified in the bidding documents) equivalent to US$0.07 per minute for a five-minute call to any telephone within the same primary service area. This compares with about US$0.05 per minute for five-minute local calls from urban coin-operated telephones. Higher charges are allowed for shorter calls, up to US$0.13 per minute for one-minute calls. The maximums are tied through a formula to published indices (wholesale prices, cost of labor, and foreign exchange) and the corporate tax rate for the full ten years of service. Licensees must post the call charges in each telephone and inform Subtel of any changes.

The maximum subsidy available from the fund for each project ranged from US$300 to US$26,000 per locality and averaged US$3,340. The subsidy, in current pesos with no adjustment for inflation, is paid in a lump sum once the facilities have been built and have been inspected by Subtel. Thus, the licensee has both a contractual obligation and an incentive to initiate service quickly. Projects are not eligible for any further subsidies.

The bidding process and its results

Public invitations to bid for each of the forty-six projects were issued in October 1995. Each project would be awarded to the bidder asking for the lowest subsidy. Bids could propose additional services, in the project locations or elsewhere, but these proposals would not be taken into account in the evaluation. Existing telecommunications companies could bid, as well as prospective new providers meeting minimum legal requirements. Thirty companies purchased the bidding documents. Bids were opened in public in December 1995, and the results announced in March 1996. Bidders made sixty-two offers for forty-two of the forty-six projects, covering most localities. The fund committed only 48 percent of its 1995 budget to achieve about 90 percent of its program, largely because bids for zero subsidy were made for sixteen projects (accounting for 51 percent of localities and 59 percent of the population). Most of the other projects were bid at or near the maximum available subsidy (table 1). About 75 percent of localities were in projects bid at US$5,000 or less per locality (table 2).

Competitive entry was the main factor driving down the subsidy. Chilesat, a long-distance carrier seeking to develop local networks, bid zero subsidy for each of those sixteen projects.


### TABLE 1  LOWEST BIDS RECEIVED FOR CHILE'S 1995 RURAL PROGRAM

<table>
<thead>
<tr>
<th>Level of lowest bid</th>
<th>Projects</th>
<th></th>
<th>Localities</th>
<th></th>
<th>Inhabitants</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td>At maximum subsidy</td>
<td>18</td>
<td>39</td>
<td>406</td>
<td>32</td>
<td>127,800</td>
<td>28</td>
</tr>
<tr>
<td>Below maximum subsidy</td>
<td>8</td>
<td>17</td>
<td>43</td>
<td>3</td>
<td>9,300</td>
<td>2</td>
</tr>
<tr>
<td>No subsidy</td>
<td>16</td>
<td>35</td>
<td>656</td>
<td>51</td>
<td>275,900</td>
<td>59</td>
</tr>
<tr>
<td>No bid</td>
<td>4</td>
<td>9</td>
<td>180</td>
<td>14</td>
<td>49,000</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>100</td>
<td>1,285</td>
<td>100</td>
<td>462,000</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Subtel.

Chilesat outbid Compañía de Telecomunicaciones de Chile (CTC), the largest local telephone operator, in eight of those projects. And it tied with CTC in the other eight. Because the bidding documents contained no provisions for resolving ties, these projects were not awarded. By mid-1996, CTC applied to extend its current license to include all eight unawarded projects.

Besides entry and defensive strategies, observers cite other factors that motivated CTC and Chilesat and that may explain why these companies had not already moved into markets for which they were prepared to bid zero subsidy. The bidding process documented the existence of demand and willingness to pay in many small, scattered localities that had not yet caught the operators' attention. Call charges exceeding those authorized in cities made the projects viable with limited subsidies. Once a public telephone in one locality is made viable by a subsidy, other services can be provided in that locality and others at low marginal cost and for significantly higher returns. And the sixty-day turnaround for processing new operating and radio licenses compared very favorably with one year or more for extending existing licenses.

Parts of the program, however, did not benefit much from competition. CTC bid at or near the maximum available subsidy for twenty-three projects in provinces where it faced no challengers. And it won three other projects by a slight margin against a small local operator, with both companies bidding close to the maximum. Some operators that were expected to bid did not participate. Compañía Nacional de Teléfonos (CNT), a regional operator, did not bid for any projects, even in its own region, which opened the way for CTC and Chilesat to gain a foothold in CNT's territory. Empresa Nacional de Telecomunicaciones (ENTel), the country's main long-distance carrier and already extensively involved in rural areas, also did not participate. And the program did not create new players. A small company established to enter the rural market bid for one project but lost to the incumbent operator.

### Lessons

The Chilean experience suggests a number of lessons that may be broadly applicable in other emerging economies:

- The key to accelerating rural telecommunications development is competition. An environment that encourages new entry and

### TABLE 2  AVERAGE SUBSIDY PER LOCALITY IN THE LOWEST BIDS IN CHILE'S 1995 RURAL PROGRAM

<table>
<thead>
<tr>
<th>Average subsidy (US$)</th>
<th>Projects</th>
<th>Localities</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>16</td>
<td>656</td>
</tr>
<tr>
<td>1-2,000</td>
<td>3</td>
<td>103</td>
</tr>
<tr>
<td>2,001-5,000</td>
<td>5</td>
<td>214</td>
</tr>
<tr>
<td>5,001-10,000</td>
<td>9</td>
<td>97</td>
</tr>
<tr>
<td>&gt;10,000</td>
<td>9</td>
<td>35</td>
</tr>
<tr>
<td>No bid</td>
<td>4</td>
<td>180</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>1,285</td>
</tr>
</tbody>
</table>

Source: Subtel.
competition can go a long way toward meeting basic telecommunications needs in rural areas on commercial terms.

- Given the right policy environment, limited government subsidies suffice to close gaps between the commercial and social objectives of rural telecommunications development. The fund’s 1995 commitment was less than 0.5 percent of telecommunications revenues countrywide.

- Market forces can determine which projects really need subsidy and how much. Competitive bidding following established administrative procedures and subject to independent judicial review can keep political pressures largely at bay. The Chilean bidding process left little room for discretion in the awards. Cost-benefit analysis was used only for the initial screening of projects, to determine roughly how much subsidy the government should be prepared to pay and which projects should go first. But limited competition for the projects meant that in many cases the subsidy awarded was the maximum available—set by the study, not the market.

- In a competitive environment, small subsidies can give tremendous leverage. The fund’s US$2.1 million commitment of public money for the 1995 program triggered private telecommunications investments of about US$40 million. These investments include additional facilities offered by the bidders, more than twice what was required by the projects. The US$2.1 million will result in 1,285 rural public telephones, averaging US$1,634 per telephone. By contrast, in the 1980s, the government paid the incumbent operators US$6 million to install only 300 rural public telephones, averaging US$20,000.

- Errors of analysis in the worst case lead only to errors of timing. The four projects that had no bidders, presumably because the maximum subsidy was too low, will be included again in the next round with higher subsidy limits. Projects deemed viable but that eventually fail to be undertaken on a commercial basis may be reconsidered for subsidy in following years.

The next rounds—1996 and beyond

The fund’s second round, begun in August 1996, covers almost 2,500 localities with about 500,000 inhabitants. The US$2.2 million savings from 1995 have been rolled over, resulting in a total budget for 1996 of about US$8.8 million. But the amount of subsidy for each location is likely to increase. Project locations are likely to be farther away from existing facilities, increasing the cost and possibly generating lower revenues. And while a one-time subsidy to offset part of the initial investment cost appeared to suffice in the first round, in the future some projects may need a subsidy for annual operating costs. In such cases, Subtel would probably prefer to lump the present value of all recurrent subsidies into a single initial payment.

With successful completion of the 1996 round, more than 97 percent of Chileans will likely have access to basic telecommunications by 1998, and the fund may well have a surplus. Given Chile’s strong market orientation, it is unlikely that the government would use the fund to subsidize regular business or residential telephone connections or use. But the fund and its market-oriented approach could be used to stimulate the provision of lifeline telephone service to low-income households, improve telephone access for disabled people, and extend Internet connectivity to public schools, health centers, and libraries.

The author gratefully acknowledges the help of Gregorio San Martín, Oscar Cabella, and Claudio Gambardella in documenting and discussing material used in this Note.

1 The planning ministry’s standard method for social and private evaluation of projects was adapted for use with clusters of localities. Simple assumptions were made. For example, operating revenue was forecast as a percentage of average income. The results, while subject to error, are believed to be good enough for initial classification of projects and rough determination of maximum subsidies.

2 In all cases, the maximum subsidy was less than the estimated initial cost.

3 Chile is divided into twenty-four primary service areas. The call charge for the subsidized rural telephones allows users to call anywhere within their primary service area, including the provincial capital and several municipal centers. Calls beyond this area are charged as long distance.

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February 15, 1997, will be remembered as a landmark date in the history of the multilateral trade system. On that day, sixty-nine governments formalized commitments to liberalize their basic telecommunications services under the General Agreement on Trade in Services (GATS). The resulting Decision on Commitments in Basic Telecommunications has both symbolic and practical meaning. The final act of the Uruguay Round in Marrakech in 1994—giving birth to the World Trade Organization (WTO)—was described by many as the beginning of a new era in international trade rules. The agreement on basic telecommunications can be characterized as the first major accomplishment of this new era. Moreover, it will foster the liberalization of telecommunications, bringing significant benefits for industrial and developing countries alike.

This Note reviews the evolution of the services and telecommunications negotiations, the scope of the new set of multilateral disciplines, and the implications of the agreement for WTO members, particularly developing countries. The basic message is that the agreement is a major accomplishment, but implementing the commitments it contains will pose a significant challenge for many of the developing country WTO members. But the potential benefits of following through with these commitments are not trivial, and policymakers should maintain the focus on the liberalization agenda, building on the commitments already made.

A clash of worlds

In the early 1980s, when the trade community, under the leadership of the United States, began to discuss the inclusion of services in the multilateral trade regime, there was no consensus on the best way to proceed. Developing countries, for example, opposed the negotiations either because they believed that they did not enjoy comparative advantage in the relevant industries or because they feared that these negotiations would intrude into other areas, such as foreign direct investment policies and national regulatory regimes. Needless to say, other topics—for example, agriculture and textiles—were much more prominent on the negotiating agenda of developing countries.

For telecommunications, resistance to trade negotiations also came from major players in the industry. After all, state-owned enterprises were the suppliers of telecommunications services in all but a handful of countries, and international telephony was conducted like a cartel, with transactions closely regulated under rules negotiated under the International Telecommunication Union (ITU). Using trade negotiations to promote the liberalization of telecommunications was an alien concept to most of this community. It was also perceived as a threat to national regulators, and in some countries, it was even portrayed as a threat to national sovereignty.

Despite the opposition, the services negotiations progressed more smoothly than most analysts had predicted at the beginning of the Uruguay Round. The internationalization of services is at the very core of the process of economic globalization. Service industries (for example, telecommunications, transport, financial services) provide critical links among geographically dispersed markets. Efficient, high-quality links are fundamental for transnational corporations—the most dynamic actors in globalization—and this critical need explains
their strong interest in the establishment of multilateral disciplines in services trade. Pushed by these powerful interests and the growing recognition of the potential benefits of liberalizing services, the negotiating agenda evolved gradually, and by 1993, the basic architecture of the GATS had been agreed on.

**The GATS in a nutshell**

The GATS comprises the framework agreement (with its twenty-nine articles and eight annexes) as well as the schedules of specific commitments and the lists of exemptions to most-favored-nation (MFN) treatment submitted by member countries. It covers four modes of international delivery of services: cross-border supply (for example, international telephony), consumption abroad (tourism), commercial presence (provision of services abroad through a branch, agency, or subsidiary), and the presence of natural persons (entry and temporary stay of foreign individuals in order to supply a service).

It broadly follows the tradition of its counterpart for trade in goods—the General Agreement on Tariffs and Trade (GATT)—emphasizing nondiscrimination and imposing limits on the use of quantitative restrictions on trade. But it introduces innovations, covering transactions associated with commercial presence and introducing a concept of market access that goes beyond border restrictions (for example, in principle, it proscribes restrictions on the type of organization under which foreign providers can establish commercial presence).

Unconditional MFN treatment is a basic obligation of signatories that applies to all services, an obligation that bars a WTO member from treating other members less favorably than any other country. But the GATS allows MFN exemptions as long as the member country identifies them explicitly. The list of exemptions is supposed to be time-bound and, in principle, should not last more than ten years. Another basic obligation of members is a commitment to transparency, which requires governments to publish and make available to the public the laws and regulations that affect trade in services.

Market access and national treatment are specific obligations under the GATS. They apply only to the service industries and activities listed by a country in its schedule of commitments. These obligations are specified at the level of each of the four modes of supply and subject to the limits made explicit in the offer. The GATS adopts a “positive list” approach with respect to sectoral coverage of service industries—that is, only the industries and activities scheduled in the commitments are subject to the GATS’s specific obligations.

**The treatment of telecommunications in the GATS**

The definition of telecommunications services for GATS purposes is comprehensive, encompassing both basic services—those that involve simply end-to-end transmission of voice or data—and value added services—those that modify the form or content of the messages relayed through the networks. By the end of the Uruguay Round, forty-eight schedules (representing 59 of the 125 governments participating in the negotiations) contained commitments in telecommunications. But almost all of these commitments covered only value added services, reflecting the resistance still facing this novel approach to telecommunications negotiations. In short, most of the relevant markets for communications continued to operate outside multilateral disciplines.

The Uruguay Round accomplished some important results for the sector, however. First, it raised awareness about the potential role of trade negotiations in fostering the liberalization of telecommunications. Second, it helped to diminish the gap in understanding between the trade and telecommunications communities by promoting a dialogue on their distinct approaches to regulation. Third, it established that access to telecommunications services was critical for trade in services and that users were entitled to fair
terms of access (as outlined in the Annex on Telecommunications of the GATS).

But the limited progress in effective liberalization of basic telecommunications led WTO members to agree to continue the negotiations beyond the date of the Round's completion (April 15, 1994). Basic telecommunications joined maritime transport, financial services, and the movement of natural persons as topics for sectoral negotiations. The Negotiating Group on Basic Telecommunications (NGBT) was created in May 1994, with a deadline of April 30, 1996, for completing the talks.

**From the NGBT to the GBT**

Participation in the NGBT was voluntary. Initially, fifty-three WTO members decided to participate in the negotiations, with twenty-four other governments attending the meetings as observers. The attitude of most participating countries about the usefulness of engaging in these negotiations had shifted significantly by then. In part, this simply reflected a better understanding of the potential benefits of liberalizing telecommunications. More fundamentally, however, it reflected the growing recognition that the industry faces a paradigm shift. Technological progress is rapidly eroding the sustainability of old practices based on monopolistic behavior, state control, and protected markets for local providers. Callback systems, virtual private networks, the Internet, and the growing promise of modern satellite communications are multiplying the opportunities for bypassing telecommunications monopolies. At the same time, the increasing information intensiveness of transnational corporations and the dramatic reductions in the cost of communications create additional incentives for customers to actively explore bypassing alternatives.

In the NGBT, the focus of the debate rapidly moved on from "why to liberalize" to "how to liberalize." Important conceptual progress was made as participants recognized that for telecommunications, the value of the market access commitments would be greatly reduced unless a procompetitive regulatory framework was also put in place. A draft reference paper describing regulatory disciplines supportive of market entry was negotiated, and most countries became signatories to this text (partially or in its entirety) in the context of additional commitments made in their offers (expanding on their market access and national treatment commitments). This can be characterized as the first multilateral effort to deal explicitly with substantive aspects of competition policy. Even though limited to telecommunications, it was a major achievement, and it paves the way for future multilateral disciplines and international harmonization.

By April 1996, thirty-four offers (encompassing forty-eight governments, with the European Union's submission counting as one) were on the table. Still, some countries—particularly the United States—were dissatisfied with the quality and coverage of the offers. Moreover, in the final phase of the talks, the issue of satellite services—that is, to what extent explicit provision for these services needed to be made in the offers—added "noise" to the negotiations. As a result, no deal was attained by the deadline of April 30, 1996. Given the progress already achieved, however, there was broad support for continuing the negotiations. Seizing this opportunity, Renato Ruggiero, Director-General of the WTO, suggested that countries should be given a chance to improve on their offers, and February 15, 1997, was established as the new deadline for the negotiations. A new body—the Group on Basic Telecommunications (GBT)—was created to carry on with the negotiations, replacing the NGBT, and the rules of participation were changed to make all WTO members full participants.

The negotiations restarted in July 1996, and by the WTO Ministerial Conference in Singapore in December 1996, several countries had already tabled improved offers, signaling support for a successful conclusion of the negotiations. Still, some thorny issues remained. Lively discussions continued on international services (for example, countries with more liberal...
regimes were concerned that an MFN commitment to liberalize international services could give rise to anticompetitive practices by foreign monopolistic carriers, on satellite services, and on what constituted an adequate "critical mass" for a deal. Other controversial issues included how to avoid discriminatory practices in the allocation of spectrum and how to draw the line between telecommunications and audiovisual services given the growing technological convergence in these areas.

Gradually, however, technical and political solutions began to emerge. With respect to international services, the United States unilaterally announced a new policy toward international settlement rates in December 1996, creating a mechanism for addressing the concerns of its own carriers about the distortions of the accounting rates system outside the WTO framework. This helped deflate opposition to the agreement based on concerns that it could foster anticompetitive practices (for example, through one-way accounting rate bypass). Also helping to pave the way to the final agreement were the adoption of a technologically neutral approach to scheduling (that is, unless otherwise noted, the commitments would cover all transmission possibilities including satellite services) and the acceptance of the concepts that frequency and spectrum management should not be used to undermine market access commitments and that MFN exemptions could temporarily be used to address the differences in treatment of audiovisual services.

In a parallel effort, governments, the WTO, and several other multilateral organizations worked to raise awareness of the importance of the negotiations for developing countries and to help these countries prepare their own offers. The World Bank, for example, through its Information for Development (infoDev) program and in close cooperation with the WTO, spon-
sored a project to provide technical assistance to more than twenty developing countries in the final stages of the negotiations. By early 1997, it became clear that a "critical mass" of offers would be achieved. On February 15, 1997, the telecommunications talks were successfully concluded.

The scope of the agreement

Sixty-nine WTO members tabled commitments by February 15, 1997. These schedules will become formally binding by January 1, 1998. Not only were several new offers added to those available in April 1996, but thirty-two of the thirty-four original offers were revised, typically leading to more substantive commitments. Commitments were made in all basic telecommunications services by both high-income and developing countries (figure 1). Moreover, most participants made commitments either to all or to parts of the reference paper, subscribing to procompetitive regulatory principles (for example, the establishment of independent regulators, the adoption of competitive safeguards, measures to ensure interconnection, transparent and nondiscriminatory practices with respect to licensing, and universal service obligations).

The exact implications of the agreement for a particular country can only be assessed by a careful analysis of its schedule of commitments, including phasing considerations, list of qualifications by activity and mode of delivery, and eventual recourse to MFN exemptions (nine governments claimed such exemptions for certain activities). It is fair to say, however, that in contrast with the GATS's results in 1994, when most schedules were characterized by status quo commitments (that is, governments basically bound themselves not to adopt more restrictive policies), the outcome of the basic telecommunications negotiations will foster
significant additional liberalization. In this sense, the agreement proved wrong those analysts who were skeptical of the role of sectoral negotiations in fostering liberalization at the multilateral level.

The markets affected by the agreement represent more than 90 percent of the world market for telecommunications (figure 2). Developing countries account for less than 20 percent of the global revenues from telecommunications...
services, but they are the fastest-growing markets for these services. Their participation in the WTO process is thus important not only for developmental reasons, but also because these markets are bound to increase in relative importance. The countries with the weakest telecommunications infrastructure (such as in Sub-Saharan Africa) are also those that participated less actively in the WTO negotiations (figure 3). Assistance to help bring these countries into the system should be a priority for the donor community.

**The road ahead**

Analyses of the importance of the basic telecommunications agreement tend to cluster around two extreme positions. Most analysts have been extremely enthusiastic and present the agreement as delivering swift liberalization of participating markets. Others are more skeptical, pointing out that the multilateral regime and the regulatory authorities are being overtaken by the velocity of technological change in the industry. According to these skeptics, the agreement plays at best a secondary role in this process of change.

Reality is somewhere in between. It is true that fast technological change has been the main driver of the paradigm shift in telecommunications, and it explains to a large extent the changing attitude in the industry on the desirability (and inevitability) of competition. But credible rules relating to market access, constraints on discrimination, and a procompetitive regulatory environment play an important part in shaping the outcome of this “revolution,” particularly in influencing the distribution of its benefits.

Private capital is expected to take the lead in funding investments in telecommunications in the developing world. In the early 1990s, 65 percent of the financing for basic wireline telecommunications in the developing world came from internal sources (profits), with commercial funds (20 percent) and official sources (15 percent) playing a more limited role. By the end of this decade, it is estimated that private capital flows will finance a much greater share of the investments in the sector (55 percent), with internal (40 percent) and official sources (5 percent) reducing their relative participation.

But private investors will be willing to invest in modernizing the telecommunications infrastructure of developing countries only if they can count on fair and stable rules of the game. Accordingly, developing countries able to signal their commitment to liberalization and to adopt a procompetitive regulatory environment will be in a better position to attract the capital flows required for these investments. WTO commitments can play an important part in this.

Benefits for developing countries are not limited to attracting foreign direct investment. Liberalization will also improve local firms’ access to efficient telecommunications service providers. This will increase their competitiveness—and thus their ability to explore the dynamism of international trade in information-intensive products and services. Last but not least, competition will improve the price-quality mix of the telecommunications services available to consumers. The critical remaining issue is the quality of the implementation of the commitments. Many developing countries are entering uncharted territory, particularly with respect to procompetitive regulatory disciplines. Those able to meet these challenges will be much better positioned to benefit from the “information age.”

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1. This section relies on Primo Braga (1996). For further details on the rationale for liberalizing services and on the architecture of the GATS, see UNCTAD and World Bank (1994) and Hoekman (1996).
2. Basic services cover voice telephony, telex, telegraph, facsimile, data transmission, private leased circuit services, fixed and mobile satellite systems and services, cellular telephony, mobile data services, paging, and personal communication services. Value added services include email, voice mail, on-line data processing, on-line database storage and retrieval, and electronic data interchange.
3. For further details on this project, which was executed by the International Institute of Communications, visit the InfoDev Website at: http://www.worldbank.org/html/infodev/infodev.html.
4. Antigua and Barbuda, Argentina, Australia, Bangladesh, Belize, Bolivia, Brazil, Brunei Darussalam, Bulgaria, Canada, Chile,
Colombia, Côte d'Ivoire, Czech Republic, Dominica, Dominican Republic, Ecuador, El Salvador, European Communities and its Member States, Ghana, Grenada, Guatemala, Hong Kong, Hungary, Iceland, India, Indonesia, Israel, Jamaica, Japan, the Republic of Korea, Malaysia, Mauritius, Mexico, Morocco, New Zealand, Norway, Pakistan, Papua New Guinea, Peru, Philippines, Poland, Romania, Senegal, Singapore, Sri Lanka, Switzerland, Slovak Republic, South Africa, Thailand, Trinidad and Tobago, Tunisia, Turkey, United States, and Venezuela.

For a discussion of the results of the GATS in promoting services liberalization, see Hoekman and Primo Braga (1996).

References


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Advances in telecommunications and informatics have transformed the Internet from an academic experiment into a household name in most industrial countries. The number of computers connected to the Internet grew from 535,000 in July 1991 to close to 16 million by January 1997 (figure 1), and it is estimated that the number of Internet users has already exceeded 50 million. Although still concentrated in industrial countries, this "network of networks" is rapidly expanding in the developing world. Many now believe that it provides a window into a future in which access to information will be independent of geographic location and interactivity in a multimedia environment will be ubiquitous.

This Note briefly reviews the history of the Internet and its evolution from an academic experiment into the main application behind the emerging global information infrastructure. It discusses the role of the private sector in these developments and the regulatory environment required for the Internet to fulfill its promise. It concludes with some lessons for expanding the Internet in developing countries.

The rise of the Internet

The origins of the Internet can be traced to the 1960s, when the U.S. Department of Defense decided to fund the development of a packet-switching data network that would allow networked computers of different sizes and types to communicate efficiently. In packet-switching networks, data files are broken into small packages that are sent independently over the network and then reassembled at the final destination. This permits efficient use of communications lines because, unlike circuit-switching, an architecture typically used for voice telephony, it does not require an open, or point-to-point, connection. Packet-switching allows many users to share a circuit, with no particular connection dedicated for a given communication session. Moreover, it increases the network's reliability, allowing it to operate even under catastrophic conditions (for example, amid a nuclear war).

The resulting network, Arpanet, began operation in 1969, linking four sites. In the 1970s, other government-supported networks emerged in the United States, but access remained restricted to the research community connected with the Department of Defense and other...
government agencies. This changed in 1986 with the creation of the NSFNet, also subsidized by the U.S. government. The idea of the NSFNet was to provide high-speed backbone services connecting regional networks as well as campuses and research centers. The network of networks communicating through the Internet protocol began to expand rapidly.

In the early 1990s, the management of the NSFNet backbone was subcontracted to private firms, which were allowed to route commercial traffic through the Internet. The explosive demand for network service in the 1990s—mainly from the private sector—led to the emergence of several commercial Internet backbone networks (such as Alternet, PSNet, and SprintLink), and in October 1995, the NSFNet backbone was shut down. U.S. government subsidies for the Internet have fallen to an insignificant amount, and almost all the costs of the Internet are now borne by its users.

