

## Overview: Regulatory Structures and Performance

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### *ABSTRACT*

The last decade has seen a worldwide shift towards greater private participation in the infrastructure industries. Most governments are reducing their roles as owners and operators of facilities, causing new emphasis to be placed on their ability to establish sustainable regulatory arrangements. Successful agencies promote credibility with investors, are perceived as legitimate and fair in the eyes of the public, and deliver greater efficiency for the economy as a whole. Newly appointed regulators play a critical role in this environment. A key factor influencing the implementation of reforms is the ability of institutions to effectively perform regulatory functions in the presence of pressures from government ministries, the private sector, consumers, and other interest groups. At the same time, the introduction of new functions has increased the demand for professional training for utility regulators.

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The World Bank's report on *Infrastructure Development in East Asia and Pacific* (1995) identified seven critical constraints limiting private participation in the capital-intensive infrastructure sectors. First, the study noted that (1) host countries had *very different perceptions regarding risks* than sponsors and lenders. Differential expectations resulted in excessive delays associated with negotiations. A second problem was (2) the *lack of clarity about the government's objectives and commitment*, again complicating the decision-making process. Prioritizing public policy objectives is seldom done in public because it requires that weights be given to potential outcomes, so all the stakeholders are aware of valuations given their concerns. The next barrier to attracting-and sustaining substantial private investment is (3) *the lack of appropriate sector policies and a transparent, stable and credible legal and regulatory framework*. In addition, the study identified (4) *unbundling, mitigation and management of risks* as a fundamental problem in most countries and projects. When nations assume contingent liabilities that cannot be sustained, the system becomes dysfunctional. Furthermore, (5) *domestic capital markets* must become more significant sources of financing for infrastructure projects—both to enhance the credibility of policy commitments and to broaden the source of funds. The study suggested that (6) *mechanisms for the provision of long-term debt* would be essential in the years ahead. Related to this point was the last issue identified in the World Bank investigation, (7) *transaction costs can be cut, particularly through open competition*. Bilateral transactions between the government and project developers lack transparency—standard bidding documents and improved demand forecasts can promote both efficiency and public confidence in the process.

Partially in response to these concerns, the Private Participation in Infrastructure Group at the World Bank funded the Public Utility Research Center (PURC) at the University of Florida to develop a two-week International Training Program on Utility Regulation and Strategy. After the first delivery in January 1997, PURC became responsible for organizing additional programs (June 1997, and January 1998 and beyond). Over a hundred and sixty participants from fifty countries have attended the first two courses.

This paper describes questions addressed in the series of training programs. Some lessons are also presented, but the focus is on identifying issues that must be resolved before regulation can contribute to improved industry performance. Both regulators and infrastructure managers have a stake in developing and maintaining a systematic, transparent, and independent process. Once they understand key principles, decision-makers are better able to develop policies that promote *credibility* for investors, *legitimacy* for consumers, and *efficiency* in the economy.

Links between government infrastructure policies and realized performance are not fully understood. The task of identifying these links is complicated by many factors, including the numerous intricate relationships among key variables. To illustrate, just as infrastructure policy affects industry performance, industry performance, in turn, affects future infrastructure policy. For example, technological developments in telecommunications and data transfer have changed the nature of telecommunications markets and the regulatory problems raised by these markets. Any cross-sectional comparisons need to incorporate endogeneity of regulatory policies. Furthermore, key economic, political, and institutional parameters affect directly both the government's choice of infrastructure policy and realized performance in the industry.

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\* Mark Jamison and Klaus Tilmel helped develop the points made in Section 2.

# 1. Fundamental Patterns of Regulatory Change: Technology, Demand, and Policy

We need to know whether there are settings in which particular infrastructure regulatory policies lead systematically to superior performance in the relevant industries. In order to assess the efficacy of different infrastructure regulatory policies, it is critical to identify those dimensions of industry performance that infrastructure policies are designed to influence. From the regulatory standpoint, quantifying performance objectives is an important (but difficult) task. It is unlikely that any single infrastructure regulatory policy will prove to be ideal in all settings. To identify the particular settings in which specific policies work well, it is important to draw meaningful distinctions among the environments in which infrastructure policies are implemented. These dimensions are identified in the context of factors that affect a country's choice of infrastructure regulatory policy.

