ANNOTATED READING LIST FOR A BODY OF KNOWLEDGE ON THE REGULATION OF UTILITY INFRASTRUCTURE AND SERVICES

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October 29, 2004

Funding for this project was provided by:

Special thanks are owed to Cynthia Stehouwer for her organizational and editorial work and to Lynne Holt, Mark Hoekstra, Hamilton Silva, Troy Quast, Juan-Daniel Oviedo, and Rich Gentry for their background research. We would also like to thank the World Bank staff and attendees at the review meetings at Eynsham Hall and Arlie House for their helpful suggestions and comments. The authors take responsibility for all errors and omissions.

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"Leadership in Infrastructure Policy"

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INTRODUCTION

Need and Purpose for this Document

Reforms in infrastructure sectors since the 1980s have resulted in major growth in the number of regulatory agencies around the world. The success and sustainability of reforms in these sectors will in large part depend upon the professionalism of these agencies, and the quality of the work that they undertake. Donor agencies such as the World Bank, the Inter-American Development Bank, USAID and others, have funded capacity building programs for agencies in developing countries, covering consulting advice, training, development of centers of research into regulatory economics, and efforts to build regional networks of regulators and practitioners in these areas, such as SAFIR and AFUR. Training efforts for newly formed regulatory agencies have been extensive. As of June 2004, 1300 regulatory professionals from 123 different countries have attended the training program developed jointly between the University of Florida's Public Utility Research Center (PURC) and The World Bank. The SAFIR course has instructed some 400 participants.

The programs of training, technical assistance and capacity building have provided relevant and timely expertise and information to regulatory agencies. However, there has been no internationally recognized measure of the expertise and professional competence of professionals working in regulatory agencies and no standard body of knowledge (BoK) to serve as guides for capacity building and professional development. The lack of a standard BoK and no obvious means by which it could be updated make it difficult to develop consistency for long-term institutional learning, to share knowledge across countries and across sectors, and to establish stable and dependable regulatory practices.

The purpose of this document is to identify such a standard BoK on utility regulation. In developing this document, we have focused on basic principles and best practices that have developed over many years of regulation in some developed countries and more recently across the rest of the world. We include case studies to illustrate how regulators make and implement decisions in practice, and to illustrate that country context matters. We do not claim that we have identified knowledge that is settled and will remain unchanged, nor best practices that all or even most countries should adopt. Regulation is a dynamic process, so practitioners and scholars are continually learning and adapting to new situations. Countries vary in their stages of development, priorities, histories, and institutional capabilities to name a few, so that best practice for one country may not be best practice for another. In recognition of these dynamics and this diversity in regulation, we include in this document literature that reflects new thinking, analysis, and opposing points of view. We also suggest that this document should be continually updated and augmented as new ideas emerge and new knowledge is gained.

Structure

This document consists of an Annotated Reading List (ARL) of the BoK and narratives that identify key topics and themes. The BoK literature includes decisions and publications by regulatory agencies and other governmental bodies; policy advisories by think tanks, consultants, donor agencies, and others; and research by academics, consultants, and other experts. The materials selected are those that senior agency staff, senior operator staff, and their subject matter peers should find most useful, but others will find many of the references useful as well. We also sought to select materials that would be assessable for generalists with a working knowledge of economics, finance, accounting, and law, although most of the BoK focuses on economic issues.

Following this *Introduction* is a note on references, which includes a list of references that are cited numerous times, a list of useful references that can be hard to obtain and so are not cited in the ARL, and a list of useful, technical economic texts. Following that note is the ARL reference list itself with narratives. The ARL is organized into chapters to provide structure to the topics and subtopics. For each topic or subtopic, the ARL includes some combination of core references, sectoral references, and other references that may be of interest. *Core references* represent broad, cross-sectoral knowledge. *Sectoral references* are intended for sector specialists. *Other references* are documents that may be interesting to those who wish to develop in depth expertise on specific topics.