Supporting the explosive growth of the Internet and of the demand for Internet services have been the rapidly evolving network architecture and user interfaces. This technology has benefited from the decline in computing costs relative to transmission costs. On the user side, the growth of the Internet has been promoted by the appearance of powerful programming languages, new network "tools," and user-friendly interfaces. The World Wide Web, a sophisticated application that allows users to access any kind of digitized information (text, picture, sound, video) and configure it for display with a mouse click, has given multimedia capabilities to the Internet. The growth of the Web has been astounding: between June 1993 and January 1997, the number of Websites leapt from 130 to roughly 200,000. Fostered by the improving multimedia capabilities, commercial use of the Internet overtook research and educational use and has been growing exponentially in the 1990s (see figure 1). By January 1997, there were close to 4 million hosts in the .com domain. The private sector has clearly taken the driver’s seat in providing both the Internet’s infrastructure and its content in the United States.

**Regulation**

The Internet has blossomed in a relatively regulation-free environment. Most regulatory activity has concentrated on defining standards for the formats and protocols necessary to operate the network. But as the commercial presence on the Net increases, regulatory issues relating to the provision of the network’s infrastructure and services become increasingly important. The development of a regulatory framework is critical in three areas: provision of Internet backbone access; Internet service providers (ISPs); and information services.

The Internet backbone servers are the highest-level network servers—those to which ISPs pay connection charges. The basic regulatory options are to provide public support for backbone access to promote connectivity or to leave backbone service provision to the market. As mentioned, the original backbone in the United States, NSFNet, was government-funded until rapid growth in networking demand led to the
emergence of commercial backbones. A similar pattern can be found in other industrial countries. In Germany, for example, the first Internet backbone—UNIDO, for Universität Dortmund—was run by the university and later replaced by commercial backbones.

ISPs provide Internet services to the end users. In the United States, ISPs are competing private firms. In other countries, the major ISP is the state-owned telecommunications operator, often a monopoly. Regulatory options for ISPs depend on the market structure in telecommunications. In many cases, the telecommunications operators are well positioned to provide Internet services. But it is worth pointing out that OECD countries with more competitive telecommunications sectors tend to have greater Internet connectivity than countries with a monopoly (figure 2).

Policymakers have to decide whether telecommunications network operators should be permitted to offer information services in direct competition with independent information service providers. As a rule of thumb, if a telecommunications operator has market power in the transport network, structural or at least accounting separation should be required to avoid anti-competitive cross-subsidization. In other words, the Internet services unit of the operator should be required to buy access to the transport network on an “arm’s-length” basis. Another, very sensitive issue is voice telephony over the Internet, which may become a serious threat to the traditional circuit-switched network.

### Appropriability of content

Digitized information can be easily reproduced and redistributed on the Internet, and providers of information find it difficult to charge users directly. Most private content providers recover costs indirectly—by providing information to potential customers about other goods and services. The indirect incentive structure is strong given the low cost of disseminating information on the Internet relative to the number of users and the bright future prospects of the Internet. But the conventional remedy for the cost recovery problem is intellectual property rights protection. Copyright, for example, protects an author’s work—whether a book, a performance, a recording, or a computer program—from unlicensed copying. In principle, traditional copyright

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**Box 1: Intellectual Property in Cyberspace**

The rise of the Internet gives new relevance to the issue of extra-territoriality and increases the demand for convergence among national intellectual property rights regimes. The Internet not only opens new possibilities for dissemination of information; it also expands the scope for activities that may infringe on someone’s intellectual property rights. With a few keystrokes, an Internet user can anonymously download copyrighted material in bulletin boards around the world. Prosecuting Internet service providers can discourage infringement, but it may inhibit the expansion of the value added services that make the Internet so powerful.

The most important international treaty on copyright protection is the Berne Convention for the Protection of Literary and Artistic Works of 1886, which provides for national treatment of domestic and foreign copyright holders and sets minimum standards for copyright protection. The World Intellectual Property Organization (WIPO)—a specialized United Nations agency that administers the Berne Convention—held a diplomatic conference in December 1996 to revise the convention and to clarify the scope of copyright protection in the digital environment. The main outcome of this conference was the WIPO Copyright Treaty. This treaty makes clear that the reproduction rights of copyright owners encompass the right to make digital copies. But its language is broad enough to allow national legislation to limit (or remove) liability at the level of network providers with respect to, for example, temporary digital storage. The treaty thus achieves a balance between the concerns of content providers and those of content carriers.

law applies to the Internet environment. But such major industrial economies as the United States and those in the European Union have revised or are now revising their intellectual property rights laws to address specific needs of electronic networks. Moreover, the global character of the Internet demands international legal governance (box 1).

An important problem in legal protection for copyright holders on the Internet is enforcement, given the speed and magnitude of data transmission. This is an area where digital rights management technologies can be of help. These hardware and software devices control access to information and the ability to use and further distribute it. In principle, these “encryption” technologies are attractive because, unlike intellectual property rights, they can provide digital protection across national boundaries. Increasingly sophisticated digital rights management technologies are becoming available on the World Wide Web. But national security reasons have been invoked to limit the dissemination of cryptographic capabilities. The United States has been trying to address the national security issue by promoting data encryption standards that can be broken by intelligence agencies and by controlling the export of encryption technology, restrictive measures that may inhibit widespread commercial use of these technologies.

A third way to recover costs is through the sale of advertising space on information pages. Commercial advertisements first appeared on the Web in 1994. Although this step toward pure commercial use of the Internet initially
met with strong resistance from the research and education communities, growth has been rapid, and advertising revenues are estimated to have exceeded US$250 million in 1996.

**Internationalization**

Although the Internet is still most widely used in the United States, the 1990s have been marked by its rapid internationalization. The share of non-U.S. hosts increased from 20 percent in July 1991 to 36 percent in July 1996. But most non-U.S. hosts still reside in industrial countries, and in July 1996, roughly 96 percent of all Internet hosts were in OECD countries.

Most developing countries are connected to the Internet—if only through email—though penetration is still low (figure 3). In 1996, there was on average only 0.5 Internet host per 10,000 inhabitants in developing countries, compared with 101 in industrial countries. The low penetration is due mainly to the poor information infrastructure in developing countries—the roads and ports that carry and process digitized information. Average teledensity (telephone lines per person) is thirteen times lower, and average PC density thirty-eight times lower, than in industrial countries.

For developing countries, establishing the right regulatory environment is as critical as it is for industrial countries—though the relevance of the regulatory experience of industrial economies discussed above is open to debate for countries with poor telecommunications networks, low computer penetration, and inefficient, state-owned telecommunications monopolies. But a few developing countries have managed to rapidly expand Internet connectivity despite weak information infrastructure, such as Brazil, Chile, the Czech Republic, Malaysia, Mexico, and South Africa.

Brazil, for example, successfully adopted a model of public-private partnership to diffuse the Internet, and it has increased Internet connectivity despite its dominant state-owned telecommunications operator. Recognizing the economic benefits of electronic networking, the Brazilian government supports an Internet backbone open to commercial connectivity and traffic while limiting the dominant carrier's activity in the direct provision of Internet services to the public. The number of Internet hosts in Brazil (.br domain) grew from 300 in January 1992 to more than 50,000 in July 1996, of which some 20,000 are commercial (.com.br domain). By the mid-1990s, Brazil had a higher ratio of Internet hosts to PCs than such economies as France, Germany, Hong Kong, and Singapore.

There are, of course, many obstacles to the diffusion of the Internet in developing countries. National laws regarding privacy and intellectual property rights protection must be refined. And the predominance of English-language content may deter local researchers or local firms that could use the Internet to add value to their goods and services.

The critical bottleneck, however, continues to be the weak information infrastructure of developing countries. Government activism to promote Internet connectivity at the level of the research and education communities may help jump-start the national information infrastructure. And governments should support community access in public libraries and community centers. But an increasingly important role for governments in fostering the Internet revolution is that in the regulatory arena. Most important here is to promote a competitive environment for Internet service providers, establish adequate rules of the game for electronic
commerce, and ensure effective incentives for the provision of content—essential measures for attracting private investment in the infrastructure and in content generation. Those countries able to attract such investment will be better positioned to benefit from the emerging global information infrastructure.

1 This understates the number of commercial hosts, since the .net domain (with more than 1.5 million hosts) and some of the country domains also include commercial hosts.

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The Restructuring and Privatization of the U.K. Electricity Supply—Was It Worth It?

David M. Newbery and Michael G. Pollitt

The electricity supply industry in England and Wales was under public ownership from 1948 to 1990. For most of this period, a single company, the Central Electricity Generating Board (CEGB), operated all generation and transmission as a vertically integrated statutory monopoly, while twelve area boards acted as regional distribution monopolies. The CEGB during this time was a classic example of a cost-of-service regulated public utility—with excessive capital costs, overdependence on high-cost indigenous coal and nuclear power, low productivity growth, and low return on assets.

In 1990, the CEGB was restructured and privatized. What were the costs and benefits? The question is important not only because the CEGB accounted for such a significant share of economic activity—with value added equal to about 1 percent of GDP—but also because its restructuring was a key part of the “British electricity experiment,” which has provided a model for power sector reform around the world. This Note reports the results of a social cost-benefit analysis of the restructuring and privatization of the CEGB.

The reform

The restructuring of the CEGB involved dividing it into four successor companies on March 31, 1990—three of which were soon sold to the general public—creating a power pool, and liberalizing entry into the generation market. The three privatized companies are National Power and PowerGen, which took the thermal generating plant, and National Grid, which was allocated the high-voltage transmission network. Nuclear Electric took the nuclear power stations.

Significant changes followed. In the first six years after restructuring, labor productivity in the successor companies more than doubled. There was a marked shift away from coal and toward natural gas. At privatization, generation based on fossil fuel used 92 percent coal, 7 percent oil, and only 1 percent gas. In the next five years, purchases of British coal fell from 74 million metric tons to 30 million, and by August 1996, gas accounted for 23 percent of generation. In the meantime, the price of coal delivered to power stations fell by 20 percent in real terms. The switch from coal and the “dash for gas” contributed to a substantial drop in emissions of sulfur dioxide and nitrogen oxides, both sources of acid rain, and of carbon dioxide, the cause of global warming.

The power generation sector added 9.5 megawatts of capacity in combined cycle gas turbines (nearly 20 percent of peak demand) in 1990–96, while demand rose less than 6.5 percent; of the new capacity, half was installed by new entrants. Fossil fuel costs per kilowatt-hour (kWh) of electricity generated fell by 45 percent in real terms as a result of fuel switching and efficiency increases, while nuclear fuel costs per kWh fell by 60 percent. Overall, real unit costs fell by about 50 percent, while real pool prices fell by a more modest 20 percent, with the difference between the two figures reflecting the lack of competition among generating companies.

Some of these positive changes could be attributed to external factors. The timely development of high-efficiency combined cycle gas turbines, the lifting of the European Union (EU) ban on burning gas to generate electricity, and tighter EU limits on sulfur emissions all encouraged the switch to gas, and the decline in
international coal and oil prices and in the domestic price of gas contributed to the reduction in unit costs.

The restructuring and privatization were not without costs. The “dash for gas” greatly accelerated the decline of the coal industry. Employment fell from nearly 250,000 miners at the time of the 1984–85 coal miners strike to only 7,000 by 1994. The collapse of the British coal market was the subject of a Parliamentary inquiry. Partly in response to that inquiry, policy toward the still publicly owned nuclear generation industry was reviewed, plans to build more nuclear power stations were abandoned in early 1996, and the nuclear industry was restructured. The more modern nuclear power stations were sold as British Energy in June 1996, leaving only the rump of aging first-generation Magnox stations and the fuel reprocessing facilities in the public sector. The coal industry was privatized at the end of 1994.

A social cost-benefit analysis

Studies have used several methods to assess the economic effects of privatization on formerly state-owned companies, including financial performance analysis, labor and total factor productivity analysis, frontier efficiency measurement, and social cost-benefit analysis. Although all these methods are of interest, only a full social cost-benefit analysis identifies who gained, who lost, and by how much—by comparing the historical and predicted future course of an industry after privatization with a counterfactual in which the industry remains unprivatized. Jones, Tandon, and Vogelsang (1990) set out this method, and Galal and others (1994) apply it to twelve privatizations, two of which involved Chilean electricity companies.

In simple terms, the analysis reduces to a project appraisal, in which restructuring and privatization are an investment project that has associated costs (redundancy payments, brokers fees) and creates a stream of net benefits arising from the evaluated differences between the privatized industry and a counterfactual publicly owned industry. The costs and benefits continue into the future, so the method involves projecting into the future both the actual outcomes and the counterfactual.

The social cost-benefit analysis of the CEGB’s restructuring and privatization proceeds in two stages: first the net benefits of the restructuring and privatization are calculated, then these benefits are apportioned among shareholders, the government, and the power purchasers in the pool or wholesale market (the distribution companies and the supply businesses of the generating companies) to see how the gains are distributed. The first stage of the analysis values four areas of net benefits and costs separately: the efficiency savings, the investment and fuel use effects, the costs of reorganization, and the environmental benefits. In each area, it establishes a set of counterfactuals with which data or projections for the actual industry are compared. The start date from which the effects of restructuring and privatization are evaluated is a weighted average of the years 1985–88. Actual data are available until March 1996, and projections are made to 2010.

To allow some sensitivity analysis for the more debatable issues, two counterfactuals are used. One is labeled proprivatization because the underlying assumptions about the industry under continued public ownership are more pessimistic than under the other counterfactual and so it suggests greater net benefits from privatization. The other counterfactual is labeled proCEGB because its more optimistic assumptions about the industry under continued public ownership point to smaller net benefits from privatization. The counterfactuals incorporate three key items: Productivity growth is lower in both counterfactuals compared with the actual, but slightly higher under pro-CEGB than under proprivatization. Gas and coal prices are the same as actual under pro-CEGB but higher under proprivatization. And under both counterfactuals, the CEGB invests in uneconomic nuclear capacity and retrofitting of some coal plant with flue-gas desulfurization units, but under proprivatization it builds more nuclear and coal plant and does more retrofitting. The counterfactuals are based on reports
of the CEGB before privatization and an analysis of the CEGB’s performance in the decade before restructuring. The proprivatization counterfactual is probably closer to what would have happened in the absence of privatization.

The results

What does the analysis show about the net benefits? The fuel and investment effects of the privatization range from gains of £3.6 billion to losses of £0.7 billion (at the U.K. public sector’s preferred 6 percent discount rate), depending on assumptions about how a utility under continued public ownership would have invested in new capacity (table 1). The net gains from privatization are higher relative to the proprivatization counterfactual; the gains come from the ending of the expensive nuclear expansion program that might have seen two new nuclear power stations built and the sharp switch from expensive British coal to cheaper natural gas for electricity generation.

Regardless of the counterfactual used, some of the benefits of privatization are dissipated in higher payments to Electricité de France (EdF), the French utility, for its cheap electricity imports. This happens because before privatization EdF had received a price equal to the average of the marginal costs of the two systems (a price lower than the system marginal cost in England and Wales), while since privatization it has received the pool price (which is at or above system marginal cost) plus a share of the fossil fuel levy paid to non-fossil fuel generators (introduced at the time of privatization to finance decommissioning at Nuclear Electric). If privatization had not occurred in the United Kingdom, the payment terms would not have changed to the benefit of EdF.

Against both counterfactuals, privatization yields substantial environmental benefits as cleaner gas generation replaces older coal-fired plant and thermal efficiencies rise at the remaining fossil fuel plant, leading to sharply reduced emissions. The figures in table 1 are conservative estimates of the environmental benefits, which include unmeasured improvements in nitrogen oxide emissions and benefits from reduced coal burning.

The restructuring and privatization have high direct costs, £2.8 billion. This figure includes all the restructuring costs of the successor companies, including substantial redundancy and early retirement payments. But the restructuring and privatization deliver unambiguous benefits in lower operating costs (£8.8 billion relative to proprivatization, £7.6 billion relative to pro-CEGB). The difference reflects the lower labor and materials and services costs that the restructuring and privatization deliver—gains difficult to imagine under a counterfactual publicly owned CEGB.

<table>
<thead>
<tr>
<th>Fuel and investment effects</th>
<th>Relative to proprivatization counterfactual</th>
<th>Relative to pro-CEGB counterfactual</th>
</tr>
</thead>
<tbody>
<tr>
<td>End of nuclear expansion program</td>
<td>3.3</td>
<td>2.8</td>
</tr>
<tr>
<td>Effect on price of French imports</td>
<td>-2.6</td>
<td>-1.5</td>
</tr>
<tr>
<td>Net fossil fuel costs</td>
<td>2.9</td>
<td>-2.1</td>
</tr>
<tr>
<td>Total</td>
<td>3.6</td>
<td>-0.7</td>
</tr>
</tbody>
</table>

**Externality benefits**

| Reductions in sulfur dioxide emissions (£125 per metric ton) | 1.0 | 0.7 |
| Reductions in carbon dioxide emissions (£12 per metric ton of carbon) | 1.4 | 1.2 |
| Total | 2.3 | 1.9 |

**Restructuring**

| Costs | -2.8 | -2.8 |
| Cost savings | 8.8 | 7.6 |
| Total | 6.0 | 4.8 |

**Total net benefits**

| | 11.9 | 6.0 |
| Total net benefits (pence per kWh) | 0.21 | 0.09 |

Source: Authors' estimates.
TABLE 2 DISTRIBUTION OF THE NET BENEFITS OF PRIVATIZING THE CEGB, WITH PRICES CONVERGING IN 2000
(£ billions at 1994–95 prices; discounted to April 1995; excluding externalities)

<table>
<thead>
<tr>
<th>Beneficiary</th>
<th>Relative to proprivatization</th>
<th>Relative to pro-CEGB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power purchasers (wholesale)</td>
<td>-1.3</td>
<td>-4.4</td>
</tr>
<tr>
<td>Government (including sales proceeds)</td>
<td>1.2</td>
<td>0.4</td>
</tr>
<tr>
<td>Shareholders (less sales proceeds)</td>
<td>9.7</td>
<td>8.1</td>
</tr>
</tbody>
</table>

Source: Authors’ estimations.

The overall net benefit of the privatization is substantially positive relative to both counterfactuals: £11.9 billion and £6.0 billion. These figures may be converted to permanent savings in the unit cost of electricity of 0.21 and 0.09 pence per kWh at a time that electricity prices were about 2.8 pence per kWh. Thus, privatization delivers a permanent cost reduction equivalent to about 3.2 to 7.5 percent of prices, or an extra 40 percent return on assets.

How has this net benefit been distributed among shareholders, purchasers in the wholesale market, and the government? Examination of price trends shows that wholesale prices have not fallen nearly as fast as costs and that profits have risen sharply in the successor companies: combined profits (before taxes and exceptionals) rose from £2.0 billion in 1991–92 to £3.5 billion in 1995–96. The share prices of National Power and PowerGen have approximately tripled since flotation, outperforming the stock market by more than 100 percent. Thus, the companies seem to have unambiguously gained from the privatization. Power purchasers seem to be paying higher prices than they would have under continued public ownership (higher company profit margins offset lower costs). And the government has gained from sales revenue, higher taxes on profits, and dividend income, though it has lost the revenue associated with the public sector dividend target for the CEBG.

Table 2 shows one possible calculation of the distribution of the net benefits of privatizing the CEBG. In it prices in the privatized industry and the counterfactual publicly owned firm converge in 2000. The study assumes that regulation would ensure long-run convergence of predicted and counterfactual prices. The results of the calculation show the perverse nature of the distributional effects of the privatization. The government’s substantial sales revenue (£9.7 billion) up to March 1996 is at least partially offset by loss of flow revenue, because tax revenue from the successor companies falls below the public sector dividend target. As a result, the government is £1.2 billion better off relative to proprivatization if prices converge in 2000. Relative to both counterfactuals, the shareholders benefit by more than the total net benefit, even after the sales proceeds paid to acquire the assets are subtracted.

Conclusion

Was it worth it? Yes, but the analysis suggests two major areas for improvement in the process of the restructuring and privatization. First, about a quarter of the net gains were transferred out of the country because of the change in payment arrangements for French electricity. If more attention had been paid to this possibility at the time of restructuring, some arrangement could probably have been found to prevent it. Second, introducing more competition in generation (by creating more successor companies) would have reduced excess entry and lowered prices, improving the distribution of the net benefits and increasing social welfare.

References


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Regulatory Lessons from Argentina’s Power Concessions

Antonio Estache and Martin Rodriguez-Pardina

Argentina’s main purpose in reforming its electricity sector was to achieve efficient pricing and production levels in the short term and an investment level sufficient to meet demand in the longer term. That required a major restructuring of the sector. It started in 1989 with a revamping of the legal framework, followed by the first implementation in 1992, and is still under way. The results have been impressive by any standard (table 1). But as in any complex reform, there are some loose ends, with the incentives for efficient long-term investment probably the most important one. This Note reviews the regulation of the price chain—through generation, transmission, and distribution—and looks at the implications for long-term investment.

Sector organization

The strategy adopted was to vertically separate the industry into generation, transmission, and distribution activities. Generation, considered a competitive activity, was broken up into twenty-five business units that were sold separately to private owners. The core of the reform in generation was the creation of a spot market open to any generator. The spot market matches supply and demand with an hourly price and allows distributors and large users to buy from any provider they choose.

Unlike generation, transmission is considered a natural monopoly, because costs are minimized when only one firm delivers the service in a given area. Although competition in operation would be inefficient, the government introduced competition for the market by auctioning contractual rights to deliver the services. Built into these (concession) contracts is another periodic competitive threat—to replace the concessionaire with a challenger. This threat obliges the incumbent to be efficient once the contract has been awarded and helps to keep transmission costs to a minimum. The main transmission company, Transener, and four of the five regional transmission companies have been privatized.

There are twenty-two main distribution companies—most under provincial government jurisdiction. Like transmission, distribution is considered a natural monopoly in a given area—although distributors buy electricity in a competitive spot market and face competition from large users, which are allowed to bypass distributors and purchase directly on the spot market. The federal government has awarded exclusive concession contracts for the three largest distributors, which serve the Buenos Aires area and together buy almost 60 percent of Argentina’s electricity consumption. Many of the provincial companies are still to be sold.

<table>
<thead>
<tr>
<th>Year</th>
<th>Spot price ($/MWh)</th>
<th>Thermal availability (percent)</th>
<th>Distribution losses (percent)</th>
<th>Transmission forced outages (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>41.85</td>
<td>48.2</td>
<td>21</td>
<td>1,600</td>
</tr>
<tr>
<td>1993</td>
<td>32.12</td>
<td>59.8</td>
<td>20</td>
<td>900</td>
</tr>
<tr>
<td>1994</td>
<td>24.99</td>
<td>61.3</td>
<td>18</td>
<td>650</td>
</tr>
<tr>
<td>1995</td>
<td>22.30</td>
<td>69.9</td>
<td>12</td>
<td>300</td>
</tr>
</tbody>
</table>

Note: The generation data for 1992 are unweighted averages for October–December only (privatization occurred over the period between mid-1992 and mid-1993). Distribution data are for Edesur (privatized in September 1992). Transmission data are for Transener (privatized in July 1993). MWh is megawatt-hour.

Source: Cammesa, Enre, and company annual reports.
Tariffs and investment

All the concession contracts for transmission and distribution have a similar design. The concessionaires have the right to operate the assets and collect the revenues. In return, they must meet specified service, operational, and maintenance quality standards and comply with certain limitations (table 2). The contracts also are the main instrument for regulating transmission and distribution activities. The most important part of this regulation is tariff design, which has a crucial link with investment incentives. In this case, tariffs are based on economic costs, with a price cap formula and a system of sanctions applied to protect users against declining quality of service.

Investments in generation

Generation investments are decided independently by firms. So the type and size of new equipment depend on private profit forecasts. How does the present regulatory environment ensure that generators make the right decisions in an open, competitive market separated from the downstream firm? In a competitive market, investment decisions are motivated by price signals, which provide sufficient information to managers about users’ willingness to pay and to users about scarcity. For a socially optimal outcome, an investment decision must be motivated by a positive difference between short-run and long-run marginal costs. So, for the private decision to coincide with the socially optimal decision, prices must meet two conditions: (1) they must exactly reflect short-run marginal costs, and (2) they must accurately signal to the firm the long-run marginal cost.

It is not clear that prices in Argentina’s spot market fulfill these two conditions (see the generation tariff principles in table 2). First, the marginal cost pricing essentially reflects the cost of fuel—not, as it should, the entire marginal operating cost. Second, although Argentina’s tariff includes a capacity payment to generators to provide a signal for long-run investment decisions, the allocation rules on who gets these payments may be biased toward base load generation with too few peaking plants. There may also be a bias toward hydro plants, as generators have strong incentives to underinvest in units requiring huge sunk costs. This bias has also been observed in the United Kingdom.

Under the institutional arrangements in the Argentine electricity sector, this bias could be corrected by coordination between generators and distributors. In other countries, an alternative would be internalization through the transmission operators, since they are the essential link in the system. This solution would imply an explicit recognition of the natural regulatory features of the transmission company and would be best implemented under public ownership.

Investments in transmission

For now, the high-voltage network concessionaire, Transener, is not responsible for decisions to build and finance new lines. This arrangement keeps the monopolist from being in charge of the network, which would have given it exorbitant power over upstream and downstream activities. The operator earns a fixed remuneration (for connection, transmission capacity, and energy transported) to ensure that there is no distortion in the spot prices of electricity or in the prices fixed by contracts (table 2). But with this cost-plus pricing, the operator has few direct incentives to invest; the indirect incentives are the penalties it must pay if it fails to meet the service quality standards set by the concession contract.