## Causation and Feedbacks

As noted earlier, the task of assessing the merits of specific infrastructure regulatory policies is complicated by the intricate relationship among key variables. Some of these relationships are depicted in **Figure 1** (Causes and Effects of Infrastructure Policies). The four boxes to the far left in Figure 1 represent some of the many factors that influence a government's choice of infrastructure policy. Industry conditions include those factors that affect industry demand (e.g., population, income, and education) and those that affect industry supply (e.g., production technologies, operating practices, and factor prices). General economic conditions include a nation's employment, savings, and inflation rates, as well as the strength, stability, and diversity of its economy, its balance of trade, and the strength and stability of its capital markets.

The Experience box in Figure 1 refers to local, national, and international experience with infrastructure regulatory policies. Industry performance under past regulatory regimes (both in absolute terms and relative to the corresponding performance in other jurisdictions) often influences the choice of future policy.<sup>1</sup> The Institutional Conditions box in Figure 1 incorporates such factors as the strength and independence of a country's judicial system, the nature and stability of the country's political system, the autonomy of regulatory officials, the resources at their disposal, and the nature and historic enforcement of property rights and laws that pertain to infrastructure development policy. These factors affect the ability of regulators to make credible long-term commitments to private investors and to pursue independent policies.<sup>2</sup>

The solid arrows in Figure 1 depict the fact that these (and other) factors affect directly a government's choice of infrastructure regulatory policy, and that the chosen policy, in turn, affects industry performance. The broken arrows in Figure 1 reflect the fact that many of the same factors that influence policy choice will also affect observed industry performance directly. For instance, under any infrastructure regulatory policy, realized production costs will generally be affected both by the prevailing production technology and by perceptions of the government's tolerance for substantial earnings. Other relevant arrows have been omitted from Figure 1 in order to simplify the diagram. For instance, industry conditions often influence and are influenced by general economic conditions. In addition, current industry performance affects both future industry conditions and experience that is relevant for future decisions.

**Figure 2** provides a more detailed look at how industry infrastructure policy affects market structure, constrains the behavior of service providers, and affects industry performance. It depicts the traditional features of infrastructure industries, like electricity supply, telecommunications, natural gas, and water/sewerage. Fundamental economic factors determine the structure of an industry. These "Basic conditions" include production technologies and consumer preference patterns. Factors influencing supply and demand determine the efficient configuration of the industry. For example, electricity restructuring is an issue in most nations. Because of technological changes, low

1. See Berg and Jeong (1991) for some relevant empirical evidence. Berg and Foreman (1996) outline some of the feedbacks in the process.
2. Levy and Spiller (1994, 1996) document the importance of these and other institutional differences among countries. The authors also provide useful guidance on how to measure these differences.

natural gas prices, and changes in public attitudes towards government intervention, markets are experiencing changes in the basic conditions which influence them. These economic forces for change are powerful, inevitable, and highly disruptive. For example in electricity, industry observers are concluding that the natural monopoly features of the industry are mainly in transmission and distribution. Generation is going to be competitive. Some countries are promoting retail choice.

Note the flow of causation in traditional utilities. Basic conditions determine structure. Structure influences pricing behavior, and the resulting industry performance is an outcome of the economic processes at work. Of course, the traditional utility market structure (no entry, single supplier, vertical integration, and homogenous output) was heavily conditioned by both regulation and public ownership, which arose to constrain monopoly power.

### Basic Conditions

Basic conditions facing an industry influence the number and size distribution of suppliers which are feasible in an industry. As noted earlier, the traditional features comprising the structure, behavior, and performance of public utility industries involve important linkages. Causation runs from the basic conditions to industry structure (entry conditions, number of firms, degree of vertical integration and product differentiation). Industry structure determines, in turn, the behaviors likely to be observed (prices, promotion, research and development, production process changes, and new service introductions). The market outcomes can then be described in terms of performance criteria (profitability, efficiency, innovation, and meeting other social objectives). Clearly there are feedbacks in this process--for example, high levels of R&D can lead to innovations which affect the production technologies and entry conditions.

Traditional regulation (particularly as developed in the U.S.) influenced the structure of industries and limited the range of behaviors observed. Regulatory rules defined markets, constrained entry, and facilitated vertical integration. Thus, cost-based rate of return on rate base regulation (ROR) was designed to enable the firm to earn a fair return on its investment while protecting customers from monopoly prices. Complex cost allocation procedures resulted in the sharing of capacity costs across customer groups, over markets for different services, and between geographic areas. Postage stamp (uniform) pricing was sometimes utilized, despite cost differences in serving various locations or customer groups.

Thus, regulation influenced the number of suppliers in various markets and the prices facing customer groups. However, the optimal configuration of firms in an industry depends on the underlying basic conditions--which change over time. For example, *economies from vertical integration*, also called *economies of sequence*, change. Vertical relationships remain in electricity in some nations today--while in others, vertical disintegration has occurred. Similarly, there can be changes in the savings associated with producing several products (instead of specializing in a single product). These *economies of scope* determine whether multi-product firms are least-cost providers of services. The familiar term, *economies of scale*, refers to declining average costs as output increases. All three economies characterized the production technologies of infrastructure industries in the past.

**Figure 2** depicts a complicated set of linkages. Poor industry performance affects the political conditions, which alter the rules under which suppliers operate. For example, the U.S. is in a period of electricity industry restructuring, in response to changes in regulatory rules. The downside risk of change is small if relatively high prices have resulted from past private and public decisions. It is no wonder that California and New York are the top of the list for electricity restructuring initiatives in the U.S. It should be noted that in anticipation of greater customer choice, firms are already changing their production processes, re-designing price structures and engaging in consumer-oriented activities. High electricity prices in some states have triggered new public policy initiatives. Other feedbacks are also important. Research and development can change the feasible scale of plants and firms (e.g. combined cycle gas turbines). Advertising and promotion activity can lead to service differentiation, which raises entry barriers (while facilitating a greater range of price/quality choices).

Energy industries are acquiring new features -- influenced by changes in public policies. But these changes represent feedbacks -- reactions to new opportunities for cost savings or perceived problems. Prior to the 1973 OPEC crisis, utilities in the U.S. were being required to convert generating capacity to petroleum! Later, federal legislation mandated phasing out natural gas as an input. (However, again laws came into conflict with basic

conditions, and the laws yielded to economic realities.) During this period, nuclear proved to be more expensive than anticipated. In addition, environmental rules have affected siting and fuel use. If the past is any guide, policy-makers will miss the mark in the future (though industry observers might cultivate more humility). We must recognize that while legislators in Washington DC, London and Brasilia can influence the pace and pattern of change, the basic economic conditions will ultimately shape optimal market structure and resulting energy industry performance.

## 2. Issues Addressed by Regulators

Infrastructure industries form the backbone of many economies throughout the world. Consequently, the performance of these industries in any country has profound implications for the performance of the country's entire economy. The PURC/World Bank Training Program on Utility Regulation and Strategy examines seven major topics (**Figure 3**):

1. *Market Structure Reform and Regulation of Network Industries* How do technological change, demand growth, and government priorities interact to change public policy? Why are countries reforming their utility sectors? What drives the search for market solutions across infrastructure sectors? What are the constraints involved for introducing competition in network industries? What are key economic and legal principles for ensuring their sound implementation? How should the interface between monopoly and competition be regulated? What is the impact of different forms of vertical and horizontal separation and service unbundling on competition and regulation?
2. *Effective Use of Financial Information for Utility Regulation* What principles and practices of cost accounting can be applied to the treatment of operating costs, capital expenditures, depreciation and taxes of utility companies? How can regulators determine the cost of capital and assess the projects, particularly in countries with scarce or unreliable cost information? What are the information requirements for regulators? How can regulators improve data quality and minimize information rents?
3. *Principles and Application of Incentive Regulation* What should be the extent of regulation? What are the trade-off between flexibility and predictability of regulatory arrangements? What has been the experience with alternative schemes of incentive regulation? What incentive rules promote competition, efficiency, and innovation? What are the strengths and limitations of alternative forms of price regulation? How does the choice of price regulation affect the system's overall credibility, efficiency, and legitimacy? What has been the experience with conducting price reviews under alternative incentive systems?
4. *Non-Price Aspects of Utility Regulation, including Environmental Regulation* What are the rationale and methods for introducing performance standards and incentives related to quality of service, health, safety, and environmental factors? What are effective regulatory strategies for monitoring performance and enforcing compliance? To what extent should universal service obligations be developed and how should they be funded?
5. *Managing the Introduction of Competition in and for the Market: Using Competitive Markets as a Policy Tool* Where can competitive forces be introduced or strengthened? What policies hinder competition and what policies promote competition? When should regulators intervene in market structure? What has been the experience with different types of market mechanisms for unbundled utility services? How should regulators apply competition rules and antitrust principles?
6. *Efficient Techniques for Regulating Prices and Price Structure* What are key considerations in rate design? How do the joint and common costs associated with network industries affect pricing rules? How does the introduction of competition affect decisions about tariff re-balancing, cross-subsidization, and funding of social obligations? How does regulation affect providers' investment and service strategies?
7. *Managing the Regulatory Process for efficiency, transparency, credibility, and legitimacy* What are key considerations for the establishment and functioning of regulatory institutions? How can the regulatory process promote legitimacy and credibility of regulatory decisions? 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? What has been the experience with alternative mechanisms for consensus building and dispute resolution? What strategies can regulators use to effectively communicate with the public? How can regulators become more efficient and effective in accomplishing their tasks in different institutional settings? What lessons from individual countries can be used to draw conclusions regarding the development of effective policies?