Who then pays for investment in transmission? All users of the grid (generator, distributors, and large users) pay connection and variable energy charges. The energy charges are paid through node prices that reflect short-run marginal costs in the network (including losses and congestion). As congestion increases, node prices fall for generators and rise for distributors and large users, creating an incentive to build new capacity. Expansion decisions should be made—and paid for—by the potential beneficiaries. But the current expansion rules fail
### TABLE 2  ELECTRICITY REGULATION IN ARGENTINA

<table>
<thead>
<tr>
<th>Regulation</th>
<th>Generation</th>
<th>Transmission</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Term</td>
<td>Not applicable.</td>
<td>Concessions are for 95 years. Term is divided into management periods of 10 years (except for a first term of 15 years). At the end of each period, the regulator rebids the concession.</td>
<td></td>
</tr>
</tbody>
</table>
| Obligations and limits | • Open entry and exit.  
• To join the spot market, generators must agree to certain technical and commercial rules.  
• No performance standards.  
• No public sector control over investment.  
• Operate and maintain existing system with no obligation to expand.  
• Allow nondiscriminatory access to capacity to any agent in the spot market.  
• Maintain specific quality standards:  
  - In technical product (voltage variations).  
  - In technical service (duration and frequency of interruptions).  
• Do not buy or sell energy.  
• Meet demands for service in concession area.  
• Allow third parties to use the system in exchange for a regulated tariff.  
• Meet specific standards:  
  - In technical product (voltage variations).  
  - In technical service (duration and frequency of interruptions).  
  - In commercial service (customer complaints and the like). |
| Tariff principles | • In the spot market, generators receive a uniform tariff at the point of delivery based on the economic costs of the system. The tariff is based on estimated hydroelectric production, the probability of system failure, and a ranking of generators by marginal cost. The hourly spot price for the wholesale market is determined by the fuel cost of the last unit in operation, after ranking the generators in decreasing order of efficiency.  
• Capacity payments are not included in the spot price, but are charged separately at a rate of US$10 per megawatt-hour—an administered price set by the secretariat of energy.  
• Tariff design must permit firms to operate prudently and economically and to generate enough revenue to cover reasonable operational costs, taxes, amortization, and a rate of return set by formula (based on efficiency, operational performance, and returns to firms facing similar risks).  
• Tariffs should be differentiated to reflect the costs of different services, form of delivery, location, and any other relevant factor specified by the regulator.  
• Tariffs must guarantee the minimum reasonable price to users while ensuring reliability of supply.  
• To ensure correct economic signals to users, prices are determined by the cost of energy transported, connection charge, and cost of transport capacity.  
• The concessionaire then receives a stable tariff reflecting the expected average prices at connection nodes over the next 5 years.  
• The price to users must separately identify the cost of electricity from the spot market.  
• When large users (those with demand over 100 kilovolts) go directly to the wholesale market, their fee is uniform but must include the cost of transport. |
| Type of regulation | • The single market price is determined by the costs of the last unit called on to generate electricity.  
• The costs recognized for each unit are based on fuel cost and specific consumption.  
• $RPI - X, X = 0$ for first 5 years.  
• Semiannual indexation to U.S. price index: 67% PPI, 33% CPI.  
• Tariffs are set in U.S. dollars.  
• $RPI - X + Y, X = 0$ for first 5 years.  
• Maximum price with total pass-through of energy costs in spot market ($Y$) and indexation to U.S. price index ($X$) as in transmission.  
• The RPI formula is applied to the specific tariff structure.  
• Tariffs are set in U.S. dollars. |
in that they recognize beneficiaries only on the supply side—the generators. The generators have argued for some time that those on the demand side—distributors and large users—also should pay for expansion, since they would benefit. Until recently, all parties had an incentive to wait for someone else to pay. Since transmission is the mechanism that guarantees competition in generation and supply, the resulting underinvestment is a worry. In May 1996, a potential crisis was averted by a decision of the secretary of energy to allow a special fund (Salex) to finance (rather than simply reimburse firms for) about US$80 million of the US$250 million needed for expansion. The generators will pay the rest. This is a short-term fix but no long-term solution. What is needed is a change in the definition of the beneficiaries of expansion.

This problem is not unique to Argentina—any country considering a vertically separated industry and market-oriented approaches to the delivery of electricity will have to address it. There is no clear, simple conceptual solution. To allow competition in generation, there must be third-party access to transmission lines. But that gives a transmission line the characteristic of a public good: several firms can use it without impeding its use by others, so no firm wants to pay its fair share. The incentive to free ride is what makes financing difficult.

Because a private user of the line will not internalize all the potential investment gains to get an efficient level of investment, property rights to the lines must be allocated by an entity with some responsibility for social concerns. This entity also needs power to prevent free riding. A short-run solution for Argentina could be to give these responsibilities to Enre, the federal regulator, making sure that the decision-making process is based on public hearings and that the secretary of energy is viewed as the arbitrator in case of conflict. To solve free riding problems in investment, this entity should have the power to exclude “bad” agents (free riders) from using new investments. To prevent abuses, there should be an implicit qualified majority rule in the investment decision-making process.

**Investments in distribution**

Decisions to invest in distribution are in principle left to the concessionaire. Yet because the concessionaire has a contractual obligation to provide service to anyone requesting it at the set tariff, the government has some leverage in the decisionmaking through the design of tariffs and penalties. The government has designed these incentives well: the tariff and penalty system in the concession contracts has prompted the distribution companies to expand their networks to the point at which the marginal cost of expansion equals the marginal cost of penalties. (The marginal cost of penalties includes the revenue generated by additional users of the system.) Thus, overall, the model warrants consideration by provincial governments in privatizing their distribution companies.

**Conclusion**

While Argentina’s power sector reforms have been impressive, some fine-tuning is needed to address investment distortions. In generation, concession contracts need to include a more comprehensive definition of short-run costs, and the capacity charge should be revised to more accurately signal long-run marginal cost pricing. In transmission, the main problem is that the definition of beneficiaries responsible for financing new lines excludes those on the demand side and is likely to result in suboptimal investment decisions.


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Brazil's electricity sector, one of the largest in the world, is made up of more than sixty-five, mostly vertically integrated, federally and state-owned monopolies. The most pressing problems in the sector are excessive operational costs—estimated to be 20 to 30 percent too high on average—and large investment needs in the face of rapidly growing demand and very limited public finance. Both of these problems can be addressed through more competition and more private participation in the sector. Competition would lower costs and thus reduce the need for politically costly tariff increases to finance investment needs. And opening the sector to private participation and ensuring competition under transparent, equitable operating and pricing rules should generate the resources to meet investment needs.

While the shape of reform in the sector has yet to be finalized, there is a consensus among federal and state policymakers and key operators that the sector's potentially competitive segments—generation and supply—should be separated from its natural monopoly segments—transmission and distribution—and awarded as concessions or sold to private investors. There is also a consensus that there should be a single, publicly owned transmission entity, that dispatch should be centralized, that prices should reflect opportunity costs, and that cross-subsidies should therefore be unraveled. But formidable political challenges remain—not the least of which, given the complex web of ownership in the sector, is getting overall agreement on the details between the federal government and the states. There are important technical challenges too. One set of challenges relates to competitive generation. The proposed unbundling of the sector parallels the reform model in Argentina, Chile, Colombia, and the United Kingdom. But while these countries have thermal-based systems, Brazil's electricity sector is largely hydro-based, requiring a different set of rules to make competition work in the wholesale generation market. There are two main issues. First, to ensure open entry and the long-term viability of competition in the electricity sector, the government must figure out how to competitively allocate water rights. Second, to provide incentives for investing in generating capacity, a pricing system must be put in place that will ensure recovery of the high sunk capital costs characteristic of hydro systems.

This Note describes a consistent approach for overcoming the technical challenges to effective competition in the generation market, using incentive-based organization and regulation.

**Open entry**

The most pressing requirement for ensuring the long-run viability of competition in hydro generation is devising a way to allocate and enforce water rights. In Brazil, the government owns all water rights. Because monopolistic ownership of primary energy sources allows the owner to appropriate the rents of all downstream activities, there should be competition for the right to use these water rights rather than for the right to own or control them. When a power generation company owns the water rights, this constitutes an entry barrier to new generators, because when analyzing the construction of a new plant, the incumbent will
internalize the impact on its existing plants. Thus, one mistake that must be avoided is selling the water rights as part of the existing companies, as was done in Chile.

Public bidding seems to be the best approach to franchising water use rights, and Brazil has already advanced in this direction through its public service concessions law, which requires public bidding for all hydropower potential of more than 10 megawatts. The law accepts either of two criteria for awarding bids to achieve efficiency in the allocation of water resources—the lowest asking price for energy, which allows different prices for different plants, and the highest payment for water use, which leads to a single price set by the market. But to optimize competition, Brazil should choose the highest payment for water use because it results in a single price for all plants. At the same time, Brazil should allow no preferences for or discrimination against different types of bidders—including generating companies, industrial self-generators, and distribution companies.

An important benefit of such competition is that it allows the market to decide when, how much, and what type of generation is needed. In Argentina and the United Kingdom, for example, the increasing share of gas generation, which involves lower capital costs and shorter construction time, is probably an outcome of granting free entry to the generation market. This diversification of primary energy sources can help reduce the expansion costs of a rapidly growing system. Thus, new energy sources should be allowed to compete on equal footing with hydro generation.

**Cost recovery**

Optimal dispatch in a hydro system does not depend only on the demand and the available capacity at a particular moment (as in the economic merit order dispatch conceived for purely thermal systems). It also has to take into account the intertemporal problem posed by water storage—whether to use water now or save it for future use. Water in a reservoir has an opportunity cost set by future prices (or costs) and the probability of overflow (once the reservoir is full). When storage capacity is full, and for run-of-river power producers, the opportunity costs are nil and water must be run through the turbines or spilled. Thus, to determine the optimal use of water today requires simulating the evolution of the system in the future. The length of the simulation period depends on the storage capacity of the system—in Brazil, the horizon for simulation is five years. The difficulty of projecting demand patterns, rainfall, equipment failures, and the like for such a long period makes the problem of hydro dispatch a very complex one to address through market mechanisms.

Another complicating factor in the Brazilian hydro system and in many other hydro systems is that there are often several generating units on a single river, so that the generation capacity of one plant is influenced by the storage capacity of upstream generators. All this implies a strong interdependence of production costs across generators—which is why it is a good idea to have central dispatch for each interconnected system.

The predominance of hydro in the Brazilian electricity sector means that marginal prices can be very low over long periods, hindering the timely recovery of capital costs. Pricing rules such as those in Argentina, Chile, and the United Kingdom, which set energy prices at cost (or bid) of the marginal plant, would result in highly volatile prices in Brazil, ranging from zero to the costs of unserved energy as the system swings between excess water and drought conditions. Ensuring cost recovery in the Brazilian system therefore requires a different approach for setting dispatch rules.

*To provide incentives for investing in generating capacity, a pricing system must be put in place that will ensure recovery of the high sunk capital costs characteristic of hydro systems.*
Two markets for efficient competition in generation

Reconciling central dispatch with the desire to introduce competition and achieve cost recovery requires focusing competition not on the physical dispatch of energy but on relevant financial (contractual) arrangements. Thus, there should be two generation markets: a spot market and a contracts market. As in other power sector models, the spot market would be used to trade energy within a defined period (typically one hour) and would determine short-run marginal cost dispatch. Generators would recover their variable costs, excluding fuel costs, in this market. But unlike in thermal-based systems, generators would recover capital (and fuel) costs in the contracts market, and the price of the financial instruments traded in that market would be the price signal for investment.

The contracts market would work as follows. Generators would be issued firm energy certificates (FECs), which they would sell to distributors and large users. Each FEC would give the holder the right to obtain from the system a specified amount of energy. The certificates could be freely traded in the contracts market among generators, distributors, and large deregulated users, and distributors and large deregulated users would be required to hold FECs as a condition of access to the spot market. The basic idea is that, with the FECs, the generator sells its capacity to the system during a given period, rather than the energy produced during that period. The requirement that distributors and large deregulated users buy firm (contracted) energy as a precondition for purchasing energy from the spot market creates a market for the FECs. The requirement for purchasers in the spot market to hold FECs in direct proportion to the amount they want to buy solves the problem of creating incentives for users to buy all energy requirements on the spot market when marginal costs are very low, thus paying only variable costs and not contributing to the recovery of generators' fixed costs. The risk that buyers without FECs will make spot market energy purchases can be handled in different ways. One possibility is to simply prohibit these purchases. But this solution would require the central dispatch entity to keep track of existing FECs to see whether demand will be covered. An alternative that would require less monitoring is to impose a financial sanction on purchasers who withdraw energy from the system in amounts exceeding their holdings of FECs. If the sanctions are set at an appropriate level—for example, at the system's long-run marginal cost—and properly enforced, there will be no incentive for purchasers lacking the required FECs to buy unauthorized energy on the spot market. The proceeds from the sanctions can be divided among all generators in proportion to their firm energy.

To ensure that FECs are used properly and effectively in the market, they should be fully tradable until they are “cashed in” for immediate delivery. Agents in the market need to be able to freely buy and sell the certificates to accommodate their needs at any given moment. As in any financial market, paper transactions in the energy market are expected to exceed actual physical transactions by several times.

Implementation

This market structure implies that the contracts market should be completely independent of physical dispatch. But it may be difficult to convince the current dispatch managers of the need to delink the two. One possible enticement to persuade generators to transfer control over production decisions to the central dispatch entity is to provide them with entitlements to energy proportional to their contribution to the system. Because the central dispatch entity, seeking to optimize system operation, is bound to increase the amount of energy obtained from plants, each generator would receive entitlements at least equivalent to its own (isolated) physical contribution. These entitlements (FECs) could then be freely sold to purchasers in the contracts market. There should be no constraints on trading in these energy contracts by generators, distributors, large deregulated consumers, and brokers (if any). Trading could be organized in
a physical market (similar to a stock exchange) or on an over-the-counter basis, or it could be done through bilateral transactions, which would probably lead to the spontaneous emergence of some kind of centralized market.

**Summing up**

In the system described in this Note, costs could be recovered by requiring distributors to purchase sufficient amounts of firm energy to cover their expected demand as a precondition for buying energy on the spot market. This obligation would eliminate any free-riding by purchasers who would otherwise gamble on buying secondary energy in the spot market. The value of firm energy would be freely negotiated in this market and would signal any need for new generation capacity.

Distribution companies would be responsible for buying firm energy (in the form of FECs) to cover the forecast demand of their captive consumers. Once this obligation is met through the contracts market, the distributors could buy energy on the spot market. The cost of both contract and spot market purchases would then be bundled with the cost of distribution to set tariffs for retail sales to captive users.

Large users (those above a defined size threshold) could bypass the distributors to purchase their requirements directly on the contracts and spot markets. They would have to pay regulated tariffs for the related distribution service (use of wires) provided by the distribution company to which they are connected. Large users could also buy FECs in the contracts market and resell them to other large users or to distribution companies. But they could not provide distribution services, which is the exclusive right of distribution companies.

For this mechanism to be effective, an obligation would have to be imposed on distribution companies to serve all captive users in their concession areas. Setting the penalty for not meeting demand as a function of the value of lost load would send the proper signal on how much should be invested in new generation plants. As long as the cost of FECs is lower than the value of lost load, it is efficient to build a new plant. Because distribution companies act as representatives of their captive users, the value of lost load, which represents the maximum price users are willing to pay for the service (the reserve price), would have to be determined by the regulator through periodic reviews. New investment would occur up to the point at which the cost of new plants exceeds the reserve price.

The model proposed by this Note is not the only solution to the technical challenges of introducing effective competition in Brazil's power generation sector. Alternative solutions may well emerge from ongoing work. But the Note does outline one approach to developing an internally consistent set of reforms that recognizes the special characteristics of hydro-based electricity systems such as Brazil's and takes advantage of the benefits of incentive-based organization and regulation.

For more information, see Martin Rodriguez-Pardina and Antonio Estache, "Exploring Market Options for the Reform of Brazil's Electricity Sector" (Economic Note 12, World Bank, Latin America and the Caribbean, Country Department I, Washington, D.C., August 1996).

1 Some estimates put the losses associated with decentralized dispatch in Brazil as high as 18 to 20 percent of annual energy generation, representing a cost of US$1.2 billion a year.

2 Certificates are based on firm energy rather than capacity because hydro systems are energy-rather than capacity-constrained. The firm energy of a system is defined as the maximum amount of energy that it can produce without exceeding the predetermined loss-of-load probability (which in Brazil is 5 percent). For each generating plant, the firm energy is the contribution by that plant to the system's firm energy. To calculate the contribution of a plant requires running a simulation model for the entire system with and without that generator. The difference between the two results is the firm energy of the plant. This approach captures all externalities associated with the plant as part of its firm energy.

5 This kind of arrangement partially mimics the capacity-contract-based pool operating in New England.

4 If export trading of FECs is authorized (and it should be), any agent would be able to cover its position unless the system is short of firm energy— in which case the market price sends a signal to cut consumption in the presence of excess demand.

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The benefits from private participation in water and sanitation depend on the level of risk and responsibility the government hands over to the private sector. But strong government commitment and careful preparation are required if the private sector is to take on significant risks and responsibilities. A government about to enter into a concession contract for twenty-five or thirty years, for example, needs to be sure that it does not, in haste, gloss over details that will later land it in messy renegotiations, with loss of face to all concerned and reduced benefits to consumers. But governments often worry that detailed preparations take too much time. This Note, based on a set of World Bank toolkits compiled from experiences in involving the private sector in water and sanitation, reviews the essential factors in choosing a privatization option and argues that preparation pays dividends.

What makes the business special?

The activities of urban water and sanitation utilities range from impounding and treating raw water, to distributing water and collecting sewage, to treating sewage. In many ways, decisions about how to involve the private sector in these operations resemble decisions about privatization in any other utility sector. All such privatizations, for example, require decisions on how to set up an independent regulator and how to set and enforce service standards. But water and sanitation have special features that governments must take into account in choosing and designing a contract and in designing a supporting policy framework:

- Water and sanitation systems are characterized by a high degree of natural monopoly. Although competition is feasible in such limited areas as building capacity and providing plumbing services, it is difficult to achieve in distribution and collection, core activities in water and sanitation (table 1). So governments wanting to involve the private sector have been able to rely little on competition to assure good outcomes for consumers and have instead had to devise regulatory systems for this purpose.

### BOX 1 TOOLKITS FOR PRIVATE SECTOR PARTICIPATION IN WATER AND SANITATION

The World Bank has recently published a set of toolkits to guide governments in designing and implementing private sector arrangements for water and sanitation. The toolkits focus on three sets of issues:

- **How to choose a private sector participation option.** What are the options? What might you have to do to make your preferred option practicable? What are the risks?
- **How to design the process for refining and implementing the chosen option.** What might a critical path look like? How do you set up a government unit to run the privatization process? What can you expect from legal, financial, economic, and engineering advisers—and how do you go about hiring them? How do you design a bidding process? What can you do to keep the contract on track once you've chosen a private partner?
- **How to ensure that contracts cover all the issues.** What should a management, build-operate-transfer (BOT), or concession contract cover? In writing or reviewing contractual documents for a concession, a BOT arrangement, or a management contract, how do you know if you've covered everything? What are your options for allocating and managing the many risks that go with the contract?

Information on how to obtain copies of the toolkits can be found at the World Bank's Website (http://www.worldbank.org).
Water is essential to life, and access to it must be ensured for all. Guaranteeing access for the poor will sometimes require designing subsidies or schemes for reducing the cost of delivering services to the very poor. A complicating factor for reformers is that existing systems for allocating scarce raw water resources among alternative uses—urban consumption, irrigation, industry—are often incompatible with efficient use. In India, for example, many cities go short of water while farmers continue to receive subsidized water for irrigation.

- Water and sanitation are well suited to local management, and in many countries, responsibility for service provision is decentralized to the provincial or municipal level. As a result, complex interjurisdictional issues often need to be resolved before the private sector can be brought in.
- Many of the assets of water and sanitation systems are buried, so obtaining accurate information about them is costly—increasing the cost of preparing for private sector participation, and the chance of surprises after the contract is signed.
- Broad access to water and sanitation yields important public health and environmental benefits. Government interventions to promote these benefits are likely to remain after privatization.

None of these issues is a barrier to private sector participation—all arise under both public and private provision. But governments often systematically confront their implications only when they begin to contemplate private sector involvement. Failure to adequately address these issues increases the risk that a government will be unable to find a partner for its pre-
ferred form of private sector participation or that a private sector arrangement will fall short of its broad policy objectives.

**The main private sector options—and who’s doing what**

Different countries have adopted different options for private sector participation. Trinidad and Tobago is using a management contract for water and sewerage services and plans to replace it with a concession. Guinea has a lease arrangement for water treatment and supply in seventeen cities. Buenos Aires and several other Argentine provinces have concessions for water and sewerage. And England and Wales have divested their water and sanitation utilities.

The main options can be clearly distinguished by how they allocate responsibility for such functions as asset ownership and capital investment between the public and private sectors (table 2). The more risk and responsibility are passed to the private sector, the more powerful are its incentives to improve services. Service contracts, which confer little risk and responsibility on the private sector, offer commensurately small gains—and are simply not designed to address managerial inefficiency or chronic underinvestment. Concessions and divestitures are well suited to tackling these problems—but demand more from government in commitment and preparation.

In practice, private sector arrangements are often hybrids of these models. For example, leases may pass some responsibility for small-scale investment to the private sector, and management contracts may, like leases, have revenue-sharing provisions that pass on some commercial risk. Options can also be used in combination—for example, a build-operate-transfer contract for bulk water supply might be combined with a management or lease contract for operating the distribution system.

**Key factors in choosing an option**

Governments seeking to involve the private sector in water and sanitation may have a range of objectives—introducing greater technical and managerial expertise and new technology, improving efficiency, constructing large-scale projects, cutting the cost of public subsidies or redirecting them to the poor, and making the sector more responsive to customers. All forms of private sector participation can be designed to improve technical and managerial capacity. But whether the other objectives can be met depends on which option is chosen and whether the government can do a good job on the enabling and regulatory environment. A poor job can lead to dissatisfied customers and difficult renegotiations with the private partner. Under the Guinea lease, for example, consumers have lost out because disputes over the division of responsibilities between the government and the operator have hampered new connections and service improvements. The Buenos Aires concession has led to better service, but there have been costly disputes over the definition of the regulator's role (for example, in determining investment requirements) and the handling of adjustments in tariff levels and structure.

To determine which private sector options are feasible—or what must be done to make a preferred option possible—a government needs to undertake a range of analyses:

- An analysis of the state of the utility—looking at the current level and standard of service, the condition and serviceability of assets, the human resources, and the financial performance. Is information about the utility's assets good enough to serve as a base for long-term contracts? If not, can better information be produced rapidly? Where information about the quality of underground pipes, for example, is partial or inaccurate, revelations about the true state of the system that come after a concession contract has been signed may lead to costly renegotiations.

- An analysis of the existing regulatory framework—both general laws that might affect private participation in the sector and sector-specific laws and institutions focusing on pricing and quality standards. Does the existing regulatory framework provide sufficient support for the private sector so that it will take on commercial risk? If not, can the necessary changes be made fairly easily? And if not, can parts of the regulatory function be simplified or contracted out in the short term? Where
TABLE 3 PREREQUISITES FOR SUCCESSFUL IMPLEMENTATION OF DIFFERENT PRIVATE SECTOR OPTIONS

<table>
<thead>
<tr>
<th>Option</th>
<th>Stakeholder support and political commitment</th>
<th>Cost-recovering tariffs</th>
<th>Good information about the system</th>
<th>Developed regulatory framework</th>
<th>Good country credit rating</th>
<th>Potential benefits of the option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service contract</td>
<td>Unimportant</td>
<td>Not necessary in the short term</td>
<td>Possible to proceed with only limited information</td>
<td>Minimal monitoring capacity needed</td>
<td>Not necessary</td>
<td>Low</td>
</tr>
<tr>
<td>Management contract</td>
<td>Low to moderate levels needed</td>
<td>Preferred but not necessary in the short term</td>
<td>Sufficient information required to set incentives</td>
<td>Moderate monitoring capacity needed</td>
<td>Not necessary</td>
<td></td>
</tr>
<tr>
<td>Lease</td>
<td>Moderate to high levels needed</td>
<td>Necessary</td>
<td>Good information required</td>
<td>Strong capacity for regulation and coordination needed</td>
<td>Not necessary</td>
<td></td>
</tr>
<tr>
<td>Build-operate-transfer</td>
<td>Moderate to high levels needed</td>
<td>Preferred</td>
<td>Good information required</td>
<td>Strong capacity for regulation and coordination needed</td>
<td>Higher rating will reduce costs</td>
<td></td>
</tr>
<tr>
<td>Concession</td>
<td>High levels needed</td>
<td>Necessary</td>
<td>Good information required</td>
<td>Strong regulatory capacity needed</td>
<td>Higher rating will reduce costs</td>
<td></td>
</tr>
<tr>
<td>Divestiture</td>
<td>High levels needed</td>
<td>Necessary</td>
<td>Good information required</td>
<td>Strong regulatory capacity needed</td>
<td>Higher rating will reduce costs</td>
<td>High</td>
</tr>
</tbody>
</table>

Note: The shading signals the degree of importance: □ not significant □ low □ moderate □ high

regulatory capacity is weak, for example, collection of information on the utility's technical and financial performance could be contracted out to a private auditing company.

- An analysis of which stakeholders (employees, consumers, environmentalists, government agencies) support private participation and which oppose it. Can processes and policies be put in place to meet stakeholder concerns? Can the risk of political interference be minimized? Often, a key factor in the success of a private sector project is identifying the concerns of employees early on and finding constructive ways of addressing them—rather than allowing those concerns to derail the reform process later.