The topics suggest that making trade-offs will be an important task for regulators. Prioritization of policy objectives must be addressed by any agency. How does the degree of government commitment at the top and the clarity of its objectives affect the success a country has in attracting private investment in infrastructure? Given the size and long gestation periods associated with projects, as well as government involvement in siting and environmental issues, how can private investors have confidence that short run politics will not raise project costs (or unduly limit associated revenues)? What policy objectives complement or conflict with one another? What weight should be given to (1) Public acceptability of regulatory decisions, (2) Low prices, (3) Revenues that are sufficient to cover costs and provide reasonable profit, (4) Economic efficiency, (5) Infrastructure development, (6) High percentage of household connected to service, (7) Reliable provision of service, (8) Rapid pace of technological innovation, (9) Stable regulatory framework, and (10) Robust competition?

A listing of these issues underscores the difficult tasks facing new regulation institutions. Warrick Smith (1997 a) identified at least nine potential roles for regulators: technician, political analyst/strategist, advocate, detective, prosecutor, judge, negotiator, educator, and manager. Not all of these roles can be performed simultaneously, but the listing illustrates the multi-faceted nature of regulation. In addition, new institutions encounter the difficulty of reconciling independence with accountability. Furthermore, the design of regulatory systems requires a careful balance between rigidity and flexibility. The former promotes predictability in decision-making and supports keeping commitments. The latter (the exercise of discretion) can facilitate adaptation to changing economic conditions.

Smith (1997 b) also identifies six common devices for the promotion of accountability.

- Rigorous transparency requirements, including reasons for decisions;
- Restrictions on conflicts of interest, including “revolving doors;”
- Effective appeal process;
- Budgets scrutinized by Legislature;
- Efficiency scrutinized by independent auditors or other public watchdogs;
- Removal for proven misconduct or incapacity.

The listing illustrates the delicate balance required for maintaining accountability and independence. Each nation must find a way to insulate regulators from short-term political pressures, while ensuring that the process is sustainable (Warrick Smith, 1997-c and 1997-d).

The predictability and consistency of regulation are important for investors, consumers, and firm managers. Can regulators commit to a long run policy – avoiding opportunistic decisions once investors have sunk their capital in fixed investments? Similarly, rational planning by both utilities and their customers requires a stable and predictable regulatory process.

## Concluding Observations

Many observers have emphasized the importance of sustainable regulatory frameworks. Initiatives undertaken by groups in response to this recognition include the PURC/World Bank International Training Program. In addition, multilateral lending organizations, regional banks, and regional collaborations among commissions have resulted in venues for the sharing of ideas. Such activity needs to be part of the on-going educational process for commission staff in every country. No one has all the answers. What is important is that independent agencies begin asking the right questions and developing the conceptual frameworks and information required for addressing critical issues.

The concluding points presented here are the result of my own experience in working with regulators and infrastructure executives. As such, they are idiosyncratic—representing my own reactions to those who are responsible for implementing public policy. One of the experiences relates to an individual who taught me a great

deal about those who face the enormous challenge of establishing precedents which will influence investment and pricing for years to come. The other reaction is more impressionistic, relating to the creation of a new profession in emerging countries.

### **National Applications**

One attendee from a developing country was that nation's first energy regulator. He understood the pivotal role he would be playing in the years ahead, and the importance of a sound regulatory framework for capital attraction and the sustainability of his new regulatory institution. He sat each morning in the front row, following the presentations carefully and asking intelligent questions of the speakers. Often he would comment on particular observations - sometimes supporting the generalization and sometimes qualifying the point by recognizing other trade-offs. His eloquence and insights were acknowledged by all.

Since I sat in the front with the other speakers, I noticed that he had two notebooks. Sometimes he would write a paragraph in one, and after hearing other ideas developed by the speaker, he would dig into his briefcase and write in another notebook. Near the end of the two weeks, my curiosity could not be contained. I asked him about the two notebooks. He responded: "One is for *useful ideas*. The other is for *interesting ideas*." As a professor who tries to translate principles into practice, I understood the distinction quite well. He wanted to return to his homeland with an agenda for his staff. He wanted to apply some of the ideas and principles immediately. However, he also recognized that some of the ideas still needed to germinate some more. The particular conceptual framework from a session might be interesting (and show promise), but it needed more time before it could be applied. Or, the idea provided a sound intellectual basis for some development (such as incentive regulation), but that background information could not be applied in the present institutional environment.

He illustrated a point I make in the introductory session: "On any given topic, a participant will know more about the issue than the speaker. Our job is to facilitate the exchange of experiences so that we all can benefit from the expertise in the room." On a national level, it is clear that each participant draws different lessons from the fifty sessions in the course. The regulators and executives find some ideas useful, and some ideas interesting. The overall experience reinforces the importance of being open to new ways of handling regulatory oversight responsibilities. Best practice may be an elusive goal, but regulators need to be engaged in benchmarking activity, just as firms compare themselves to one another—striving for excellence in performance.

### **A New Global Awareness**

Sector regulation is a relatively new activity for most countries. Government intervention via ownership or ministerial decrees has characterized these industries. Now, independent regulatory commissions and antitrust authorities are implementing national policies towards monopoly segments of infrastructure industries. The image of a new cadre of bureaucrats might make citizens nervous. However, the images that remain with me are far different from the stereotypes depicted in newspapers: faceless, power-hungry individuals who reduce efficiency through the issuance of arbitrary rules.

Attendees were aware of the reputations of people in other government agencies. They wanted to avoid getting into the trap of protecting their jobs at the expense of productive activity elsewhere in the economy. Thus, I observed a sense of professionalism throughout the course. Individuals with diverse technical training were looking for specific skills and improved understanding of how alternative processes affected industry performance. Attendees sought approaches to decision-making that would improve the lives of ordinary people in their countries. They understood the links among market reform, credibility and capital costs, incentives for cost containment, service quality, competition, rate structures, and the design and management of regulatory processes. In addition, I think that they were realistic in terms of recognizing institutional constraints faced at home. Regulators knew that their agencies needed to establish a track record that would justify the trust others were placing in them. Executives in attendance recognized the potential fragility of new institutions and the importance of identifying procedures that promoted

win-win outcomes. The experience has made me optimistic regarding the role that regulatory institutions can play in promoting development.

I also observed friendships between staff in different nations, as they looked to one another for sound solutions to complicated problems. They shared a common bond when they brought specialized skills from law, engineering, economics, and public administration to tasks at hand. Such trans-governmental networks illustrate Anne-Marie Slaughter's (1997) view that international forums can contribute to the resolution of policy issues that cut across national boundaries. According to the comments of Training Course attendees, one of the main things they learned was that all countries have very different starting places, but are dealing with common issues. Some are in early stages of development with very basic or non-existent infrastructures while others are developed but are moving away from governmental control. Being able to share cross-country and cross-sectoral experience and to learn how to translate principles into practice is essential to improve regulatory performance. National boundaries and international rivalries receded into the background when these professionals began to address issues that were common across countries.

Nations will continue to move forward in the creation of legal and regulatory frameworks conducive to efficient pricing, innovation, and capital formation. An emphasis on microeconomic reform can establish good momentum in this area. Nevertheless, there is much that is interesting and useful yet to be learned. As an academic involved in that learning process, I would urge that governments and private organizations continue the dialogues initiated over the past decade. Educational institutions can also play a role in providing forums for sharing experience and exploring new ideas. We hope this Training Program serves as a catalyst for new initiatives that strengthen agency analytical capabilities and enhance productivity in infrastructure industries.

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