- An analysis of the financial viability of alternative options. Do current tariffs cover costs? Can the private sector reasonably be expected to boost efficiency enough to meet the proposed service objectives without increasing tariffs? If not, will consumers be willing to pay higher tariffs? And if not, can grant finance (or subsidies to needy households) support service improvements? This kind of financial analysis can sometimes lead to redefinition of a private sector project—for example, rebalancing planned investment expenditures between new production capacity and the rehabilitation of existing distribution systems.

As table 3 shows, in a very simplified way, the results of these analyses can point the government to an appropriate choice of private sector option. If regulatory capacity is weak and political commitment is low, for example, a concession will be difficult to implement. Even with strong political commitment to a concession or divestiture, however, countries that lack a good business climate or a strong track record of successful private investment may not immediately be able to attract large-scale private financing for infrastructure projects. These countries may need to start out with a management contract and work up to options that demand more of the private sector.

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Getting the Private Sector Involved in Water—
What to Do in the Poorest of Countries?

Penelope J. Brook Cowen

There is growing recognition that the private sector can do much to help meet infrastructure needs in developing countries. But the countries most in need of the private sector’s assistance—technical, managerial, and financial—are those least likely to be attractive to it. This problem is particularly acute in the water sector.

Water has historically been hugely underpriced in most developing countries. Though subsidized water tariffs generally do little to help the very poor (who often lack formal water connections), governments have clung to them in the belief that they are doing the socially appropriate thing. Moreover, proposed tariff increases tend to meet with vociferous opposition from the middle class and wealthy. Water systems are often poorly run, sustaining losses through physical leaks and poor collection systems. (Many developing country water utilities collect revenues on as little as a third of the water that they supply.) And with many of the assets underground, the actual state of systems is often unknown. Regulatory frameworks are often lacking, incomplete, or internally inconsistent, and the relevant skills thinly spread. Because of the political sensitivity of the sector, governments often have little credibility as regulators or contractual partners. There is little trust that they will maintain a favorable operating environment and a tariff yielding a reasonable rate of return.

This is not a setting conducive to the substantial, long-term, sunk investments needed to build or rehabilitate infrastructure. Nor is it a setting in which the private sector will happily take on commercial risk. All these problems occur to some extent even in relatively well-endowed developing countries—countries in which incomes are rising, there is an established, professional bureaucracy, and the government has some track record of fair dealing with the private sector. But they are particularly acute in the poorest countries. Some of the poorer countries of Central and Eastern Europe, for example, and Sub-Saharan African countries emerging from long periods of internal conflict suffer not only from very low incomes, but also from limited administrative capacity and a limited or unfavorable government track record.

While much stands in the way of private provision of water services, there are a number of ways to reduce the costs and increase the attractiveness of contracting.

While much stands in the way of private provision of water services in such countries, there are a number of ways to reduce the costs and increase the attractiveness of contracting. There is, of course, no magic formula that a country can apply to instantly transform itself into an attractive destination for large sunk investments. But the options below each target some aspect of the problem and, individually or in combination, may speed that transformation.

Option 1: Taking a stepwise approach

Some countries are considering a stepwise approach to private sector involvement—beginning with a management contract and building up to a concession or divestiture. Trinidad and Tobago recently implemented a management contract for water and sewerage services and plans...
to move to a contract involving greater private sector risk in three to five years' time. And in 1989, Guinea entered into a lease contract for water services in seventeen cities and towns, with the hope of moving to a concession when the lease comes up for renewal in 1999.

The virtue of the stepwise approach is that it allows gains from private sector involvement while providing the government time to address tariff, regulatory, or information problems in the sector. For example, the government may introduce gradual tariff increases over the life of the management contract, use the time to build up regulatory capacity and implement regulation, or require the contractor to build a database on the state of the water system. In each case, the effect will be to create an environment a little more conducive to private sector investment and risk taking.

But while stepwise approaches are an attractive way to secure at least some private sector involvement in risky countries, there is no guarantee that they will get beyond the first step. Because decisions about involving private companies in the water sector can be politically costly, governments may be unwilling to take the next step beyond a management contract, especially if they have not raised tariffs to cost recovery levels during the term of the contract. Governments may also be lulled into a false sense of security if the management contract provides just enough gains to keep key voter groups happy and feel that they need do no more—even if many people still lack adequate service. Management contracts can be good at improving services for those who already have connections, but typically do little for those without connections, who are often less politically powerful. Transitional arrangements should therefore include incentives for the next steps, such as sunset clauses on government roles or triggers in the contract for reallocating risks between the parties once specified conditions have been met.

In stepwise processes that replace low-responsibility, low-risk contracts with high-responsibility, high-risk, and potentially high-return contracts, the question of rebidding necessarily arises. While there may be real competition in awarding the initial management contract, maintaining competitive pressures during the transition to a lease or concession is more difficult. The company that wins the management contract will naturally have an advantage in bidding for subsequent contracts, and seeing this, other potential bidders may stay away. But barring that company from bidding for the next phase may reduce interest in bidding for the management contract.

In either case, competition is likely to be limited or absent during the shift to a more complex contract. This raises the stakes in the bidding of the original contract. Ideally, this contract should be let with all the seriousness of a concession or divestiture. But the informational deficiencies justifying a stepwise process in the first place generally preclude such a sophisticated approach. Much work remains to be done in finding innovative solutions to this cluster of problems.

Thus, while stepwise approaches have many attractions—and may be the only viable option for poorly endowed countries—their design and implementation are not straightforward. Much attention must be given to creating incentives to take subsequent steps and devising mechanisms for maintaining competitive pressures on the initial contractual partner.

Option 2: Simplifying contracts

In countries with limited administrative capacity (even more than in countries that see themselves as administratively competent!), simplifying contracts can do much to simplify monitoring and reduce uncertainty. One of the attractions of management contracts is that, in principle, they need not require the kind of regulatory and monitoring infrastructure necessary for leases, concessions, or divestitures. But if a management contract is to yield real improvements in performance, a good system of incentives and monitoring is essential. There are two key requirements for a good system: clear and indisputable performance indicators and a monitoring agency or official with the skills and budget to do the job, and the strength, integrity, and autonomy to do it independently.
Management contracts often contain long laundry lists of performance indicators, providing for bonus payments when targets are met or exceeded. But finding indicators that offer a fair and indisputable basis for managerial incentives is difficult. Many of the conventional indicators of water utilities’ performance—such as unaccounted-for water and staff productivity—depend on factors that may be only partially within the control of a management contractor. Success in reducing physical losses may depend in part on the government’s investing in rehabilitating pipes. Success in improving collections may depend on the government’s paying its own bills and supporting a policy of disconnection for nonpayment. Success in reducing operating costs may depend on the ability to lay off workers. Moreover, the measurement of some indicators can lead to disputes. Which definition of unaccounted-for water is to be used? If metering is incomplete or faulty—as it generally is—how are water losses to be measured?

There is no simple solution to these sorts of problems. Generally, though, there is a case for moderation in using indicators—sticking to those least likely to lead to measurement problems and disputes—and for adding more direct incentives, such as revenue sharing.

**Option 3: Contracting out parts of the regulatory function**

Many developing country governments have limited administrative capacity, little or no regulatory experience, and little tradition of creating independent regulatory agencies. As a result, several countries are considering contracting out parts of the regulatory function, such as the collection and processing of data on company performance. Angola is considering this in the context of preparations for a management contract. And the Philippine government, which has implemented twin concessions for water and sewerage in Manila, plans to contract out a range of performance auditing functions.

Contracting out the task of gathering and processing the detailed information necessary to carry out the regulatory function can significantly reduce the government’s administrative burden. It can also increase the credibility of the regulatory process if the auditing company has a strong reputation for quality and integrity. Not all aspects of the regulatory function can be contracted out, however. No regulatory rule or contract for private participation, no matter how precisely written, can remove all discretion from regulatory decisions, and the exercise of this discretion cannot be contracted out. Contracting out parts of the regulatory function can, at best, cast greater light on the exercise of that discretion.

**Provisions must be carefully specified for renegotiating aspects of the contract and for adjusting contractual terms over time. Over the life of the partnership, these provisions can be even more important than the initial terms of the contract.**

In poorly endowed countries, private investors perceive their risks as high in part because of concerns about how regulatory discretion will be used, including in revising and renegotiating contracts. Even if a contract were bid on the basis of perfect information about the current status of the water company’s assets and about new investments needed, the future would hold uncertainties that could not be handled by contract. And an initial contract is usually based on highly incomplete information about such factors as the condition of underground assets and future investment requirements. Careful provision must therefore be made to deal with unexpected events over the life of the contract.

**Option 4: Increasing predictability in the use of discretion**

Provisions must be carefully specified for renegotiating aspects of the contract and for adjusting contractual terms over time. Over the life of the partnership, these provisions can turn out to be
Getting the Private Sector Involved in Water—What to Do in the Poorest of Countries?

even more important to success than the initial terms of the contract. Such provisions need to specify at least four elements:

- The conditions under which adjustment of terms or renegotiation may occur (including penalties to curb frivolous renegotiation).
- When and under what conditions a contract must be renegotiated—as opposed to when price or service adjustments are made by agreement or by regulatory discretion.
- The process for initiating and conducting renegotiation.
- The processes to be followed and the authorities to be appealed to in the event that the parties to the contract cannot agree on how to resolve an issue (arbitration provisions).

In countries with no history of regulatory or judicial independence, clearly specifying processes for articulating and resolving disputes is particularly critical. International arbitration is often advocated as a means of offering comfort that disputes can ultimately be resolved in a neutral forum. But such arbitration is costly, and for most disputes—and for many smaller contracts—it may not be feasible. In these cases, there may need to be more reliance on the incentives for dispute resolution implicit in arbitration rules.

The need for realism

The main objective of projects to secure private sector participation in the water and sanitation sector is to get better services to consumers at lower cost. In most developing countries, the poorest consumers face an appalling situation. Many lack access to potable water and any kind of sanitation. In many cities, the wealthy receive piped water at below cost, while the poor must rely on unsafe water at very high cost. In Luanda, where recipients of piped water pay less than a cent per cubic meter, people without connections may pay as much as US$16.00 per cubic meter for untreated water delivered by tanker.

Involving a private sector partner in the delivery of water and sanitation services is often the only sustainable way of making a dent in these kinds of problems. But it is easy to lose sight of this (obvious) objective in the course of designing, implementing, and monitoring a private participation arrangement. Governments often start with a fear that the private partner will be a rapacious profit-taker. Considerable efforts will (rightly) be made during project preparation to guard against possible abuses of monopoly power.

But there is often a sharp difference between what private companies see as the minimal return necessary to go into business in a risky country and what governments view as an acceptable level of profit. (Advisers to developing country governments considering private participation in water will all be familiar with the gasps of disbelief and indignation when they first voice assumptions about expected returns on equity.) Governments that have happily (or at least blindly) tolerated high levels of rent seeking and wasteful behavior by public water company officials can become positively puritanical about relatively modest profit taking by a private company. This is not to say that private companies with a monopoly to supply water services should be allowed to take any level of profit that they choose. But governments should be realistic about the profits that they should allow, recognizing the need of their private partners to earn a reasonable return and to be rewarded for the risks that they shoulder.

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1 For definitions of different kinds of private sector participation, see Pierre Guislain and Michel Kerf, “Concessions—The Way to Privatize Infrastructure Sector Monopolies” (Private Sector, June 1996).
2 See Helen Nankani, “Testing the Waters—A Phased Approach to a Water Concession in Trinidad and Tobago” (page 97 in this volume).

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Testing the Waters—A Phased Approach to a Water Concession in Trinidad and Tobago

Helen Nankani

The government of Trinidad and Tobago has adopted a two-phase approach to privatizing its water services. In the first phase, a preconcession, or enhanced management, contract was recently awarded through a competitive bidding process. After three to five years, in the second phase, this management contract will be converted to a long-term concession for which the incumbent will have first rights of negotiation. With the management contract in place just over a year, it is too early to draw firm lessons. But the two-phase strategy looks like a good choice for a small country with poor sector information and limited regulatory capacity. The preconcession agreement gives the government time to gather information for better risk allocation in the future, develop a long-term tariff regime, and establish a relationship of trust with a private operator—while it also improves service using private sector management. This Note discusses the strengths and weaknesses of the strategy.

Choosing a model

The Water and Sewerage Authority (WASA) of Trinidad and Tobago, a publicly owned and managed company, provides service to the island’s 1.27 million inhabitants. In the past, WASA exhibited all the problems of a traditional public water utility. On average, water was available for less than twelve hours a day. About half the water went unaccounted for, and only one percent of the 240,000 customers were metered. The sewerage system was in disrepair and served only 30 percent of the population. Labor costs accounted for 60 percent of total operating expenses, compared with 40 percent for an efficient water company. Water tariffs were kept very low. Until the mid-1980s, the government had not raised rates for fifty years. WASA consistently failed to generate enough revenues to cover operating expenses, and by the end of 1992, it had accumulated government transfers totaling US$800 million—a burden the government was increasingly unable to bear. So, under immense public pressure for better service, in early 1994 the government started to recruit a private operator to take over WASA’s operations.

There were several complications. First, although privatization had much political support, a long-term, thirty-year concession, typical for the water sector, was daunting, in part because it would require the time-consuming task of amending the company’s authorization act in the months preceding a general election in November 1995. Second, the impending election put pressure on the government not only to improve performance, but also to secure the best deal possible. Third, with poor regulatory capacity and little information on the condition of the system or on water consumption patterns, the government needed time to establish an effective rate setting mechanism or a basis for setting an initial tariff during the competitive bidding process so that bidders could develop reasonable estimates of the long-term risk and probable rate of return.

These circumstances led the government to opt for a two-phase strategy. In the first phase, under an interim management contract, WASA would contract a private operator to provide a management team to meet operational, maintenance, and investment targets and follow an agreed business plan over the term of the agreement. WASA would collect service fees as before, but the new operator would have to fund
Testing the Waters—A Phased Approach to a Water Concession in Trinidad and Tobago

any operating deficits through a loan to WASA, giving the operator an incentive to minimize deficits. A World Bank loan to the government would provide funds over the contract's five-year term to enable the operator to maintain the system, expand coverage of water and sewerage services, improve billing and collection, and install meters—all in accordance with proposed targets. If the targets are not met, the contract may be terminated early. The operator also would be required to provide the government with the information it needs to design a long-term regulatory regime. The operator would receive a fixed management fee, a variable fee contingent on its meeting annual coverage and service targets, and first rights to the full concession.

Moving to the long-term concession in the second phase would add to the private operator's responsibilities for operation and maintenance the responsibility for financing capital expenditure. The switch to the long-term contract could be triggered before the end of the five-year management contract by a request from either WASA or the operator once the performance targets are reached. Failure by the operator and the government to reach an agreement for the concession would initiate competitive bidding and disqualify the operator from future bidding. In either case, the operator would be able to recover the money lent to WASA during the management contract. Under both the interim and the long-term arrangements, ownership of assets would remain with the government.

Securing a world-class private operator

In May 1994, the government retained Banque Paribas and Halcrow as investment advisers to assist in preparing and implementing a strategy for securing private sector participation and in managing the bidding—from preparing the request for proposals to evaluating the bids. In June 1994, in a request clearly setting out the requirements for proposals and the evaluation procedure, prospective operators were invited to submit expressions of interest. The response was better than expected: twenty-one firms submitted prequalification documents. Of these, five were prequalified on the basis of financial and economic criteria: Anglian Water International (U.K.), Lyonnaise des Eaux International (France), Saur Water International (France), Severn Trent Water International (U.K.)/George Wimpey (Caribbean) Ltd. (U.K.), and Thames Water International (U.K.). The rest either dropped out or were rejected because they lacked credentials in the sector and the financial strength to enter into the second phase of the contract with WASA. The government focused on identifying a contractual partner for the long term.

In November 1994, bidders were asked to submit three proposals—technical, financial, and supplementary—by February 13, 1995. The government required the three separate proposals because it wanted to ensure that it obtained not only good financial bids, but also technically competent management teams.

The technical proposal, evaluated first, named the bidders' candidates for top management and set out a business plan, a plan to increase the hours of water service, and a series of performance targets based on requirements specified in the request for proposals. To test the private sector's appetite for risk, the request left it to the bidders to determine what share of the management fee would be paid as a fixed amount and what share as a performance bonus. More points went to those willing to assume greater risk by relating their remuneration more to performance-related targets than to fixed fees. All five firms earned the minimum score or better on the technical proposal, qualifying for the next stage.

In the financial proposal, each bidder specified the amount of the nonguaranteed loan that it would extend to WASA to cover operating deficits, the interest rate on the loan, and a management fee. While the financial terms of the winning bid have never been made public, the method for evaluating the financial proposals was as follows. Say a bidder proposed a US$20
million loan at 10 percent interest and a US$10 million management fee. The management fee would be subtracted from the discounted loan (US$18 million), yielding US$8 million. This amount is worth forty points, five points for each million dollars. Thus, this scoring method awards more points for higher loans, lower interest rates, and lower management fees.

The supplementary proposal was designed to serve as insurance against a no-bid situation if the terms of the management contract turned out to be unattractive to bidders. In this proposal, which the government was aware would add an element of subjectivity to the evaluation process, bidders could propose their own contract design. The request for the supplementary proposal also invited proposals for a water treatment project to serve an industrial town in Trinidad and Tobago. To minimize any bidder concerns about the transparency of the process, the supplementary proposal could be opened only for the top financial bid or for the top two bids if they were within 5 percent of each other.

Once the rankings were finalized at the beginning of April, the supplementary proposals for the top two bidders were opened. Severn Trent/Wimpey was selected by the end of April, and WASA immediately started negotiations with the winning bidder on the finer points of the agreement. But in the end, the management contract did not take effect until April 1996, after the new government elected in November had had time to examine and endorse the contract.

A parallel track for reform

While the recruitment of the preconcession operator went forward, the government began a series of initiatives to improve WASA’s economic viability. In 1994, it granted WASA the right to increase tariffs by 35 percent for customers receiving water for more than twelve hours a day—providing an incentive for the operator to expand coverage and ensure reliable service. The tariff increase was introduced in 1995, before the new operator came on board. This timing was meant to separate the two events, to ensure that the politics of the increase would not sour the arrival of the new operator in the eyes of the public. But the government also judged that the tariff increase was needed to attract high-quality bids. It estimated that the new tariffs, along with the expected improvements in billing and collection, would generate cash flows sufficient to meet future investment needs.

WASA continued to reduce its staff through voluntary separations and retirements, an effort initiated in 1992. The government assumed responsibility for a large share of WASA’s current debt service, and the World Bank provided a loan in August 1994 to assist WASA with emergency repairs of leaks and purchases of essential parts until the management contract took effect in April 1996.

The government also undertook institutional reforms. It made the Water Resources Agency, the division of WASA responsible for water quality, an independent government agency, and it has taken steps to amend WASA’s authorization act to accommodate a private sector concession. In addition, the government continued its efforts to reorganize the Public Utilities Commission, focusing water regulation activities in one entity and setting up better means for monitoring the private operator. It is also revamping the tariff setting mechanism, to allow cost recovery and adequate profits.

The prequalified bidders reported that they considered the government’s early reform efforts to be credible, a key factor in the great interest in bidding.

Conclusion

The case of Trinidad and Tobago shows that even for small countries there can be strong private sector interest in providing water and sewerage services. Several factors account for the enthusiastic response from bidders. The government’s request for proposals clearly specified the rights and responsibilities of the operator as well as its own objectives and requirements.
The government went to great efforts to develop an honest assessment of WASA's prospects and to make relevant materials available to bidders. And it responded to numerous requests for additional information and met often with bidders to clarify issues.

The experience of Trinidad and Tobago also suggests that with careful preparation a country can attract private sector interest even before an institutional framework is fully established. Although it is usually recommended that an independent regulatory system and an appropriate legal framework be in place before private sector participation is introduced, this typically makes heavy demands on the administrative and institutional capacity of countries.

Trinidad and Tobago started reform with limited regulatory capacity, and because of a desire to move quickly, the government proceeded with private participation without developing a full-fledged regulatory regime. Instead, it incorporated into the contract such regulatory aspects as performance standards. This feature was enough to attract world-class operators willing to finance working capital and assume high operational and commercial risks. As the first phase of the concession is carried out and more information about the system and about consumption is obtained, the government will be able to establish an appropriate regulatory and tariff structure and other necessary preconditions for the full concession.

As implemented in Trinidad and Tobago, the phased approach to a concession appears to be a good alternative for countries unable to move immediately to a full concession. It provides the benefits of private involvement in the water sector in the short term, and it allows the government and the private operator time to develop the terms and conditions of the more complex thirty-year concession. If both parties opt for the longer-term arrangement, the preconcession would have provided them with the information and experience needed to efficiently allocate risks. In addition, the approach permits the government to demonstrate its credibility as a contractual partner and thereby improve the terms and broaden the scope of future partnerships with the private sector.

If both parties opt for the longer-term arrangement, the preconcession would have provided them with the information and experience needed to efficiently allocate risks.

The two-phase approach also has some drawbacks. First, during the management contract, the government, not the private operator, is still responsible for financing the much-needed rehabilitation and capital improvements. Second, the long-term operator is in effect selected on the basis of criteria for a short-term contract. If there is no competitive bidding for the long-term concession, the government cannot be sure it is obtaining the best arrangement possible. Retaining good financial advisors for the negotiation of the concession and using concession contracts executed in other countries as benchmarks can help in getting a satisfactory deal.

It also remains to be seen how well the government implements the reforms needed to allow the concession to move into the second phase, when the private sector would begin to make its first significant investments. Postponing more extensive private participation runs the risk that political resolve will weaken and that gains made in the first phase could be reversed. But Trinidad and Tobago's two-phase approach at least reduces the risk of reversals by contractually locking the government and the private operator into a long-term relationship.

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Water Privatization and Regulation in England and Wales

Caroline van den Berg

In 1989, England and Wales embarked on one of the first modern privatizations in the water sector. The government sold ten publicly owned water companies—encompassing water and sewerage assets and operating licenses—and set up a new, independent sector regulator. These reforms have delivered an impressive volume of new investment, full compliance with the world’s most stringent drinking water standards, a higher quality of river water, and a more transparent water pricing system. But experience during the first regulatory cycle also reveals some lessons about the information requirements of effective regulation and the risks to the political independence of the regulator. This Note reviews those lessons.

Before 1989, the water industry in England and Wales consisted of ten publicly owned water authorities and twenty-nine privately owned water supply companies. The government argued for privatizing the publicly owned services on two counts: privatization would result in more efficient companies, and private owners would fund the investments needed to meet tighter water quality standards and make up for past underinvestment.

The government split the water authorities, transferring the main environmental regulatory responsibilities to the National Rivers Authority and converting the remaining water and sewerage services into private companies to be sold on the stock exchange. The government also set up a new regulatory agency, Ofwat, which sets the maximum prices that water companies can charge. The agency’s primary duty is to ensure that the companies can finance themselves by earning a reasonable rate of return on capital. One of the major objectives in the new regulatory design was to avoid political interference in the regulatory process. Built-in checks and balances, such as financial autonomy for the sector regulator and status as an independent government agency, were supposed to limit political discretion in policy and investment decisions. To further strengthen independence, the regulator was given broad discretion in interpreting the law, implementing general rules, and modifying company licenses.

An important innovation of the British system of economic regulation is the use of price caps. These caps set maximum prices for all water companies, in five-year cycles. A second innovation—the use of yardstick, or comparative, competition—addresses the problem of the water companies’ monopoly over information the regulator needs to do a good job. Through performance comparisons, Ofwat derives yardsticks that it can use to assess the efficiency of water companies. Less efficient utilities are given more demanding efficiency targets and are expected to come up to the standard set by the best performers.

Because large investments were necessary and water privatization was new territory for the government, the privatization was done on terms favorable to shareholders to ensure that the
public flotation would succeed: the government wrote off most of the debt on the public companies' books. (As a result, the government's costs ended up exceeding its revenues: the direct net effect of the sale of the companies was a deficit of about £1.3 billion.)

The reforms also affected the twenty-nine privately owned water supply companies. Before the reforms, these companies had been subject to statutory controls on profits, dividends, and borrowings. In 1989, they were brought under the same regulatory regime as the privatized water authorities and were able to convert themselves into public limited companies. By the end of 1996, after a spate of mergers and takeovers, only nineteen such companies remained.

**Impact on investment, operating efficiency, and profits**

With regard to the government's two objectives—investment and efficiency—the results have been mixed. By volume, the government's investment targets have been realized. In the six years after privatization, the water companies invested a massive £17 billion, compared with £9.3 billion in the six years before privatization.

But there are signs that not all this investment has been efficient. First, because the price cap worked more like rate-of-return regulation during the first regulatory cycle (1989–94), there may have been incentives to gold-plate investment plans. Second, the separation of economic and environmental regulatory responsibilities made creating the right investment incentives more difficult—especially given customers' low willingness to pay for the water quality improvements mandated in European Union directives. Establishing closer coordination between these two regulatory functions earlier in the reforms could have resulted in clearer and less conflicting investment incentives.

Third, because Ofwat's mandate is limited to ensuring the financial viability of the utilities, it does not take the public costs and benefits of water policies sufficiently into consideration when assessing companies' investment programs. The most striking case in point is water metering for residential customers, on which almost no progress has been made. Although in the medium to longer term metering is desirable as a means of managing water resources more effectively, its high up-front costs have led many water companies to drag their feet. Finally, since privatization, investments in the regulated water business have occurred in a cycle that corresponds with the regulatory cycle. This pattern tends to distort the timing of investments and weaken utilities' incentives to generate cost savings toward the end of the regulatory cycle.

Real sector operating costs per unit of water actually increased slightly during the first regulatory cycle, though staff numbers fell. The companies attribute this rise in operating costs to the additional investment to achieve higher water quality standards. Another reason for the higher costs could have been high transfer pricing between regulated and unregulated parts of the business (such as laboratory and consultancy services). As long as cost pass-through is allowed, a holding company can increase its profits by pricing such internal transactions above cost. The regulator has taken steps to prevent these cross-subsidies and requires companies to disclose more information on transfer pricing. But the main factor in the higher costs appears to be the generous first price cap. Utilities apparently had few incentives to reduce their operating costs. The regulator tightened the price cap considerably in 1995, however, so it is likely that companies will reduce their operating costs during the second regulatory cycle (1995–2000).

The investment boom has led to significant price increases for consumers. The real average residential water and sewerage bill has gone up by 28 percent since privatization. The regulator has accepted that there are large differences among water companies and has calculated different price caps. As a result, there are large variations in average water and sewerage bills among utilities. For the average household, water and sewerage are still afford-
able, but low-income households have difficulty paying for these services.

At the same time that prices were rising for consumers, the profitability of the water and sewerage companies soared, creating a serious public backlash against the reforms. If these profits are adjusted for the £5 billion debt write-off, the increase is less spectacular, though still positive.

**Regulatory lessons**

It is still early days for the new regulatory model. But the experience so far has shown that the tools of price cap regulation are both complex to administer and critical: if the price cap is set too high, the utilities will earn excess profits; if it is set too low, underinvestment will result. As mentioned, in the first regulatory cycle, price cap regulation did not differ significantly from rate-of-return regulation. The second cycle will be a truer test of the mechanism. But setting the key parameters in the mechanism—using financial prices, defining the price adjustment factor, choosing the method of asset valuation—has been complex and time-consuming. The price cap also suffers from having been grafted onto the inefficient tariff structure of the original publicly owned utilities—a tariff regime that was not based on water consumption levels and did not provide an incentive for efficient water use. Ideally, a rate structure should be revamped before privatization—after privatization, it is hard to revise.

Even though price caps are said to reduce the possibilities for cross-subsidization, the experience so far shows that price cap regulation has not eliminated the incentive for companies to selectively alter prices. The tariff basket formula used by Ofwat still provides the companies leeway for price discrimination between rate categories while they keep the overall price for the tariff basket below the price cap. The companies apply the price cap to an average price for a group of services or rate categories. Using moral suasion, the regulator has insisted on rebalancing tariffs, but many of the inefficiencies in the rate structure remain.

In most companies, for example, households with water meters still pay higher effective rates than those without meters.

The water companies’ performance shows how important it is to provide the right incentives. To do this, the regulator must have access to good information. But the water companies’ control over information affords them opportunities to manipulate the information they make available to the regulator. Yardstick competition was supposed to address this problem. Under yardstick competition, the regulator sets price caps on the basis of comparative data from similar utilities in the United Kingdom or abroad. Efficiency levels for inputs, unit costs, and quality of service are set on the basis of lowest-cost, highest-service standards. Yardstick competition is most effective when firms face similar conditions. Ofwat’s calculation of individual price caps for the water companies suggests that each company operates under different conditions. So far, Ofwat has not been very successful in developing robust measures of relative performance. When used, relative performance indicators have resulted mainly in broad groupings indicating below- or above-average performance. Building a reliable database and related analytical tools has proved a regulatory challenge requiring much time and effort.

The water companies’ information monopoly increases the risk of regulatory capture. Aware of this risk, Ofwat has stepped up its efforts to prevent regulatory capture by expanding the scale and scope of regulation and by applying more elaborate tools for monitoring. For example, it is using expert engineering appraisals, through capital expenditure certification and
through cost reductions based on the results of econometric models. But econometric modeling suffers from lack of sufficient data to run regressions, problems in quantifying explanatory factors, and difficulties in assessing an appropriate charge for capital assets. Monitoring the performance of private utilities to ensure the effectiveness of price cap regulation has become an elaborate process that increasingly resembles Treasury scrutiny and control of utilities under public ownership. This can in the longer run result in excessive control, which could erode utilities' management autonomy.

The experience shows that to set appropriate price caps, the regulator needs a sound and reliable database and effective tools to analyze the data. Building the database and assembling the necessary tools takes time and effort.

The regulator has broad discretionary power to modify the licenses of a company, thus altering the fundamental regulations that apply. This discretion, combined with the importance in the British model of the individual regulator's personality, adds up to a regulatory environment that is less stable than often presumed. At the same time, and despite efforts to insulate regulation from political interference, politics remains an important influence on the orientation of regulation. Although price caps are supposed to be reset every five years, the water regulator intervened twice during the first regulatory cycle, forcing two interim price reductions—clearly under political pressure. The current debate about profit sharing and the introduction of competition in the water industry is inspired mainly by political considerations. As a result of the perceived instability of the regime, investors require higher risk premiums and thus higher rates of return. The degree of regulatory discretion has led to criticism about the regulator's lack of accountability. There are mechanisms to challenge regulatory decisions, but only a few companies have used them, suggesting that utilities have little confidence that they can overturn Ofwat's decisions. There is evidently a tradeoff between accountability and maintaining an independent regulator. Although the independence of the regulator is important, the balance between independence and accountability needs to be shifted in favor of the latter so as to reduce the instability of the regulatory system.

**Conclusion**

The England and Wales privatization rates as a partial success over the first regulatory cycle. It has delivered the large investments needed to meet higher water quality standards, but it is still too early for a verdict on efficiency because the first price cap was not tough enough to force companies to reduce operating costs. The experience shows that to set appropriate price caps, the regulator needs a sound and reliable database and effective tools to analyze the data. Building the database and assembling the necessary tools takes time and effort. The second regulatory cycle should be a better test of price cap regulation. But the early difficulties have had costs. The combination of steep tariff increases and sale terms that were too favorable for shareholders and firms has created credibility problems for the reforms. Public resistance to the price rises associated with privatization has made the regulatory system more susceptible to political interference—against which the built-in checks and balances have not provided sufficient insulation. The experience has also shown the need for better coordination between economic regulation of the water companies and such government functions as water resource management and support for lower-income households.

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Regulating Water Concessions
Lessons from the Buenos Aires Concession

Claude Crampes and Antonio Estache

The public water and sewerage services for greater Buenos Aires were privatized under a concession contract three years ago. Already, there are positive results. Labor productivity has almost tripled, service coverage has increased, reliability and responsiveness have improved, and the price of service has fallen. But there are also some teething problems, especially in regulation. This Note discusses lessons for policymakers contemplating a similar approach to water sector reform.

Strategy

Argentina privatized the water and sewerage services in the Buenos Aires metropolitan area in 1993. The assets of the public enterprise, Obras Sanitarias de la Nación (OSN), included 77 kilometers of underground tunnels, 9 pumping stations, 2 treatment stations, 370 kilometers of water mains, and 19,000 kilometers of distribution pipes. Poor maintenance of the system had led to significant water losses—probably about 40 percent, although no one really cared about measuring them then. OSN produced 3.7 million cubic meters of water a day and served about 6 million inhabitants, about 70 percent of the area’s population. Coverage for sewerage was even lower, at about 58 percent.

To avoid a prolonged process of privatization, the government opted to award the right to provide service under a concession rather than sell the utility, thus keeping the fixed assets under public ownership. Selling the assets would have required overcoming legislative hurdles, and the government feared that assessing the value of the underground pipes would be costly and time-consuming. The government also decided not to break up the utility. A single private firm would operate the services for thirty years, a reasonable period in which to finance and complete the required investments. The concession could be extended for one year, but at the end of the term, a new bid would be organized.

The main objective of the reform was to reduce the cost to the government of operating the services while minimizing the price for service delivery. Bidders would compete to provide services at the lowest price (the largest discount to the public tariffs). No cash payments would be required. But the winning bidder, as the concessionaire, would assume responsibility for operating and maintaining the fixed assets and would be obligated to expand coverage, guarantee water quality, and develop sewage treatment. The targets for coverage imply investments of about

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<th>Indicator</th>
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<td>Increase in production capacity (percent)</td>
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<td>Water pipes rehabilitated (kilometers)</td>
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<td>Sewers drained (kilometers)</td>
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<td>Decline in clogged drains (percent)</td>
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<td>Residents with new sewer connections</td>
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</table>

Source: Aguas Argentinas.
US$4 billion over the life of the contract, with a large share to be disbursed at the beginning of the concession period. Pricing would be governed by general tariff principles set out in the concession contract, maintaining the cross-subsidies that existed under public provision. The first price review would occur after five years. There would be some possibility for renegotiating the rules in the case of an unenforceable event or new information, but any change would have to maintain the implicit rate of return proposed by the winning bidder (that is, maintain consistency between the timing of costs and the evolution of tariffs). The concessionaire would also be responsible for negotiating the private labor contracts with the labor unions (since all workers ended up “privatized”).

**Impact and lessons**

The impact of the concession strategy has been generally positive (table 1). Since May 1993, the first month of private operation, the maintenance system has been revamped and the backlog of repairs significantly reduced. Rehabilitation has cut water losses to about 25 percent, according to estimates by the concessionaire, allowing coverage to increase by 10 percent with no increase in production. Coverage for sewerage services is up about 8 percent. And prices were initially reduced by 27 percent. While they rose in 1996, they are still 17 percent lower than those charged by the public utility.

But not all has been smooth sailing. Negotiations with the unions, for example, have been tense, though first impressions suggest a successful outcome. Most direct indicators of labor productivity show dramatic improvements. And after a 48 percent reduction in staff in the first year of operation, the concessionaire is now recruiting to keep up with the demand for services. But indirect labor costs remain high, comparable to what they were under public management, as the concessionaire continues to provide many of the fringe benefits traditionally available to civil servants (total labor costs are still about 60 percent of operating costs). The most difficult adjustments, however, have been in the regulatory area.

**Competition**

Water distribution and sewage collection are natural monopolies, so the scope for direct market competition is limited to minor activities, such as billing and revenue collection. In the Buenos Aires concession, competition was introduced through the bidding process. This process, which plays a critical role in drawing out enough information to ensure that a concession is awarded successfully, generally worked well.

The rules required potential bidders to prequalify to limit the bidding to firms with strong technical and financial capabilities and to ensure that any foreign bidders would be the very top operators. The call for bids went out in June 1992, requesting two envelopes. The first, which determined whether a bidder qualified, held technical offers (including legal features of the bidder, a mission statement, operational plans, proposed regulations for users, and a US$3 million guarantee of commitment to the offer). The second envelope, opened if a bidder qualified, held financial and economic offers, including adjustments to the current tariff rate, indicators of financial strength and commitment, and an explanation of how the bidder would operate with the new tariff. The contract would go to the bidder offering the largest discount to the public tariffs. The rest of the information to be provided was essentially intended to demonstrate that the discount proposed would allow revenues consistent with the level and timing of expenditure commitments.

The concession contract was awarded in December 1992 (transfer occurred in May 1993) to Aguas Argentinas, a consortium headed by Lyonnaise des Eaux-Dumez that offered a tariff discount of 26.9 percent. This result suggests that the competition for the market has been effective in reducing costs to users. To sustain this gain, the national government is considering yardstick competition when the price review comes due—possible now that some of the provincial services have also been privatized under concessions. Yardstick competition is used in the United Kingdom, where the regulator calculates and widely publicizes water companies’ comparative efficiency.
The Private Sector in Infrastructure

**Government as regulator rather than service provider**

A key to the success of the bidding process has been its transparency. Just as important is transparency in the concession contract—clear and unambiguous assignment and enforcement of the rights and obligations of the concessionaire. The main regulatory instrument, this contract spells out the rules of the game for the private monopoly. But for the privatization to be effective, the Argentine government has had to recognize that once a private operator takes over, it is in charge within the terms of the contract. That does not mean that the government has no role. Because competition is limited to the initial bidding and the rebidding at the end of the concession (crucial to the effectiveness of the initial bidding), the government has a critical role to play as a regulator. But this is not a day-to-day management role. Some argue that the level of detail in the Buenos Aires concession contract reveals reluctance by the government to give up management of the service and that the contract focuses too much on processes and detailed targets. There may be some truth in this, but it also reflects the lack of data at the time of bidding. Also true, however, is that private monopolies will try to keep regulators at a distance to make the most of their monopoly power. The challenge is to design a contract that achieves the right balance. This requires good data, which can take time to collect.

The government's new regulatory role is in the hands of a newly created independent regulatory agency, Ente Tripartito de Obras y Servicios Sanitarios (ETOSS). The agency is financed by a user fee levied on consumers and governed by a directorate appointed to a six-year term, with the option of one renewable term. It monitors the concessionaire, enforces the concession contract and regulatory decisions, and levies fines when necessary. This new role may be the most difficult fact to accept for the newly created regulatory agency, as many of the agency's employees had worked for the public water utility. Most recognize that they need new skills to be effective regulators and that when they lack the skills for a particular task, they need to recruit international experts—as they did recently to assess a request by the concessionaire for an adjustment in the contractual investment plan.

**Adjustments and renegotiation**

Soon after the concession had been awarded, water quality problems revealed that the infrastructure was in worse shape than the government and the concessionaire had estimated. So in June 1994, they agreed to accelerate the delivery of some service requirements. The resulting cost increases (over 7 percent) triggered a contract clause allowing an increase in tariffs, and Aguas Argentinas was granted a 13.5 percent tariff hike. There was much public confusion about this increase, and many users felt that it was unfair. Poor explanation of the approval process to the users was partly to blame for this perception.

This experience underlines the need for rules allowing adjustment in the terms of concession contracts when new information becomes available or circumstances change. It also shows the need for regulators to ensure that the public understands their decisions and perceives them as independent. This requires transparency both in analysis and in decisionmaking. Although the concession contract should be prepared as if it were not going to change, under specific, limited circumstances, some flexibility may be good policy. To ensure that the contract is a credible regulatory instrument, modifications should be arrived at under fair and workable renegotiation rules based on clear, preestablished criteria and agreed to by all parties. Fortunately, the Aguas Argentinas contract included such a rule.

The challenge for policymakers is to find a transparent mechanism for modifying the terms of the contract without undermining investor or consumer confidence. A renegotiation rule should expose what changed unexpectedly. For example, if the assets deteriorated between the time the bids were made and the transfer of the assets, what was the cause? Was it the weather? Or did the public operators stop maintaining the assets? If the first, responsibility
might be shared between the government and the concessionaire. If the second, the concessionaire might have a fair claim for revising the contract. The public policy criteria for testing whether revision is needed must be preestablished and clearly defined. And any change to the contract that is warranted should be limited to the issue at hand: the entire contract should not be renegotiated. Of course, unilateral modification of the rights defined in the contract or the bidding documents—say, through a request to accelerate investment or a move to impede tariff adjustments, without full compensation—is tantamount to expropriation and defeats the purpose of reform.

**Investment and tariffs**

The design of the tariff formula is at the core of effective regulation and critical to the sustainability of reforms. The Argentine regulatory regime recognizes legitimate costs and allows an additional profit margin (a loose form of cost-plus regulation, as information on cost is very approximate). There are about four different kinds of tariff structures. Which structure is applied depends on the kind of building, and how the tariff is charged depends on whether the consumer is metered. The design of this family of tariffs introduces a number of distortions. First, the metering incentive is in the wrong direction. Consumers have an incentive to install a meter only if their consumption is small, but without meters it is difficult for the concessionaire to track water losses. Second, average prices are lower for large users than for small users, even though for water, unlike for electricity, there is no technological justification for this. And third, the two-part tariff for metered customers leads to cross-subsidy problems. The tariff has a fixed part to cover the cost of infrastructure and a variable part that is proportional to consumption. But total connection costs are less than total revenue from the fixed part of the tariff. The resulting cross-subsidies lead to inefficient and often inequitable investment decisions.

Another problem with the tariff formula is that it provides little incentive to invest in expanding the sewerage system. The metered tariff creates a complex system of cross-subsidies between water and sewerage services. Although the water and sewerage charges are higher than operating costs, they do not fully cover investment costs. The contract allows the concessionaire to use revenues from existing clients to cover water system expansion costs not covered by new customers.

**Conclusion**

As Argentina is finding out, regulating a private monopoly can be challenging. Its experience suggests that to maximize the gains from water privatization, reformers in other countries should make the most of competition for the market, make sure that the government is comfortable with shifting its role from service provider to regulator, anticipate needs for renegotiating or adjusting the terms of the contract, and not underestimate the problems of tariff design.

The Argentine regulators, to their credit, are aware of the tariff design problems and are dealing with them systematically. For example, they are commissioning a tariff study (from an international consulting company) that should lead to marginal cost pricing and to a new tariff based on metering. With the benefit of hindsight, many in the government may regret not having commissioned the study much earlier, when the sector was being restructured. That would have prevented the delay in implementing efficient and equitable tariff principles—and many of the disagreements that have arisen among users, providers, and regulators since May 1993.


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There is widespread agreement that most developing countries urgently need massive highway construction programs. Traditionally, highways have been viewed as public goods that must be financed and operated by the public sector. But in recent years, many governments have neglected maintenance because of chronic budgetary problems, and traffic has grown well ahead of capacity. So, it has become increasingly accepted that highways should be built, financed, and operated by private firms and that users should pay for using them. Several advantages are claimed for privatized roads. Private firms build highways faster because they face fewer financing constraints, and they are more efficient than state-owned firms. Users are more likely to accept the concept of paying for roads owned by the private sector. And franchising should prevent the building of “white elephants,” since private firms do not want to lose money.

Despite these avowed advantages, the experience with highway franchising has been far from happy. Three of the four franchises that France awarded in the early 1970s went bankrupt after the oil shock and were taken over by the government. Several of the twelve franchises awarded by Spain before 1973 had building costs four to five times higher than expected, but traffic about a third of original projections. As a result, three firms went bankrupt, two firms were absorbed by stronger franchise holders, and the government granted toll increases and term extensions. In Mexico, excessively high tolls have led to empty highways and the renegotiation of the original franchise agreements. The duration of some of the toll road franchises has more than doubled, and the government has had to pump in US$2 billion to save firms (and the banks that made loans to them) from bankruptcy.

This Note argues that many of the problems that have plagued highway franchises stem from the combined effects of special features of the highway business and the type of franchise contracts that have typically been used. First, traffic forecasts are notoriously imprecise; it is difficult enough to make accurate traffic predictions for the short run and much harder for the long run (box 1). Moreover, demand for a highway is largely beyond the control of the franchise holder. Second, most franchises have been awarded for a fixed term (say, twenty years) that is independent of demand realization. In what follows, this Note describes the main shortcomings of fixed term franchises and then presents a new mechanism, the least-present-value-of-revenue (LPVR) auction, that endogenously adjusts the duration of the franchise to the realization of demand. The Note argues that this mechanism is far better than current systems.

**Fixed term franchises**

Fixed term mechanisms typically are one of two kinds. In the version now used in Chile,
A New Method for Auctioning Highways

BOX 1 DEMAND FLUCTUATIONS—VEHICLE FLOW ON TOLL ROADS NEAR SANTIAGO

The demand risk faced by the holder of a fixed term franchise is illustrated by the table below. The table shows the rate of growth in the number of motor vehicles paying tolls during the past decade at the three busiest tollbooths near Santiago, Chile. Even though Chile’s economy has been more stable in the past decade than in any other decade this century, with no recessions and GDP growing by an average 6 percent a year, traffic growth rates have fluctuated considerably—both across years and across roads in a given year.

Annual rate of growth in vehicles paying tolls (percent)

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<tbody>
<tr>
<td>Angostura</td>
<td>8.8</td>
<td>15.0</td>
<td>11.7</td>
<td>4.5</td>
<td>8.7</td>
<td>12.4</td>
<td>6.7</td>
<td>7.8</td>
<td>9.4</td>
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<tr>
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<td>13.1</td>
<td>8.1</td>
<td>7.2</td>
<td>5.2</td>
<td>2.9</td>
<td>3.9</td>
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<tr>
<td>Lampa</td>
<td>3.8</td>
<td>13.4</td>
<td>15.9</td>
<td>8.9</td>
<td>6.8</td>
<td>18.0</td>
<td>8.8</td>
<td>16.2</td>
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</tbody>
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Source: Ministry of Public Works, Chile.

The regulator fixes the term and the franchise is awarded to the firm that bids the lowest toll in a competitive auction. In the version used in Mexico, tolls were fixed by the regulator and the franchise was awarded to the firm asking for the shortest term.

The main defect of fixed term mechanisms is that they create unnecessary risk for the franchise holder. Since demand is uncertain and competitive bidding dissipates ex ante rents, the winner of the franchise chooses a franchise term (or toll) such that it faces significant losses if traffic turns out to be considerably below expectations. This may happen even when traffic flows are sufficient to pay for the road in the long run. Faced with high risk, the franchise holder will demand a risk premium, which is paid by users (or, through government guarantees, by taxpayers). For Chile, this risk premium is estimated at about a third of the investment cost; for most developing countries, it can be expected to be even larger.

Because of the high risk associated with highway franchises, lenders have refused to grant franchise holders loans unless governments guarantee the debt (as in Spain) or provide generous minimum toll revenue guarantees (as in Chile). Guarantees reduce the incentives for lenders to screen projects and monitor their performance, one of the basic arguments for highway franchises. A second consequence of high risk is that when demand turns out to be lower than expected, contracts are renegotiated and losses shifted to users or taxpayers. The expectation of renegotiation prompts firms to bid artificially low tolls (to lowball), expecting better terms after the contract has been awarded. It also implies that firms that excel at renegotiating contracts can compete with firms that are considerably more efficient at building, financing, and operating highways. Thus, with fixed term franchises, the advantages of privatizing roads are easily lost: taxpayers and users pay for roads that are bad investments, inefficient firms win franchises, and firms do not mind building white elephants.

Fixed term franchises have additional disadvantages. First, they increase the likelihood that the franchise will be awarded to the firm with the most optimistic traffic projection (the winner’s curse). Second, fixed term contracts are inflexible, which can be a serious problem if tolls turn out to be out of line or congestion makes it desirable to widen the highway. The problem arises because it is difficult to agree
on the fair compensation—the expected income forgone over the remainder of the franchise—to be paid to the franchise holder in these cases.

**LPVR franchises**

The least-present-value-of-revenue mechanism corrects several shortcomings of fixed term mechanisms. In this approach,
- The regulator sets a maximum toll.
- The franchise is won by the firm bidding the least present value of toll revenue.
- The franchise ends when the present value of toll revenue equals the franchise holder's bid.
- Toll revenue is discounted at a predetermined rate specified in the franchise contract. The rate should be a good estimate of the loan rate faced by franchise holders.

As an example, consider an auction with two firms. The first firm estimates costs of $100 million and bids $112 million, while the second estimates costs of $99 million and bids $110 million. The second firm wins and operates the franchise until the present value of toll revenue is $110 million.

**Advantages**

The basic principle underlying LPVR auctions is that the franchise holder should not make losses when the long-run demand for the highway is sufficient to pay all costs. Thus, the term lengthens if traffic grows more slowly than expected, and it shortens if traffic grows more rapidly than expected. Revenues are the same even with different demand realizations, so the risk borne by the franchise holder is far smaller than under fixed term franchises. For this reason, the franchise holder requires a smaller risk premium, and users pay less on average. The lower risk for the franchise holder also means that the winner's curse is less likely, because bids are less dependent on demand projections.

With LPVR auctions, the franchise holder still bears the risk that the road may not be self-financing in the long run—that is, that it will turn out to be a white elephant. But since white elephants are usually the result of lobbying by pressure groups, they should be easily detected by potential bidders.

A further advantage of LPVR auctions is that competition for the franchise reveals, through the winner's bid, the income required to earn a normal return. This reduces the scope for opportunism after the contract is awarded, because the winning bid can be used as a benchmark. In the case of government opportunism leading to a regulatory taking, the franchise holder can go to court, asking for fair compensation equal to the difference between its bid and the present value of toll revenues already received.

Opportunistic renegotiations that favor the franchise holder are also less likely, for three reasons. First, because the term automatically lengthens if demand grows more slowly than expected, it is less likely that franchise holders will face financial distress and therefore demand renegotiation. Second, renegotiations in favor of the franchise holders are explicit wealth transfers: term extensions are impossible by definition, and the only effect of a toll increase is to shorten the term of the franchise. Since explicit wealth transfers are easier for the public and the media to understand, they are less likely. Third, the government can discourage lowballing by bidders by threatening to end the franchise if the franchise holder asks for a renegotiation, compensating the franchise holder with whatever sum remains to be collected.
The winning bid determines the fair compensation for termination of the contract at any time as the difference between the present value of revenue earned and the original bid. This ensures flexibility in LPVR contracts. If demand exceeds expectations and requires an expansion of the highway, the franchise holder can be paid the fair compensation and the franchise reauctioned. It is also easy to adjust tolls. If tolls need to be raised because of congestion, the only effect is that the franchise ends earlier. If demand for the highway is highly uncertain before it is built (as is often the case for new highways), the setting of tolls can be postponed until after construction.

**Limitations**

The main limitation of LPVR franchises compared with fixed term contracts is that they provide fewer incentives to engage in demand-enhancing activities. Any expense that increases demand shortens the franchise and so increases profits less than it would under a fixed term contract. As a result, the franchise holder may underinvest in road quality or maintenance, speedy attention at toll booths, or swift cleanup of accidents. For this reason, LPVR auctions require regulatory institutions that set and enforce minimum quality standards for franchise holders. Regulation need not be complicated. For example, independent agencies could monitor waiting times at toll booths, and the waiting times could be published in newspapers to make the regulators accountable to users. (Even with fixed term franchises, it becomes necessary to monitor quality as the end of the term approaches.) This defect of LPVR auctions can be mitigated by rewarding franchise holders that achieve short franchises.

**Conclusion**

LPVR auctions are a promising mechanism for privatizing not only highways but also other infrastructure projects. They are attractive for projects requiring large investments up front and in which demand is unresponsive to efforts by the franchise holder. They also require a low-cost capability to verify revenues, the quality of service, and the residual value of investments.


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When Argentina began concessioning its major roadways in 1990, it had a mature, well-connected, but poorly maintained network. Maintenance had been squeezed by the shortage of government funding and the high cost of public sector construction and maintenance—construction costs averaged about twice what might be considered best practice. Thus, Argentina’s main reform objectives were reconstruction and maintenance of existing roads and reduction of the public finance required by the sector. Involving the private sector in exchange for the right to charge users tolls was seen as a way to both shift the financial burden to users and maintain roads more efficiently. The general strategy for privatization was to unbundle viable roads into build-operate-transfer (BOT) concessions awarded through competitive bidding. Most of the traffic is concentrated near major nodes, such as Buenos Aires and to a lesser extent Rosario and Córdoba. Thus, the concession program has so far focused on the multilane roads and freeways serving these cities, along with other intercity and major city access roads.1

The first wave of concessions—Intercity roads

In the first wave of privatization, the government concessioned about a third of the intercity highway system, offering twelve 12-year concessions in 1989 and awarding them in early 1990. The segments had traffic averaging at least 2,000 to 2,500 vehicles a day, a level considered viable for private concessions. In return for the right to collect tolls, the concessionaires were required to undertake a program of maintenance, rehabilitation, and capacity improvements. Built into the concessions was a toll structure subject to price cap regulation. It set a uniform value per kilometer for each class of vehicle and was consistent across all concessions. The maximum toll was five times the basic toll and was to be determined by vehicle size, number of axles, and distance traveled between toll booths. To protect concessionaire revenues against inflation, tolls were to be updated using a formula giving roughly equal weight to the cost of living index, the wholesale price index, and the value of the U.S. dollar. But the government provided no revenue guarantees to the concessionaires.

The concessionaires’ obligations included undertaking certain investments before starting to collect tolls, such as correcting the most serious deficiencies in the pavement and in vertical signaling, and undertaking other investments during the term of the concession to achieve specified service levels. The service levels, defined so as to recover past service levels, were measured by an index of road serviceability (the state of the pavement) ranging from 1 to 10. Targets were set for three periods: during the first three years, the objective was to reach an index of about 6.4; in the following seven-year period, the index was to improve to 8; and during the last two years of the concession, it could not fall below 7.5. Although the bidding documents did not specify the size of the investments required to reach the serviceability targets, it was estimated that at least 50 percent of the network would have to be repaved during the first three years, with another full repavement during the remaining nine years of the concession. The concessionaires were also initially obligated to pay a fee (canon) to the state for the use of the road infrastructure during the life of the concession.
and to take legal responsibility for any accidents resulting from poor road conditions.

The intercity road concessions were awarded in twelve simultaneous bidding contests. The bidding was competitive, with 147 bids submitted. The concessions were awarded to thirteen consortia formed by forty-six private companies. These thirteen consortia were to pay canon totaling US$890 million (1990 dollars). While the canon was the key criterion in the bid selection, there were many other criteria, including technical qualifications and timing of investment.

The intercity road concessions had been in operation for only five months in February 1991 when the government decided to suspend the contracts and renegotiate them. Several developments led to this decision. First, indexation increased the basic toll by more than 50 percent. Second, many concessionaires started to collect tolls before undertaking the required investments. Third, toll booths were located either at a relatively short distance from one another or near urban centers in order to capture suburban trips—lack of access alternatives created captive traffic. These three developments prompted public protest and strong pressure to reduce the tolls. In addition, the government's emergency decree to peg the new peso made the contracts' tariff escalation clause illegal.

The renegotiations resulted in a major overhaul in the design of the concessions. Tolls were reduced by more than 50 percent. To compensate the concessionaires, the canon was eliminated, and the government also granted concessionaires a total annual subsidy of US$57 million. The subsidy, to be distributed among concessionaires according to the size of their value added tax (VAT) contributions, amounts to a shadow toll because VAT contributions are directly related to traffic levels. The location of toll booths and the commitments and schedules for road works were also renegotiated.

The second wave of concessions—Access roads to Buenos Aires

In 1992, the government initiated a second wave of concessions, for the maintenance, operation, and improvement of three strategic access highways radiating from Buenos Aires. A fourth concession with no right to collect tolls was negotiated with a construction company that had been building a road under a public contract for many years.

The government, benefiting from its experience with the intercity concessions, designed simple, straightforward concession terms and bidding criteria for the Buenos Aires access roads (table 1). Bidders received a comprehensive concession contract detailing the amount and sched-
ule of required investments, the required service level, and the risk-sharing arrangements between the government and the concessionaire. The contract allocated the bulk of the project risk to the private concessionaire by precluding any revenue or traffic guarantees or any other guarantee or financial support from the government. In addition, the contract assigned to the concessionaire the risks associated with pending land expropriations. And it required the concessionaire to build parallel untolled access roads, mainly collector streets. The bidding criteria were reduced to one variable: the lowest toll offered.

**Impact**

The results of the concessions so far have been mixed. All have been hit by the “tequila effect” recession that started in early 1995. The concessions for urban access roads promise to provide some badly needed increases in urban highway capacity that the government otherwise might not have built. But achieving all the objectives is taking longer than expected. Construction on two of the four concessions has been delayed by legal problems with land expropriation and with relocation of the people now living in the area needed for the construction. Because of the delay, the concessionaires have been unable to start collecting their tolls. The other two concessionaires can collect only part of their tolls because not all their facilities are in place. Moreover, in three of the four concessions, only 25 to 60 percent of required investments have been made; in the fourth, investment was accelerated.

Under the intercity highway concessions, road use more than quadrupled between 1991 and 1996—raising toll revenues from almost US$60 million in 1991 to a projected US$258 million in 1996 (figure 1). However, most of this increase occurred before 1995—since then the recession has kept traffic and revenues fairly flat. The maintenance of the intercity highway system, including the concessioned portions, has improved significantly. The share of paved roads in bad condition declined from about 30 percent in 1989 to 25 percent in 1993, and the regulator predicts that it will fall to about 10 percent in 1997. And maintenance of the concessioned network is no longer a major drain on government budgets—though government subsidies increased from US$23 million in 1991 to more than US$65 million in 1996, in part because of the government’s reluctance to allow toll increases.

But on the negative side, investment is behind schedule because the renegotiations reduced the concessionaires’ potential returns. Although the intercity concession program estimated that at least 50 percent of the road network had to be repaved during the first three years of the concessions, actual repaving has fallen short of this mark. Still unclear, however, is the efficiency of construction and maintenance. The government has collected no information to show whether the private sector is maintaining the roads at a lower cost than the public sector did—or whether it is doing better for the same cost.

**Lessons**

Three main lessons have come out of the reforms. First, it is important to have simple and transparent criteria for the bidding. In the initial round for the intercity concessions, the bidders had to satisfy a long list of technical and financial criteria, all with different weightings. By contrast, bidding for the Buenos Aires access road concessions used a single criterion, and investment obligations were discussed with potential investors before the bidding documents were finalized. Using a single, unambiguous criterion not only provides transparency in the award process. It also avoids unnecessary complications.
resulting from tradeoffs between competing offers on multiple criteria.

Second, the rules for renegotiating contracts should be spelled out as early and as clearly as possible. Adequate rules were not issued until 1995. These new rules specify the conditions under which changes in some aspects of the contracts are allowable. And they recognize the importance to the concessionaire of ensuring that renegotiation does not alter its financial return when the problems that led to the renegotiation are beyond its control—as when the government's pegging of the new peso to the dollar made the contracts' tariff escalation clauses illegal. Before the new guidelines were adopted, the concessions were renegotiated bilaterally, with each party seeking the best deal it could get. Now, all the allowed options and the terms of eligibility are clearly specified so that all concessionaires are playing by the same rules.

Third, institution building must be taken seriously. Before the concessioning, all the main technical functions (planning, design, maintenance, construction) for the national highway network were the exclusive responsibility of the Dirección Nacional de Vialidad (DNV). The same functions were performed by similar agencies at the provincial level. Poor coordination among these agencies led to poor planning and inefficient decisions. The reform transferred the management and control of roads to the provinces. The DNV was to become a national planning and coordinating agency responsible for allocating resources and auditing their use for national highways while also acting as a regulator for these highways. The DNV does not yet fully perform either function. It is not independent, and its staffing and organization are inadequate for effectively supervising the concessionaires. Nor does it require meaningful reporting by the concessionaires. Similar institutional weaknesses occur in supervision of the access roads. The responsible agency, located in the Secretariat of Public Works, does not collect or publish information on a regular basis, and its staff, though very committed, have been neither assigned clear goals nor provided with sufficient resources.

**Challenges ahead**

For future concessions, the government will need to work out a way to translate efficiency gains by the concessionaires into savings for road users and to structure the contracts so as to provide the right incentives and the flexibility to adapt to new circumstances. In the current concession schemes, it is unclear whether efficiency gains have benefited road users through savings in operating costs or in time. Another challenge is for the DNV's Organo de Control de Concesiones, which now relies on the toll operators for traffic and toll revenue information, to improve its capability to audit the results submitted by the concessionaires. This regulatory function will become even more necessary in the future if there are more flexible contracts with mechanisms for translating efficiency gains into lower tolls or for cross-subsidizing the provincial roads that have less traffic but act as feeders to the intercity links. A final challenge is regulatory independence. In December 1996, all the regulators of the road and rail concessions were united into a single agency. This is a positive development that will support consistent regulatory decisions. But this new commission still reports to the Public Works and Transport Secretary, and its five members have not been appointed using the kind of transparent criteria usually recommended to ensure the political autonomy of regulators.

For more information, see Antonio Estache, F. Helou, and Martin Rodriguez-Pardina, "A Portable Description of Argentina's Transport Privatization and Regulation" (World Bank, Latin America and the Caribbean, Country Department I, Washington, D.C., 1995).  

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A Retrospective on the Mexican Toll Road Program (1989–94)

Jeff Ruster

Mexico's private toll road program more than doubled the national toll road network—from 4,500 kilometers in 1989 to 9,900 kilometers in 1994. Fifty-three concessions were awarded for the approximately 5,500 kilometers of roads, and by the first quarter of 1995 forty-four were in full or partial operation, representing 5,120 kilometers. The investment of approximately US$13 billion in the program over the period 1989–94 was sourced from local commercial bank debt, concessionaire equity, and federal and state government grants and equity contributions (figure 1).1

However, gross miscalculation of investment costs and operating income led to an unsustainable set of operating conditions for these limited recourse financings. The financial equilibrium of the sector was further undermined by the Mexican currency crisis of December 1994. The combination of macroeconomic and project-level factors brought new project development to a virtual standstill, despite government estimates that another 6,500 kilometers of roads are needed by 2000. Restructuring of both project debt and equity investments has been the main focus of recent efforts.2

The financial and economic repercussions have been widespread. Local commercial banks were saddled with nonperforming toll road loans estimated at US$4.5 billion to US$5.5 billion. Concessionaires and their affiliates were faced with writing off significant portions of their investments. Moreover, the government has been unable to unclog the road construction program and has been under severe pressure to inject scarce financial resources to rescue investors. Users, in the meantime, were left with some of the most expensive road tolls in the world.

In retrospect, some industry observers have characterized the toll road program as a rushed and poorly designed effort to develop the infrastructure the country needed to compete effectively in an era of free trade. Others have simply labeled it a mechanism to lift the construction industry out of the economic depression of the 1980s. Whatever the diagnosis for the poor performance of the sector, from a private investment perspective the impact was to shut off capital flows to the sector and to add to the Mexican banking system's nonperforming loan portfolio.

This Note presents a diagnostic of key policy, regulatory, and institutional gaps that undermined the financial equilibrium of the sector. A checklist of recurrent problems illustrates how the failure to address these issues manifested itself in the course of implementation.
BOX 1 THE TOLL ROAD CONCESSIONS

Legal framework. Under the program, the Secretary of Communications and Transport granted concessions to special-purpose entities, which in almost all cases were either directly owned by or were affiliates of one or more local construction companies. The concession agreements were issued under the federal law of General Means of Communication, which governs, among other things, roads that connect two or more Mexican states and bridges along any such road. Under this legal framework, concessions could not exceed fifteen years, though this was later extended to thirty years, and a free, parallel alternative to each highway was required.

Concession party responsibilities. The concessionaire was responsible for financing, building, operating, and maintaining the toll road subject to government regulation for a specified period of time in exchange for the right to receive toll revenues generated by the project. The role of the Secretary of Communications and Transport centered on project definition, including highway path, location of interchanges and toll booths, and number of lanes; establishment of design and construction standards; design and implementation of tendering procedures; and supervision of the concessionaire.

Concession design. The concession specified the duration of the agreement, the work to be undertaken, operational and maintenance standards, government supervision, required maintenance reserve funds, concessionaire reporting requirements, certain fees payable to the government, and the tolls to be charged. On termination of the concession, the right to operate the highway and to collect toll revenues reverted to the government. The government was to remain the owner of the project throughout the term of the concession.

Tariff and adjustment mechanism. Each concession set forth a schedule of tolls by category of vehicle. Tolls were allowed to increase semiannually in accordance with the consumer price index (CPI) or whenever the CPI increased by 5 percent or more since the previous adjustment. All other toll adjustments beyond the levels set forth in the concession required the government's written approval.

Guarantees. Each concession also contained guarantees of traffic volumes by category of vehicle. Most concessions provided that if the actual traffic volumes on the highway fell short of those specified in the concession, the concessionaire would be entitled to request an extension of the term of the concession to permit recovery of its investment.

Major issues and sector performance

Although the program attracted significant private investment, well-publicized problems negatively affected sector performance. These revolved around the following issues:

- **Inadequate tendering process and concession design.** The prequalification standard was not rigorous enough (for example, bidders were not required to submit a detailed financing plan). Also, the project award criteria limited the pool of potential candidates (and thus potential competition for the market) to a handful of local construction companies that were more interested in the construction work than in the long-term financial viability of the projects. (See box 1 for an outline of the concessions.)

- **Inadequate financial discipline in government-owned commercial banks.** This led to large amounts of nonrecourse financing with little or no due diligence undertaking. It was not uncommon for lenders to waive important conditions precedent to initial and subsequent funding (insurance and bonding requirements, securing permits and rights of way, satisfactory review of traffic studies, geotechnical and environmental studies, and the like). As the story goes, such behavior was guided by an implicit understanding that even if the projects proved commercially nonviable, ultimate recourse was indeed to the government.

- **Underdeveloped local financial markets.** Legal and regulatory limitations combined with poor macroeconomic fundamentals inhibited the capacity of local markets to provide long-term fixed rate financing. Peso-denominated debt featured very short maturities rarely extending beyond five years, with interest rates often 1,000 to 1,500 basis points above those paid by the government. This situation was exacerbated by the currency crisis of December 1994, when all-in interest rates rose to more than 100 percent a year for most projects, which were already strapped to meet their debt service obligations.

- **Underdeveloped institutional capability.** The above three issues were aggravated by the fact that the program's scope simply ex-
ceeded the technical and administrative capacity of the local construction industry, the liquidity of domestic financial markets, the project finance experience of most financial intermediaries involved, and the institutional capabilities of regulatory officials. Consequently, the control mechanisms needed to develop the roads within such a short time were never adequately addressed.

A summary follows of how these four problems manifested themselves in all phases of implementation—in the regulatory and institutional framework for the concessions, the operative period, and the financial and legal arrangements of the projects.

The regulatory and institutional framework

Problems relating to the regulatory and institutional framework for the concessions included vague project selection criteria stemming in large part from the lack of an intermodal strategy and inadequate planning criteria at the federal and state level, inadequate prequalification and award criteria, uncertain tariff adjustment procedures, and lack of an independent regulatory authority to supervise the contractual arrangements. The major recurring issues included the following:

- This greenfield program sought to establish five main road corridors, three of which were to run between the main industrial centers in Mexico and the principal border crossings into the United States. Nonetheless, some high-priority segments were never concessioned, while others that were constructed lacked contiguous sections that would integrate them into the network. This piecemeal pattern of contracting reduced the near-term attractiveness of the toll roads to long-distance traffic, particularly to truckers, who pay the highest tolls.
- Somewhat related is the lack of an intermodal development strategy. Thus, project development in the various transport sectors often occurred without due coordination. Consequently, investors were unable to determine whether a project fit well into the long-term development plans of a region, especially given concurrent plans to privatize the rail, port, and airport sectors.
- Understaffing and limited institutional capabilities within the Secretariat of Communications and Transport often led to problems in obtaining permits or approvals for change orders on a timely basis and to inadequate enforcement of the concession requirements regarding construction and maintenance quality control standards.
- In addition to the problems relating to bid selection criteria, there was no efficient preselection process to screen out potential bidders that lacked the capacity to assume the essential risks of construction design and management, completion of large projects, and commercial management of toll road operations. While operating a toll road is fairly simple (mostly consisting of collecting tolls from passing vehicles), managing a toll road program is much more complex. It includes estimating demand in the face of competition from toll-free roads or other forms of transport, adjusting tolls to optimize revenues, planning maintenance to minimize long-term costs, and managing short- and long-term financial commitments. Ideally, the bidding consortia should be able to demonstrate that these skills are available to them. The lack of a good screening process led, for example, to the selection of medium-size concessionaires that financed their equity contributions through commercial loans. When projects began to suffer financial difficulties, these concessionaires were often unable to meet their equity infusion requirements. Others did not have the necessary technical capabilities, including specialized machinery, skilled labor, and adequate quality control procedures. Even some of the larger companies were stretched too thin, given the speed at which different concessions were awarded to the same firm.
- Formal mechanisms were never established for soliciting or channeling inquiries or requests from private sector participants before, during, or after the bidding process. Thus, the relationship that developed between the public and private sectors often lacked transparency and was at times adversarial.
Project cost structure

Cost overruns and delays frequently arose because of information deficiencies, problems with securing rights of way, lack of effective turnkey construction arrangements, unanticipated design changes, local community resistance, and permitting issues. As a result, the average cost per kilometer of new highway rose to about US$2.6 million to US$2.8 million, compared with the original estimated cost of US$1.7 million. This figure does not reveal the full extent of the overruns associated with the “hard costs” of construction, that is, the costs associated with required equipment, material, and labor, and as opposed to “soft costs” (interest payments during construction, cost escalation due to inflation, advisory services, and the like). The dramatic drop during 1990-94 in both inflation and interest rates offset in part the real increases in hard costs.

Reasons for the cost overruns included the following:

- Projects often broke ground with only very preliminary engineering and design work. In the case of the 267 kilometer Cuernavaca-Acapulco toll road, for example, this led to cost overruns of 200 percent and time delays of thirty months.
- Construction often began without first securing the right of way. This failure was often exacerbated by mounting resistance from local farmers and community groups, environmentalists, and historical conservationists, and resulted in delays and even rerouting of some projects. As problems occurred, machinery and material sat idle while mobilization and interest costs mounted.
- One of the most frequently recurring problems related to supervision and unilaterally mandated change orders by the Secretary of Communications and Transport. In a project in which four pedestrian bridges were expected, the final number reached almost sixty as a result of government-mandated change orders, often required to appease local interest groups.
- Many projects were financed under very loose cost-plus construction arrangements or none at all. This, combined with the fact that lenders only rarely hired an independent engineer to assist them with their due diligence investigation before financial closing or with supervision of the contractors’ efforts, created a void in terms of monitoring quality control programs, permitting issues, and the progress of construction budgets, critical path activities, and the like.
- In some projects, construction came to a virtual standstill because of poorly defined procedures and bureaucratic delays regarding the issuance of permits for purchase and use of chemicals or dangerous substances. In one project, time delays resulting from problems in securing permits for dynamite directly resulted in cost increases of nearly 30 percent.

Project revenue structure

Cash flow generated by the sector has been far below base-case expectations as a result of traffic shortfalls and higher-than-expected operations and maintenance expenditures. The December 1994 currency crisis led to a sharp decline in disposable income and thus road usage, along with a drop in economic activity that resulted in a marked decrease in commercial activity and freight transportation. As a result, of the thirty-two projects for which operating data were available in March 1995, less than five could meet their base-case revenue projections. On average, actual project revenues were 30 percent below original projections.

Important factors leading to this situation included the following:

- Shortcomings in the traffic studies reflected a general lack of expertise by the concessionaires, the lenders, and their consultants in developing adequate methodologies (box 2). On only five of the thirty-two toll roads for which traffic data are available has the average daily traffic been above base-case expectations (table 1).
- In some projects, trucks were expected to account for 20 to 45 percent of users. In reality, trucks were less than 5 percent of the traffic on many roads, leading to a weighted aver-
age tariff much lower than originally expected. In some cases, the existence of a black market for toll tickets contributed to this outcome.

- Despite obvious time and cost advantages of the new roads, many potential users were simply unwilling to pay the toll. Aside from the extremely high tariffs, this unwillingness was also due to the fact that the concessionaires did little to market the time and cost savings of the roads (for example, through monthly passes, volume discounts, and direct negotiations with high-volume users such as trucking or passenger bus companies).

- In all but a few concession agreements, the concessionaire could adjust the tariffs only with prior approval by the Secretary of Communications and Transport (even for downward adjustments). This greatly reduced the flexibility of the concessionaire in efforts to maximize cash flow.

- Minimal attention was paid to the development of such auxiliary services as gas stations, rest stops, hospitals, tow truck services, and restaurants. (For most projects, concessionaires were granted the right to operate these services for two years beyond the concession term.) A toll bridge expected to handle 5,000 trucks a day moving through a U.S. border crossing captured only 200 users a day. This shortfall was in large part due to inadequate attention to access roads and to installation of customs clearing facilities.

- The government faced great resistance from the trucking industry in implementing and enforcing technical measurement and axle-weight standards. Truckers for the most part continued to use the toll-free option, especially in light of the very high tolls.

- Operations and maintenance budgets often were not heavily scrutinized by the concessionaire or its lenders, and in many cases extraordinary maintenance costs were grossly underestimated. Though provisions for major maintenance reserve funds were included in most concession agreements, enforcement of these provisions by the Secretary of Communications and Transport and creditors was often lacking, especially as concessionaires began to experience financial difficulties.

BOX 2 TRAFFIC STUDIES

Traffic study methodologies often suffered from the following:

- Lack of analysis of specific traffic characteristics, including time and seasonal variations by type of vehicle, trip origins and destinations, and purpose and frequency of trips.
- Failure in projections to identify key economic parameters that would affect road usage, such as population, employment, per capita auto ownership, per capita and disposable income, and performance of key industrial indicators.
- Unrealistic growth rate assumptions for extended periods that, if realized, would have exceeded the capacity of the road.
- Failure to include an end-user learning curve or differences in tariff elasticity between end users.
- Overreliance on increased demand due to the opening of interconnecting roads, the construction of which was often delayed or never undertaken.
- Underestimation of the congestion relief that the opening of the new toll road would bring for the toll-free option, and thus overestimation of the actual time savings of the new road.
- Insufficient attention to general conditions of alternative and feeder routes and the identification of factors influencing the traffic-carrying capacity of key sections.
- Inadequate and at times not readily accessible data from the Secretary of Communications and Transport for traffic studies.
- Though investors sometimes employed their own independent consultants, actual fieldwork was limited to one to two weeks of traffic surveys. This was often the result of insufficient time allotted to bidders and financiers between the date of release of the bid documents and the deadline for delivery of bids.
- Inadequate toll collection operations and systems, poorly designed fiduciary structures, and the inexperience of the trustees and commercial banks responsible for supervising the flow of project funds led to less than strict controls over collection and proper application of road revenues.

Project financial structure

Lack of liquidity in the local financial markets, use of short-term, high-cost, floating rate debt, currency risk (both devaluation and convertibility) faced by international investors, and the
high cost and limited availability of surety and insurance coverage severely hampered sector performance.

- Concessionaires' financial contributions were in the form of “sweat equity” provided through the retention of work from construction affiliates. These contributions originally amounted to 25 to 30 percent of investment costs, but as lenders demanded higher equity cushions and debt service coverage ratios, these contributions increased to about 50 percent of project costs. This led to inflated construction budgets (and hence toll levels), with some projects effectively financed with 100 percent or more leverage. Estimates of the average gross margins in the road building program range from 35 percent to 50 percent of total costs. Like the distortions arising from the bid selection criteria, these excessive margins in no small part were the result of a lack of competition among the limited number of project bidders.

- The concession agreements contained an adjustment clause to shorten the concession term if traffic exceeded guaranteed levels. Because of the lack of any upside potential, this clause led to significant disincentives to apply true risk capital.

- The only source of local debt financing was the commercial banking sector. But the tenors for such debt often extended only through the construction period, with the expectation that once the project was in operation, cash flows would be securitized through local or international debt offerings. However, as roads incurred cost overruns and the debt servicing ability of the projects proved far less than had been expected, these construction lenders soon were forced to restructure and extend the terms of their bridge financing. In addition, the loans were characterized by high floating interest rates, often 1,000 basis points higher than the local market reference rate. This combination of high interest rates and short maturities resulted in prohibitively high tariffs.

- As many projects became increasingly unable to meet their debt service obligations, lenders' appetite for new toll road investments declined. Consequently, many banks that had underwritten huge amounts for projects were later unable to syndicate or refinance the loans, and liquidity quickly dried up in the market. Once word spread about the actual financial situation of many projects, other, untapped sources of funding (such as international institutional investors) quickly turned their attention to other investment opportunities, both within and outside the country. Likewise, in the few international offerings, market liquidity and resulting pricing were adversely affected by the presence of currency risk, in the form of both exchange rate depreciation and convertibility or transferability concerns.

- Local commercial banks were lacking in credit analysis, loan documentation, internal controls, and risk and liquidity management. Thus, the skills needed for limited recourse financing—to analyze project credit, security arrangements, and operative agreements—simply were not adequate for the complexity of the projects and the huge demand for credit.

- Performance, advance payment, and hidden defects bonds, as well as insurance for property damage, third-party liability, force ma-

### TABLE 1 DAILY TRAFFIC HAS NOT MET EXPECTATIONS

<table>
<thead>
<tr>
<th>Average daily traffic as a percentage of guaranteed traffic</th>
<th>Number of roads</th>
</tr>
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<tbody>
<tr>
<td>Above 100</td>
<td>5</td>
</tr>
<tr>
<td>75–100</td>
<td>2</td>
</tr>
<tr>
<td>50–74</td>
<td>8</td>
</tr>
<tr>
<td>25–49</td>
<td>8</td>
</tr>
<tr>
<td>6–24</td>
<td>9</td>
</tr>
</tbody>
</table>

*Note: As of December 1994.*

*Source: Author's compilation.*
jeure, and delayed opening, were high cost and very scarce. Where coverage was secured, significant problems arose in collection. These problems resulted as much from lenders' inexperience in negotiating the terms of such policies as from cumbersome and vague collection procedures.

Legal considerations

Legal aspects of the projects that weakened financial discipline included issues associated with lender security and enforcement rights, dispute resolution mechanisms, tax treatment, and procedures for securing government capital contributions. Key problems included the following:

- Legal disputes in Mexico arising between a private party and the government were to be resolved within the constraints of the Mexican court system and were not subject to international arbitration. Being subject to the local court system represented a significant risk to international investors because of their lack of familiarity with the legal system.

- State governments were expected to provide grants or cash equity or to dedicate toll revenues from existing roads for certain projects as part of the construction financing, as contingent obligations to cover cost overruns, or to cover costs related to securing the right of way. But there were often delays or actual defaults in the fulfillment of these financial obligations, in part because the contributions were to be sourced from annual budget appropriations, a process subject to tremendous uncertainty and discretion. As a result, state governments were often left without any means for meeting their obligations. Other problems arose because of the lack of a clear registration process for public debt, which left lenders with no clear understanding of where they stood relative to other state creditors.

- Lenders were not allowed a collateral assignment of the concession agreement. Consequently, they could neither secure revenue generated by the project nor exercise borrower substitution rights in the event of a default. This greatly diminished their bargaining power at the negotiating table with both the borrower and the government.

- Some concessionaires were not single-purpose entities. In these cases, it was impossible for lenders to isolate specific cash flows by project, and borrowers with multiple concessions were able to apply the cash flow from some projects to support the financial needs of related but separately financed ventures.

- Under many trust agreements, local banks allowed the concessionaire the final word in technical decisions on such matters as change orders, change of material subcontractors, and toll collection procedures. This led to major problems relating to construction and operating costs as well as quality control.

- Certain tax aspects affected the financial viability of the projects. Changes to the tax code were required regarding the 2 percent tax on assets, application and calculation of depreciation and tax credits, and payment of value added taxes. But these modifications were made only after nearly twenty-five projects had been concessioned, and in many cases they required annual approval and thus subjected financiers to nonrenewal risk.

Policy conclusions

Policies to address such issues would vary depending on sector objectives, the current status of the legal and regulatory framework, and the technical and financial capability of the public and private sector participants. Of the many lessons to be learned from the Mexican program, however, perhaps the most important for governments developing a sector program based on private investment is the necessity of devising systems of regulation and support that provide the encouragement and room for maneuver that the private sector needs, while minimizing the government's exposure to the host of commercial and financial risks surrounding projects. The sector strategy must include sound and explicit incentives to select worthwhile projects. Prices should be set to ensure the viability of privatized enterprises without protecting private parties from bankruptcy. Prices should also be allowed to
reflect actual demand—in this respect, the need to develop congestion pricing is of fundamental importance. The regulatory framework should check the abuse of market power and ensure adequate services. Besides protecting investors, an appropriate regulatory and market structure protects the government and eventually taxpayers from bearing ultimate responsibility for the financial performance of privatized enterprises.

1 Federal funding also included contributions by Petroleos Mexicanos (Pemex) and by Caminos y Puente Federales de Ingreso y Servicio Conexo (Capufe), the federal highways and bridge operator, for more than 1,100 kilometers (km) of public toll roads.

2 Recent government estimates show that 26 billion new pesos (US$1.5 billion) will be required to restructure existing concessions. The World Bank’s Operations Evaluation Department reports that by early 1997 nearly forty projects, accounting for US$1.5 billion of debt and equity investments, have submitted requests to the government for financial restructuring.

3 The governments of several Mexican states also granted concessions under local law to build and operate highways; these have generally been modeled on those granted by the Secretary of Communications and Transport under federal law.

4 The five major axis links are Nogales-Culiacan-Tepic-Guadalajara (721 km); Nuevo Laredo-Reynosa-Monterrey (480 km); Ciudad Juarez-Mexico City-Puebla-Oaxaca (340 km); Mexico City-Veracruz-Sayula-Ocozocoautla-Arriaga-Puerto Madero (428 km); and Tlapaz-Pachuca-Mexico City (222 km).

5 Three projects already in operation were nevertheless able to refinance by tapping the international capital markets prior to the December 1994 currency crisis. This was due in large part to expectations that Mexico would receive an investment-grade rating. These three projects are as follows:

- The ten-year, US$207 million placement for the Toluca toll road in June 1992. The deal initially was not well received despite repricing of about 700 basis points over U.S. Treasuries. Investor concerns centered on tight debt service coverage ratios of 1.25 to 1, combined with the existence of currency risk, a particularly sensitive issue at the time because the peso was estimated to be about 20 percent overvalued.

- The US$110 million placement for the Ecatepec-Pirámides and Maricavelo-Veracruz toll roads, which were jointly securitized. The proposed financing and security structure was perceived as much simpler than that in the Toluca placement, and it provided for a dual amortization process. The target amortization is based on a twelve-year final maturity. The alternative schedule requires payment (with a 1 percent added premium for investors) in eighteen years if project revenues are impaired, whether because of insufficient traffic flows, currency fluctuations, or similar risks. The deal was priced at about 500 basis points over U.S. Treasuries at the time of closing.

- The Mexico City-Guadalupe toll road, owned and operated by Capufe. The placement of exchange rate-linked bonds in August 1994 was originally planned as a US$625 million, twenty-year final maturity transaction. But because of investor concerns about currency risk and long-term interest rate volatility, the issue was cut back to a seven-year, US$265 million 144A placement (though also featuring a dual amortization schedule with an expected payout in five and a half years and a targeted average life of three and a third years). The issue received a local currency-based “A” rating from Standard & Poors. The deal was initially placed at about 350 basis points over U.S. Treasuries.

A fourth financing of about US$300 million for the Tepic-Guadalajara toll road was canceled at the last minute because of the onset of the December 1994 currency crisis.

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Railway Concessions—Heading Down the Right Track in Argentina

José Carbajo and Antonio Estache

Argentina privatized many of its railway services by concession contract during the early 1990s. The reforms have been remarkable for their speed and innovation—despite the complexity of the issues and the lack of “off-the-shelf” models to follow at the time. The overall result has been positive. Many services have improved. Traffic has grown—up about 180 million passenger trips a year. Subsidies have been cut dramatically—down from US$2 billion or so a year to a little more than US$100 million. But as with any complex reform, there is an unfinished agenda. And with the Argentine approach becoming a model for other countries in Latin America, this review of the lessons starting to emerge from the reform experience is a timely one.

Strategy for reform

When the Menem administration set the railway reform in motion in 1990, Ferrocarriles Argentinos, the largest operator, ran a national network of about 35,000 kilometers, employed 92,000 people, and was losing about US$1.4 billion a year (1992 dollars). These losses were a big drain on the Treasury and the main motivation for reform. On top of this, the fixed assets were in poor shape—in 1990, 54 percent of the track network was in fair or bad condition, and only half the locomotives were available for service. As a result, the operator was losing traffic and market share.

The reform strategy the government adopted was to break up the network into monopoly franchises that combine track and service operations—identifying the profitable and unprofitable segments in the freight and passenger markets, awarding concessions to the private sector through competitive bidding, and transferring a sizable network to the provinces. This single-operator strategy means that competition will arise not from several operators using the same track but from several potential op-

### RAIL CONCESSIONS—EARLY IMPACT

(percentage increase)

<table>
<thead>
<tr>
<th>Freight volume, major lines, 1990–95</th>
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<tbody>
<tr>
<td>Nuevo Central Argentino</td>
</tr>
<tr>
<td>Ferrocarril Mesopotámico</td>
</tr>
<tr>
<td>Buenos Aires al Pacífico</td>
</tr>
<tr>
<td>Ferroexpreso Pampeano</td>
</tr>
<tr>
<td>Ferrosur Roca</td>
</tr>
<tr>
<td>40%</td>
</tr>
<tr>
<td>50%</td>
</tr>
<tr>
<td>92%</td>
</tr>
<tr>
<td>130%</td>
</tr>
<tr>
<td>160%</td>
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<table>
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<tr>
<th>Passengers carried, 1993–95</th>
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<tbody>
<tr>
<td>Subte (subway)</td>
</tr>
<tr>
<td>Urquiza</td>
</tr>
<tr>
<td>San Martín</td>
</tr>
<tr>
<td>Belgrano Sur</td>
</tr>
<tr>
<td>Mitre</td>
</tr>
<tr>
<td>Roca</td>
</tr>
<tr>
<td>Belgrano Norte</td>
</tr>
<tr>
<td>28%</td>
</tr>
<tr>
<td>36%</td>
</tr>
<tr>
<td>64%</td>
</tr>
<tr>
<td>69%</td>
</tr>
<tr>
<td>74%</td>
</tr>
<tr>
<td>83%</td>
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<tr>
<td>408%</td>
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</tbody>
</table>

*Source: Comisión Nacional de Transporte Ferroviario.*
operators bidding for the exclusive right to provide a service during the life of a concession.

The freight network

The freight network was partitioned into six vertically integrated concessions, each for thirty years with an optional ten-year extension. Concessionaires are responsible for all operations and maintenance and for the investment program proposed in their bidding documents. Each concessionaire is free to introduce new working rules and practices. Because the fixed assets remain the property of the government, private operators must pay the state a fee for the use of the rail infrastructure and rent for the use of the rolling stock. Operators can offer intercity passenger service, but must allow other passenger operators access to the track in exchange for a toll. Freight tariffs have been deregulated, but operators must file maximum rates with the regulator for approval.

The commuter network

The government identified seven suburban railway services for privatization. The concession terms were set for ten years (twenty for the metro, or Subte, of Buenos Aires), and the model of concessioning was similar to that for the freight network, though it differed in two important respects. First, while freight concessionaires were expected to make a profit, it was accepted that suburban rail might need public subsidies for operation, rehabilitation, and investment. The government identified for each line the type and amount of investments needed, which the private operator was expected to undertake. The regulator would set the maximum fares—with automatic increases for rising quality of service. Concessionaires would also pay a nominal fee to the government for the use of the rail infrastructure.

Second, concessions were awarded on the basis of a single criterion: the lowest subsidy required to operate the line and undertake the specified investment and rehabilitation program. Bidders for the freight concessions had faced a complicated set of weights attached to the criteria used to select the winning bid—experience, investment plan, employment pledge, local investor participation, fees and rent, the access toll. The method for the commuter concessions was more transparent, and probably induced more rational bidding behavior from potential concessionaires (see below). In the end, the subsidy requested by the winning consortiums amounted to slightly more than US$1 billion (1992 dollars), spread over twelve years—most of it for capital investment and system upgrading, not operations.

The intercity passenger services

Viability studies of the intercity passenger services concluded that only one corridor, Buenos Aires–Mar del Plata, was commercially profitable. Low traffic levels prompted the government to decide not to subsidize any of them. Instead, the government offered the provinces the option to continue providing the services at their own expense. Most provinces rejected this offer, and in those cases routes were closed. Provinces that accepted the offer entered into concession agreements with the state, which transferred to them the rolling stock and other equipment necessary to run the services. The provinces agreed to subsidize the services and run them over the network concessioned to the freight and commuter rail operators, paying a fee to these operators for access to and use of the track.

Impact

With only about three years having elapsed since the awarding of concessions, it is still too early to tell how much more successful the new operators have been. And concessionaires have been hampered by the unexpectedly poor state of the assets on transfer—maintenance and inventory seem to have been neglected during the final months of public ownership. But some preliminary conclusions can be reached. Excluding Subte, the commuter railway concessions show on average a healthy 75 percent increase in passenger traffic. Car kilometers increased only 25 percent, pointing
to more effective use of capacity. The SUBTE has experienced 28 percent passenger growth—perhaps in part because of worsening road congestion, but also in response to improved customer service, security, and safety, particularly at stations. Growth in revenue-passengers carried also has been impressive, in large part because of the measures against fare evasion that all private operators adopted.

Traffic has also grown in freight services, but the private operators are reaching on average only 60 to 70 percent of their projected traffic. Some estimates put revenues as low as 50 to 60 percent of projections. Part of the explanation for this is stronger-than-expected competition from trucks. But another part is overoptimistic demand projections—the bidding process prompted concessionaires to make unrealistic projections and investment promises to help them win concessions. The consequence is that freight concessionaires have not been fulfilling their investment promises, which amount to about US$1.2 billion over fifteen years. For now, the regulatory agency that oversees the freight concessions is filing the requisite penalties, but has problems enforcing both the payment of the penalties and the investments. Most suburban rail operators also are falling short of projected demand—by about 30 percent—again in part because of overly optimistic demand projections but also because of competition from bus services.

Lessons

One objective for privatization was to minimize or eliminate the fiscal drain from the railway deficits, reducing subsidies to the minimum possible level by inducing the private sector to take over the profitable segments of the freight market and, in exchange for the lowest minimum subsidy, the commuter railway lines. Competition among enough bidders for the right to operate the monopoly concessions would ensure that any subsidies would be kept to a minimum. Private sector control of operations and maintenance was expected to improve efficiency and service quality.

Competition for the market

How well has competition for the market worked? It is difficult to tell with precision. There were so few bids for the freight concession, for example, that it is reasonable to wonder whether the full benefits of competition have been realized. The answer is obscured in part by the flawed scoring system in this early bidding process. Nevertheless, government subsidies for railways have been significantly reduced, through increased labor productivity and cuts in services. The reduction in employment on the services previously operated by Ferrocarriles Argentinos is particularly dramatic—from 92,500 in 1989 to about 17,000 now. (The government went to considerable effort to ensure that severance pay would ease the layoffs.) No more than half the labor savings were achieved by cutting services. The most significant cuts were in intercity passenger services, where the number of train kilometers operated fell by about three-quarters and the number of passengers by perhaps two-thirds.

Flexible contracts

The many freight concessionaires reportedly not meeting their investment promises are essentially disinvesting in the network, failing to maintain lightly used lines. This presents the government with the following dilemma: If it enforces the letter of the contracts, making the concessionaires undertake the promised investments, they may go out of business, ceasing service. If instead the government does not enforce the contracts, it loses credibility, sets a precedent, and incurs a reputation cost. And even if the concessionaires could afford to comply with their contracts, making them undertake investments that might be commercially unnecessary is questionable from an economic perspective. What is needed is a mechanism for flexible yet fair renegotiation of concession contracts.

Challenges ahead

As can be expected from a complex and challenging exercise, the railway privatization still has an unfinished agenda. An overall regula-
tory structure must be put in place, and a contractual strategy needs to be devised for dealing with concessionaires' noncompliance with their concession agreements.

The single-operator strategy shifts the burden of preserving effective competition to the contract and to the regulator. Once the concessionaire is selected, a specialized regulatory agency becomes responsible for any final contract negotiations, for contract enforcement, and in some cases for other regulatory functions. This system appears to work reasonably well, with three qualifications. The first, and most easily corrected, is that broad grants of discretionary regulatory authority to guard against monopoly abuse, such as that enjoyed by the freight rail regulator, are probably unnecessary and unwise. The regulatory commissions should focus on enforcing and monitoring contracts and not be distracted by issues of monopoly. Most of the modes already face strong competition. The freight railroads, for example, compete fiercely with trucks and with one another.

The second problem, at least as important but far more difficult to solve, is how to cope with the need to periodically renegotiate or modify the concession contracts. Renegotiation or modification may seem antithetical to the whole idea of concession contracting: the contract system is meant to protect both the public and the concessionaire by specifying all the terms of the concession in advance. The prospect of renegotiation could undermine potential concessionaires' incentives to bid honestly and could open the door to political interference. But Argentina’s transport concessions showed that it is probably impossible to specify all the conditions in advance, especially in an economic environment changing as rapidly as Argentina’s. So the contracts must be seen as living documents. Even carefully drawn contracts may become obsolescent because the world changes quickly and in unexpected ways. Part of the problem may be that the rail concession contracts were poorly drawn. But in many ways the obsolescence of the contracts stems from the success of the economic reforms in Argentina.

If revisions are to be considered, they must be based on clear, agreed, preestablished criteria. Such criteria could include: How would overall efficiency be affected? Would investor and consumer interests be protected? To adjudicate disputes, one procedural option is to rely on normal commercial contract law and the incentives and opportunities it creates for the voluntary renegotiation of contracts that no longer serve the interests of either party. But courts tend to be better at enforcement than at renegotiation. Another option is to establish a special commission to arbitrate contract disputes using clear and fair rules. The challenge is to find such rules. One possibility is a rule that, in the event of a negotiating impasse, requires the arbitrator to choose one of the two parties' best and final offers, without modifications. Allowing no modifications would give both parties (the government and the concessionaire) strong incentives to be reasonable and to recognize each other's legitimate interests. This system has been used successfully with labor contracts in the United States.

A final, related concern is the proliferation of regulatory commissions. There is now one for each transport concession program. If arbitration commissions are to be used in addition, they should be independent from the enforcement commissions; otherwise, the arbitrator would also be one of the disputing parties to the contract. But some of these commissions could handle several sectors. Argentina does not need a large number of enforcement or arbitration commissions.


José Carba/o, Private Consultant, and Antonio Estache (aestache@worldbank.org), Latin America and the Caribbean, Country Department I
Competing Private Ports—Lessons from Argentina

*Antonio Estache and José Carbajo*

Before Argentina began reforming port operations in 1990, its ports were costly and inefficient. Restrictive labor regulations led to high labor costs. Most ports were open rather than terminal-based, leading to inefficient operating practices and unnecessary costs for cargo handling and storage. They were overregulated by multiple agencies with overlapping responsibilities. As a result of all these problems, the ports were losing market share to the road sector and to the more efficient Chilean ports.

To reduce costs and increase productivity, the reform strategy sought to deregulate, decentralize, and concession the sector and organize competition within it. As performance indicators for the port of Buenos Aires show, the improvements have been dramatic (table 1). Port charges and shipping tariffs have declined sharply, and labor productivity has nearly quadrupled. Cargo volumes are up 50 percent—though this is considerably less than the 110 percent new private operators had predicted.

Two broad lessons have emerged from Argentina's port reform. First, competition can be effective—competition introduced not only among ports, but also by inviting operators to bid for a concession to operate a port and by dividing large ports into terminals and offering each as a separate concession. Second, to successfully pull out of the sector, the government has to show strong commitment even after the port services have been privatized, applying clear and coherent rules of the game. Almost seven years after the beginning of the reform, Argentina still lacked an independent port regulator. The integrity of the reforms has very much depended on the personal authority of the undersecretary of ports, the "father" of the reforms.

### Strategy

Between 1990 and 1993, the government abolished most of the restrictive regulations governing working practices at ports and on vessels. Argentine shipowners were allowed to temporarily register their ships under foreign flags and thus benefit from lower requirements on crew size. Contracting arrangements with stevedore companies were freed up, and pilotage and towage services were deregulated and operators allowed to establish their own tariffs. Foreign ships were allowed to practice cabotage. And other labor agreements and norms that were hampering productivity in port operations were abolished.

The decentralization occurred in two stages. In the first stage, the major ports—Dock Sud

<table>
<thead>
<tr>
<th>Indicator</th>
<th>1991</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cargo (thousands of tons)</td>
<td>4,000</td>
<td>6,000</td>
</tr>
<tr>
<td>Containers (thousands of teu's)</td>
<td>300</td>
<td>540</td>
</tr>
<tr>
<td>Capacity (thousands of containers per year)</td>
<td>400</td>
<td>1,000</td>
</tr>
<tr>
<td>Operational area (hectares)</td>
<td>65</td>
<td>95</td>
</tr>
<tr>
<td>Productivity (tons per worker per year)</td>
<td>800</td>
<td>3,000</td>
</tr>
<tr>
<td>Average stay for full containers (days)</td>
<td>2.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Cost for container imports (US$ per ton)</td>
<td>450</td>
<td>120</td>
</tr>
<tr>
<td>Port tariff for exports (US$ per ton)</td>
<td>6.7</td>
<td>3.0</td>
</tr>
<tr>
<td>Port tariff for imports (US$ per ton)</td>
<td>2.1</td>
<td>1.5</td>
</tr>
</tbody>
</table>

a. Teu's are 20-foot-equivalent units.

Source: Administración General de Puertos.
at the port of Buenos Aires, Bahia Blanca, Quequén, Rosario, and Santa Fe—were transferred to the provinces, subject to the creation of port administration entities. Conceived as nonprofit organizations charged with owning and maintaining the port’s infrastructure and common use areas, including waterways and access areas, these entities are governed by shippers and representatives of provincial and local governments. They are required to lease the port terminals as concessions and will receive fees from the concessionaires for the use of the infrastructure. Any profits have to be invested in the port. In the second stage, the sixty small ports, half of which had not been operational for many years, were transferred directly to the provinces, which may operate them, lease them to private firms, or abandon operation.

The organization of competition started in the largest and busiest port, the port of Buenos Aires, which handles most of the containers bound to or from Argentina. The port was divided into three areas with different functions and administrations. Dock Sud was transferred to the province of Buenos Aires as a port specialized in bulk liquids. Puerto Nuevo, which remained under national jurisdiction, was split into six terminals that would compete against one another after being concessioned to the private sector. Puerto Sur, still to be developed, will be concessioned to the private sector.

By 1995, the new authority for Puerto Nuevo had awarded its six terminals to concessionaires, and a similar process of concessioning was under way at the other major ports. The Puerto Nuevo concessions were auctioned to the highest bidder—the bidder offering the highest annual canon (based on expected traffic) to the government. Although bidders were allowed to bid for more than one terminal, they could be awarded only one (terminals 1 and 2, however, were awarded jointly). The winning bidders offered annual canons for the six terminals totaling US$32.5 million—based on projections of cargo volume that have since turned out to be unrealistic. The concession terms for the six terminals range from eighteen to twenty-five years (table 2). During the term, the concessionaire has exclusivity over all loading and unloading services at the terminal, but must guarantee service to anyone demanding it.

The government set maximum cargo charges in the bidding documents, and concessionaires had to specify their tariffs in the contract subject to this cap. In cases of major demand and supply imbalances, concessionaires can apply to the port authority to adjust these tariffs. The adjustment rule in the contracts is a rather loose one, simply stating that tariffs should be made public and that they must be just and reasonable while allowing a reasonable return to investors. The concession contract also includes explicit annual investment targets and requires the port authority to contribute a specified amount of the financing.

The outcome

The combination of deregulation, competition, and privatization has led to dramatic reductions in port charges and in barge and ocean shipping tariffs. Charges for shipping containers between Argentina and Northern Europe declined by 30 to 70 percent in less than two years, and charges for shipping grain and other bulk goods by about 10 percent. Decentralization has led to the closure of the small, unprofitable ports transferred to the provinces, with large net savings. Most of the savings have come from improved labor productivity, however. At the port of Buenos Aires, total employment fell from about 8,000 just before the reforms to 2,500 in 1994 and has remained around that level. The liberalization of operating rules drastically reduced the requirements for stevedores in the port of Buenos Aires, leading to higher labor productivity: the amount of cargo per non-administrative worker rose from 800 tons in 1991 to 3,000 in 1995. Tariffs for port services have also declined by varying amounts, depending on the port, size of ship, and type of service. In the port of Buenos Aires, for example, towage tariffs fell by about 40 percent following flag changes and the introduction of increased competition. Pilotage tariffs have decreased, with the size of reductions depending on the port and the area of service. Stevedore tariffs report-
TABLE 2  SUMMARY FEATURES OF THE PORT TERMINAL CONCESSIONS AT PUERTO NUEVO, BUENOS AIRES

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>Twenty-five years for terminals 1, 2, and 3; twenty-four years for terminals 4 and 6; and eighteen years for terminal 5.</td>
</tr>
<tr>
<td>Ownership</td>
<td>The state remains the owner. Concessionaires acquire only the right to maintain and use infrastructure and equipment, for which they pay a usage &quot;fee&quot; to the government.</td>
</tr>
<tr>
<td>Labor</td>
<td>Concessionaires must employ 1,350 people from the public agencies previously operating at the port or present an equivalent number of redundancy agreements.</td>
</tr>
<tr>
<td>Operations and maintenance</td>
<td>All commercial operations are performed by the concessionaires.</td>
</tr>
<tr>
<td>Pricing</td>
<td>The government set a price cap on cargo charges, and concessionaires had to specify their tariffs in the contract subject to this cap. The port authority can authorize adjustments to the tariffs.</td>
</tr>
<tr>
<td>Capital investments</td>
<td>Each concessionaire is to undertake annual investments as specified in the terms of the concession. The port administration will contribute a fixed sum for the infrastructure rehabilitation works and will supervise these works, which must be carried out in specific stages according to a set timetable.</td>
</tr>
<tr>
<td>Financial performance</td>
<td>Each concessionaire bids on the basis of a business plan and annual financial results.</td>
</tr>
</tbody>
</table>

edly have also declined and are expected to decline even more when privatization is complete. Maritime tariffs have fallen by up to 40 to 50 percent for cargo movements that were previously reserved for Argentine flag ships.

The deregulation and privatization of port and maritime transport, combined with the other major economic reforms, have had a considerable impact on external trade. The decline in Argentine ports’ market share was quickly halted. Maritime transport regained its historical share in Argentine external trade, accounting for more than 90 percent of exports by volume and about 75 percent of imports. The average shipping tariff for both exports and imports fell between 1991 and 1995. Overall, the cost savings resulting from port deregulation and privatization total about US$156 million a year, according to a 1994 government estimate.

Lessons and challenges

These results suggest that effective competition can be introduced in port services. But they also reveal important lessons about the need for institutional reform and efficient contracting.

Institutional issues

Most of the benefits achieved would not have been realized without coordinating all the agencies involved in the business of ports—including the police and customs. This integrated policy approach has meant significantly lower transaction costs than occurred under the uncoordinated monitoring and policing by multiple agencies before the reform. Much of the credit for this approach goes to the strong reform team of the undersecretary of ports. The three port authorities in Buenos Aires and the two in Santa Fe are now governed jointly by representatives of all the main players. They still have monitoring responsibilities, but their regulatory responsibilities have been greatly reduced by the substantial deregulation of port operations and maritime cargo reservation, thus facilitating competition.

A flaw in the reforms has been the failure to fully take into account other transport modes. For example, at the port of Buenos Aires, concessionaires are planning large increases in capacity that will lead to a big increase in city traffic. If urban road use were properly priced, concessionaires would have considered the full social costs of their actions. But because urban roads are subsidized, a likely outcome will be traffic congestion and pollution.

Still pending is the organization of an independent national port authority to act as regulator and as monitor of the concessions. The national authority’s functions and obligations should be structured around transparent procedures for informing users about the cost and quality of
services. Similarly, to put all the ports on the same competitive footing, the transfer of the ports remaining under the control of the old port authority needs to be completed; this entity can then be liquidated. Finally, further concession arrangements and institutional changes are required so that the activities associated with the dredging and signaling of navigation channels can be fully privatized.

**Playing by the rules**

The concessioning of terminals 1 and 2 offers an important lesson about maintaining credibility in the concessioning process. The bidding, governed by a published set of rules, resulted in the award of the two terminals to an international consortium headed by P&O Australia, in partnership with a local stevedore company and a local shipping line. The consortium's winning bid was US$13.5 million. The second highest bid, for US$9.6 million, came from an Argentine consortium, Murchison and Roman Maritima. After the Argentine consortium protested that the Argentine partner of the winning consortium did not have enough equity, the government disqualified the winner and awarded the bid to the Argentine consortium. Later, a court judgment cleared P&O's partner of any wrongdoing or misrepresentation.

Recognizing the potential damage to the concession process, the government urged the two parties to work out an agreement. Eventually, the P&O consortium acquired 49 percent of the Argentine consortium and created a new company. This outcome may have benefited each of the consortia more than winning the bid would have. If the government had formally awarded the P&O consortium terminals 1 and 2, Murchison, then a major port contractor, probably would have pulled out with all its equipment as well as its large client base, including 50 percent of all container traffic. Instead, Murchison can benefit from the international expertise of P&O. But the lesson is simple. In awarding concessions, there is no substitute for sticking to the rules and applying straightforward criteria. This case had a positive outcome, but only thanks to an unusually skilled government negotiator.

Looking ahead, there is a risk that some concessionaires will not comply with the terms of their contracts. Bidders were too optimistic about market growth potential: the combined bids at the port of Buenos Aires of US$32.5 million a year reflected expectations that cargo volume would grow to 8.1 million tons, an unrealistic 110 percent increase. There has already been a casualty. The concessionaire for terminal 6 went into bankruptcy in late 1995, and the terminal was closed. Given the strong competition among the terminals, the risks are serious. Any new crisis could lead to requests for major contract renegotiations. The authorities should use a flexible, transparent, by-the-rules approach in any renegotiations—as they did in some minor renegotiations that cut port tariffs by 25 percent.

**Bankruptcy and employees’ rights**

Bankruptcy is a normal risk of privatization, and the government is preparing a new bid for terminal 6. But the workers are unhappy because they have not been paid by the bankrupt operator. They want the government to pay their wages, arguing that they are still civil servants. The government does not feel obligated to pay them, and the matter has been in the courts for almost a year. Unless the issue is resolved, any new bid is unlikely to meet the government’s expectations. Establishing clearer rules of the game for the workers might have prevented the problem, but no one foresaw that it would happen. Now it is a serious, precedent-setting challenge for the government—and a valuable lesson for other countries considering privatizing their ports.

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1. Canon is the rental fee for infrastructure owned by the public sector.

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Summaries

Multisector

**Competition in Network Industries—Where and How to Introduce It**

Deregulation and new technology, including the advent of smart markets, have provided new opportunities for competition in power, water, transport, and telecommunications. Michael Klein and Philip Gray look at the various options for competition—competition for the market (franchising), competition in the market (open access, pooling, and time-tabling), and competition among networks. How competition is introduced and how effectively and easily it is implemented will vary from one network industry to another. But the authors propose some general rules: The more complex the network and the smaller the sunk costs, the greater the value of introducing competition from other networks. The faster the rate of technical change, the greater the dynamic benefits from competition. And the lower the regulatory capacity, the more efficient it will be to opt for competition.

**The Cost of Privatization Transactions—Are They Worth It?**

Although the number of private infrastructure projects continues to grow, tales of endless delays and exorbitant development costs still scare both developers and governments. Michael Klein, Jae So, and Ben Shin show that these costs depend less on project size than on the familiarity and stability of the policy environment. As governments gain experience and clarify policy, these costs will inevitably fall.

**Capital Market Pressures and Management Incentives—And the Implications for Sale Strategies**

Timothy Irwin and Ian Alexander propose a number of good privatization rules to ensure that management will improve after infrastructure privatization. Governments should ensure that several firms are operating in the privatized sector so that if one goes bankrupt, another can readily take over. Governments should permit concentrated ownership and foreign ownership, because the presence of large shareholders and a large pool of potential buyers helps induce better managerial performance. And finally, governments should not guarantee profits through regulation.

**Colombia’s Mixed Ownership Model for Privatizing Infrastructure**

Colombia has taken a more gradual approach to private participation in infrastructure than such other Latin American countries as Argentina, Bolivia, and Chile. Its approach is closer to that in many Asian countries: existing assets remain in state hands, and new infrastructure is financed by the private sector through project finance arrangements—but with government guarantees. The approach has attracted much private capital. But it can complicate reform, and the lack of clarity surrounding public and private roles in regulation, operation, and investment can make reform less sustainable. Philip Gray explains the approach and the conflicts that can and do arise.

**Utility Regulators—The Independence Debate**

Some governments are reluctant to surrender political control over regulatory decisions, and some who agree on the general desirability of independent agencies may question whether they are feasible in all country settings. Warrick Smith argues that regulatory independence is worth the effort even in countries with little tradition of such government entities. The agencies should have arm’s-length relationships with regulated firms, consumers, and politicians, and they should have the funding and expertise to underpin such independence. He explains the requirements for achieving independent agencies, including formal safeguards, and suggests possible paths of transition for setting up such agencies.
Utility Regulators—Roles and Responsibilities

There are three main issues in defining a utility regulator’s role: the scope of its coverage, its role in relation to ministers, and its role in relation to other regulatory entities such as the competition agency or agencies dealing with environment or health and safety. Warrick Smith makes a case for multi-industry agencies covering everything from power to water to transport. Multi-industry agencies have several advantages that are especially important for developing countries. They allow the pooling of scarce expertise. They reduce the risk of industry and political capture. They reduce the risk of inconsistency in regulatory approaches across sectors. And they help to deal with the blurring of industry boundaries as utilities enter one another’s markets (as when power utilities enter telecommunications, and water and power utilities merge).

Utility Regulators—Decisionmaking Structures, Resources, and Start-up Strategy

The design of a regulatory agency’s decisionmaking structure encompasses issues relating to the number of decisionmakers, the basis for selecting them, the role played by stakeholders, and the regulatory and appeals processes. The selection of the regulator is critical—especially in countries that have yet to establish a reputation for competence and reliability. When agencies are to be independent, the goal should be to select regulators with the personal qualities needed to exercise independent judgement and resist improper pressures. An appeals process is also important to ensure that the regulator does not stray from its mandate and that it remains accountable. Warrick Smith outlines good practice.

Price Caps, Rate-of-Return Regulation, Risk, and the Cost of Capital

Ian Alexander and Timothy Irwin compare the effect of price cap and rate-of-return regulation on the risk borne by regulated utilities, showing that price cap regulation subjects firms to greater risk and therefore raises their cost of capital. The implication is that firms regulated by price caps must be permitted to earn higher returns. If not, they will be unable to attract new investment capital, and the quality of service will decline.

Prices, Cross-Subsidies, and Competition in Infrastructure

One common—and erroneous—argument against introducing competition in infrastructure is that entry barriers are necessary to maintain subsidies. Timothy Irwin explains how subsidies can be funded in a competition-neutral way by, say, imposing levies on all the operators or funding the subsidy out of general tax revenue. A third option is to end price subsidies altogether, relying instead on social safety nets to assist those who are hurt when competition leads to rate rebalancing.

The Distribution of Gains from Utility Privatization and Regulation in Argentina

This Note reports on a new study by Omar Chisari, Antonio Estache, and Carlos Romero that looks at the distributional effects of privatizing the gas, water, power, and telecommunications sectors in Argentina in the early 1990s. The study shows that the annual gains from private ownership and effective regulation are substantial. At about US$3.2 billion, they are equivalent to a large share of the annual investment in these sectors. The study also shows that all income classes benefit from privatization—and the poorest benefit relatively more from effective regulation. Finally, the study shows that, contrary to popular belief, the big increase in unemployment in the mid-1990s was due not to privatization, but to the backwash effect of the Mexican currency crisis in late 1996.
Infrastructure Finance—The World Bank Group’s Financial Instruments

Philippe Benoit explains the financial and contractual structure of the main financial instruments offered by the World Bank Group—the International Bank for Reconstruction and Development, the International Development Association, the International Finance Corporation, and the Multilateral Investment Guarantee Agency—to support public and private infrastructure projects. These instruments include loans, guarantees, equity investments, and political risk insurance.

Telecommunications

Competition and Technology Change in Telecoms—Implications for Universal Service, Employment, and Regulation

Ben A. Petrazzini argues that competition in domestic telecommunications markets promotes both universal service and employment in developing countries. Competition is strongly correlated with increasing teledensity in several countries. In developing countries where teledensity is low, the network expansion prompted by competition creates a demand for workers that outweighs the trend toward workforce reduction generated by network modernization, a trend that is more dominant in industrial countries. And since incumbents face increasingly fierce international competition from callback services, Internet phone, low-earth-orbit satellites, and global operators, countries can gain by introducing competition and privatization sooner rather than later.

Telecommunications Reform—How to Succeed

Telecommunications reform—privatization and opening markets to competition—can be a positive-sum game in which all stakeholders can gain: customers, existing and new operators, employees, domestic and foreign investors, and government. But the extent and timing of benefits vary from one case to another. Björn Wellenius sets out some rules for reform that will enhance those benefits: Get support at the highest level of political authority. Sort out conflicting objectives early—especially the conflict between maximizing revenue and delivering more, better and cheaper services. Use market mechanisms rather than individual negotiations to select partners and determine the right sale price. Establish and follow clearly defined processes for sale and regulation that are open to participation and review by all interested parties. And respect and trust the general public and keep it informed. Although major transactions such as a privatization or the issuance of new licenses drive the reform agenda, change continues well beyond them. Following the rules and honoring commitments help consolidate an environment for sustainable development of telecommunications. Also critical is to build regulatory capability to suit changing needs—and to take every opportunity to enhance competition.

Extending Telecommunications Service to Rural Areas—The Chilean Experience

Chile has one of the most competitive telecommunications markets in the world. After it privatized the industry in the late 1980s, the number of telephone lines quadrupled to more than 2 million, the range of services grew, and prices fell to among the lowest in the world. Still, about 10 percent of Chileans live in localities without even a public telephone. To address this gap, the Chilean government began auctioning subsidies to private operators to supply public telephone service to rural areas, awarding them to the operator asking for the lowest subsidy. Examining the lessons from the Chilean experience, Björn Wellenius concludes that competition can go a long way toward meeting basic telecommunications needs on commercial terms. And he finds that market
forces can determine which projects need subsidies and how much. He proposes using the same techniques to provide lifeline service and to extend Internet connectivity to schools, libraries, and health centers.

**Liberalizing Telecommunications and the Role of the World Trade Organization**  
63

In February 1997, sixty-nine governments of high-income and developing countries agreed to liberalize their basic telecommunications services under an agreement negotiated through the World Trade Organization. Most participants in the agreement have subscribed to procompetitive regulatory principles, including independent regulators, competitive safeguards, measures to ensure interconnection, universal service obligations, and transparent and nondiscriminatory practices in licensing. The markets affected by the arrangement represent more than 90 percent of the world market for telecommunications. **Carlos A. Primo Braga** reviews the evolution of the agreement and argues that the critical issues now are ensuring the quality of implementation and setting up a procompetitive regulatory environment.

**The Private Sector and the Internet**  
71

Carlos A. Primo Braga and Carsten Fink look at the rise of the Internet as the main application behind the emerging global information infrastructure. Many now believe that the Internet provides a window into a future in which access to information will be independent of geographic location and interactivity in a multimedia environment will be ubiquitous. The authors review the need for a regulatory framework for the Internet in three critical areas: provision of backbone access, Internet service providers, and information services. They also explore the problem of the appropriability of content, discussing intellectual property rights in the digital era and other remedies to the cost recovery problem. For developing countries, however, the critical bottleneck is still their weak information infrastructure.

**Power**

**The Restructuring and Privatization of the U.K. Electricity Supply—Was It Worth It?**  
77

David M. Newbery and Michael G. Pollitt report on a study that assesses the costs and benefits of the restructuring and privatization of the electricity supply sector in England and Wales. Since privatization, real unit costs have fallen by about 50 percent and real pool prices by 20 percent, and a switch from coal to gas has contributed to a drop in polluting emissions. But some of the positive changes can be attributed to external factors, such as the development of high-efficiency combined cycle turbines and the fall in coal prices. So the authors estimate the net benefits of privatization over the period 1995–2010 by comparing the historical and projected path of the privatized industry with what might have happened had the assets stayed under public ownership. They estimate the overall net benefits from privatization at £11.9 billion. Costs fall, but much of the benefit goes to the shareholders—prices in the wholesale market fall much less. The authors suggest that more competition may help to reduce these prices.

**Regulatory Lessons from Argentina’s Power Concessions**  
81

In the early 1990s, Argentina vertically separated and privatized most of its electricity industry. Transmission and distribution, considered natural monopolies, were sold by concession. The main objectives of the reforms were efficient pricing and production levels in the short term and enough investment to meet demand over the longer
The Private Sector in Infrastructure

The Real Possibility of Competitive Generation Markets in Hydro Systems—
The Case of Brazil 85

In Brazil’s electricity system—one of the world’s largest—plans are afoot to privatize and to introduce competition after unbundling the sector into competitive and monopoly segments. Moving to a competitive generation pool in a hydro-based system such as Brazil’s poses two significant technical challenges: ensuring open entry for generators and designing a market that will enable investors to recover the high investment costs characteristic of hydro systems. Antonio Estache and Martin Rodriguez-Pardina propose an approach using incentive-based organization and regulation, a model with potential application in other hydro systems.

Water

The Private Sector in Water and Sanitation—How to Get Started 89

The more risk and responsibility a government hands over to the private sector in water and sanitation, the more powerful the incentives for better performance—but also the more demands on the government in commitment and preparation. So a government about to enter into a long partnership for a water concession or build-operate-transfer arrangement—typically for twenty-five to thirty years—needs to be sure that it does not overlook details that will later land it in messy renegotiations. A lease is less demanding, but offers smaller gains and will not fix such problems as chronic underinvestment. It will, however, give the government time to prepare a longer-term option. In this Note, based on toolkits recently published by the World Bank, Penelope J. Brook Cowen sets out the range of options for involving the private sector in water and sanitation and reviews the lessons on what can make or break a private participation process.

Getting the Private Sector Involved in Water—What to Do in the Poorest of Countries? 93

Countries suffering from low incomes, limited administrative capacity, and an unfavorable government track record—some of the poorer countries of Central and Eastern Europe, for example, or Sub-Saharan African countries emerging from long periods of internal conflict—struggle to attract private investors to their water sectors. The settings they offer are not conducive to the large sunk costs characteristic of water sector investments. But there are a number of ways to reduce the costs of contracting and increase the attractiveness of projects. Penelope J. Brook Cowen assesses the strengths and weaknesses of some of the options, including building up from a management contract to a full concession in a two-step approach, simplifying contracts, contracting out some regulatory functions, and increasing the predictability of regulatory discretion.

Testing the Waters—A Phased Approach to a Water Concession in Trinidad and Tobago 97

The government of Trinidad and Tobago has adopted a two-phase approach to privatizing its water services, first awarding a management contract through competitive bidding and then, after three to five years, converting it through negotiation to a long-term concession. With the management contract in place just over a year, it is still too early to draw firm lessons about the strategy. But Helen Nankani argues that the two-phase strategy is an attractive one for a small country with limited regulatory capacity and poor information on the state of the...
business. The preconcession agreement gives the government the time to gather information, create a regulatory regime, and establish a relationship of trust with a private operator—while simultaneously delivering better service under private sector management.

**Water Privatization and Regulation in England and Wales** 101

In 1989, the United Kingdom embarked on one of the first modern privatizations in the water sector. The government sold assets under license and set up an independent economic regulator to ensure that companies carry out their obligations and can finance their activities. The important innovation of U.K. regulation is its use of price caps and yardstick competition. Caroline van den Berg highlights two lessons from the U.K. regulatory experience: Designing an effective price cap has turned out to be complicated. And built-in checks and balances, such as financial autonomy and status as an independent government department for the regulator, are not always enough to prevent political interference.

**Regulating Water Concessions—Lessons from the Buenos Aires Concession** 105

The Argentine government privatized the water and sewerage services in greater Buenos Aires by concession. The water and sanitation utility was sold as a single monopoly business, but bidders had to compete on the basis of price for the right to provide service. Contractual targets for service coverage implied significant investment over the life of the contract. The assets have turned out to be in worse shape than expected, however, and a renegotiation rule has allowed a tariff hike to pay for accelerated investment. Claude Crampes and Antonio Estache argue that the pricing system is still flawed, producing incentive problems for investment.

**Transport**

**A New Method for Auctioning Highways** 109

Eduardo Engel, Ronald Fischer, and Alexander Galetovic attribute many of the problems in highway privatization to the combined effect of features of the highway business and the fixed term contracts used. The main issues: traffic forecasts are notoriously imprecise, the franchise holder has almost no control over demand, and most franchises have been awarded for a fixed term that is independent of demand realization. The authors propose a new mechanism for privatizing highways—the least-present-value-of-revenue auction—that overcomes flaws in the fixed term franchise because the contract term automatically adjusts to traffic growth. If traffic grows more slowly than expected, the term lengthens—and if more rapidly, it shortens. The basic principle underlying the auction is that the franchise holder should not make losses when the long-run demand for the highway is sufficient to pay all costs.

**Designing Toll Road Concessions—Lessons from Argentina** 113

Argentina began to concession intercity highways and the access roads to Buenos Aires in the early 1990s. It first offered the intercity highways for competitive bids, setting the terms, the tolls, and the service levels and basing bid selection primarily on the rental offered for the infrastructure. When it concessioned the access roads in a second round, it set the terms and the investments and selected the bid offering the lowest tolls. The results so far have been mixed. Investment has lagged, but maintenance of the intercity highways has improved. Antonio Estache and José Carbajo review the lessons from this experience and identify some of the chal-
challenges for future concessions: following clear and simple rules in the bidding process, establishing clear rules for renegotiation, and strengthening regulatory capacity.

A Retrospective on the Mexican Toll Road Program (1989–94) 117
In 1989, Mexico initiated a private toll road program of fifty-three concessions involving an investment of about US$13 billion in limited recourse financing over the period 1989–94. The program more than doubled the size of the national toll road network, but miscalculations of investment costs and overoptimistic forecasts of operating income undermined the viability of the toll roads. An already bad situation was made worse by the Mexican currency crisis of December 1994, and the private toll road initiative came to a virtual standstill. Local commercial banks were saddled with nonperforming loans estimated at US$4.5 billion to US$5.5 billion. Concessionaires and their affiliates have been faced with writing off large portions of their investments. And users were left with some of the highest tolls in the world. Jeff Ruster diagnoses the flaws in the design of the program and shows how the failure was manifested in the implementation of different phases of the projects.

Railway Concessions—Heading Down the Right Track in Argentina 125
The Argentine government has privatized its railway industry by breaking up the network into exclusive concessions. The freight businesses were considered generally profitable, but the commuter services were expected to need subsidies and were sold to the bidder seeking the lowest subsidy. Both sets of concessions require the concessionaires to make specified investments over the life of the contracts. So far, the results in traffic levels and industry costs have been positive, but the freight concessionaires, earning revenues far below target, are not investing. José Carbajo and Antonio Estache look at the implications for the design of the concessions.

Competing Private Ports—Lessons from Argentina 129
Port reforms in Argentina have sought to deregulate, decentralize, and privatize. And they have sought to introduce competition not only among the ports but also for the ports—by inviting operators to bid for port concessions—and within the ports—by dividing large ports into terminals and offering each as a separate concession. Bidders were asked to set their own charges, subject to a maximum price cap for cargo, and concessions were awarded on the basis of the highest rental offered for the infrastructure and equipment. The results have been generally positive, with increased productivity, higher cargo volumes, and big reductions in tariffs. Antonio Estache and José Carbajo look at the lessons from the reform and set out the remaining challenges.
The International Forum for Utility Regulation (IFUR) was established to provide opportunities for information exchange, policy debate, and training across sectoral, regional, and institutional boundaries. Forum activities are open to regulators, infrastructure policymakers, and public and private operators from OECD as well as non-OECD countries. Recent activities include:

- Publication of two directories: The International Directory of Utility Regulatory Institutions, which contains descriptions of more than 700 regulatory agencies in over 180 countries, and The International Directory of Regulatory Strategy Departments of Private Infrastructure Companies with responses from approximately 100 companies worldwide. Copies of these directories can be obtained from IFUR at 202 473 6566 (tel.) or 202 522 2029 (fax). In addition to the print format, both directories are now available on the World Bank's Website: http://www.worldbank.org/html/fpd/psd/ifur/directory/index.html.

- Two offerings of the International Training Course on Utility Regulation and Strategy, cosponsored with the Public Utility Research Center at the University of Florida. This two-week course is the first of its kind to offer training in competition, market structure, incentive regulation, and the regulatory process for mid- to senior-level staff from regulatory agencies and regulatory strategists from private infrastructure companies. The two offerings have drawn 170 public and private sector participants from 45 countries in the electricity, gas, water, and telecommunications sectors. The faculty includes academics, regulators, World Bank staff, and private sector representatives. Typical issues addressed during the two weeks include:
  - What are the basic principles for competition policies? What are the regulatory and pricing issues in the transition to competitive markets?
  - How can financial data, the fundamental building blocks of regulation, be obtained and used? How can regulators make decisions on economic tradeoffs under conditions of imperfect information?
  - How do regulators decide which tools to use in incentive regulation—rate of return, price caps, yardsticks, or hybrid combinations? What are the tradeoffs, and how does the choice affect the system's overall credibility, efficiency, and legitimacy?
  - What are the rationale and methods for introducing performance standards and incentives, particularly related to quality of service, health, safety, and environmental factors? What are the social considerations in utility regulation, such as connection and disconnection policies and alternative payment methods?
  - What are the principles of measuring costs and setting prices in network industries? What are the issues in determining rate structure, such as interconnection pricing, pricing of bottleneck functions, predatory pricing, and stranded investments?
  - What strategies are at the disposal of regulators to effectively manage complex and often politically sensitive negotiations involving government, investors, consumers, and other interest groups?
  - How can regulatory agencies assess their own performance? What are the key aspects of internal agency management, including information management, case management, staff development, human resource strategies, budget management, and evaluation of agency performance? What has been the experience using different incentive mechanisms for training, motivating, and retaining staff to stay at the cutting edge of industry developments?

The next course will be held January 12–23, 1998. For more information or to receive an application packet, please contact the Public Utility Research Center, University of Florida, at 352 392 6148 (tel.); 352 392 7796 (fax); purcecon@dale.cba.ufl.edu (email); or http://www.cba.ufl.edu/eco/purc (Website).

- Partnership with regional initiatives by furnishing speakers, World Bank representation, or printed materials for conferences such as the Hemispheric Energy Steering Committee for the Americas, APEC's Regulatory Working Groups on electricity and telecommunications, the World Electricity Conference, and the 1996 Colloquium on Utility Regulation in Spain.