Length and Relative Importance of Chapters

The chapters in this document have different lengths, but these lengths are not intended to imply relative importance. Chapter length is affected by numerous factors, including our ability to find materials that provide comprehensive coverage, the number of topics and subtopics associated with a chapter, and the richness and deficiencies of the existing literature. For example, Chapter III on Financial Analysis is highly important, but it has fewer references than some other chapters because the materials we found on this topic were generally more comprehensive than materials on other topics. Also, even though there are examples and cases where regulators have successfully regulated state-owned enterprises and where countries have overcome poor governance to establish independent regulatory agencies, there is little literature on frameworks for doing so. References in these areas should be added to the ARL as the literature develops. Furthermore, the ARL references only documents written in English. This is because the preponderance of research and studies of regulation have been done on English-speaking countries or at least countries where English is commonly spoken. This should also change over time.

Conclusion

We hope that this document is useful for advancing the high quality work being done by many regulatory agencies, the further development and expansion of efficient utility infrastructure, and research that expands our knowledge of basic principles and best practices.

NOTE ON REFERENCES

Major References

Each of the following references addresses several topics in the ARL. They are listed here to make the ARL easier to use.

Armstrong, Mark, Simon Cowan, and John Vickers, Regulatory Reform: Economic Analysis and British Experience, Cambridge, MA: The MIT Press, 1999.

Baldwin, Robert, and Martin Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999.

Guasch, J. Luis, and Pablo Spiller, Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story, Washington, D.C.: The World Bank Group, 1999.

Gómez-Ibáñez, José, Regulating Infrastructure: Monopoly, Contracts, and Discretion. Cambridge, MA: Harvard University Press, 2003.

Hunt, Sally, Making Competition Work in Electricity. New York: Wiley & Sons, 2002.

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition.

Newbery, David M., Privatization, Restructuring, and Regulation of Network Industries. Cambridge, MA: MIT Press, 1999.

Viscusi, W. Kip, John M. Vernon, and Joseph E. Harrington, Jr., Economics of Regulation and Antitrust. Cambridge, MA: MIT Press, 2000.

Out-of-Print or Difficult-to-Obtain References

Below are two useful references on utility regulation that may be difficult to obtain. These references focus on the U.S. case and provide some unique explanations of practices that are so widely accepted that more recent texts omit these explanations. These references are not cited elsewhere in this ARL and so are listed here only for those readers who can obtain copies and might want to do further study, especially on the U.S. case.

Bonbright, James C., Albert L. Danielsen, and David R. Kamerschen, Principles of Public Utility Rates. Arlington, VA: Public Utilities Reports, 1988.

Phillips, Charles F., Jr., The Regulation of Public Utilities. Arlington, VA: Public Utilities Reports, 1993.

Technical References

Many excellent economic texts on utility regulation are too technical for the non-economist reader. We have tried to avoid these texts as much as possible, although some of the readings do contain technical equations and discussion. Such references were included only when less technical, high quality references could not be found on the given topic. Below are listed some technical economics texts that might be useful for readers who wish to do further, in-depth study of regulatory economics.

Berg, Sanford V., and John Tschirhart, Natural Monopoly Regulation: Principles and Practice, New York: Cambridge University Press, 1988.

Brown, S.J., and D.S. Sibley, The Theory of Public Utility Pricing. Cambridge, U.K.: Cambridge University Press, 1986.

Laffont, Jean-Jacques, and Jean Tirole, A Theory of Incentives in Procurement and Regulation, Cambridge, Massachusetts: The MIT Press, 1993.

Mitchell, B., and I. Vogelsang, Telecommunications Pricing: Theory and Practice, Cambridge, U.K.: Cambridge University Press, 1991.

Train, Kenneth E., Optimal Regulation: The Economic Theory of Natural Monopoly, Cambridge, Massachusetts: The MIT Press, 1991.

Overview of Utility Regulation

A. Introduction

There is a growing consensus that the successful development of utility infrastructure – electricity, natural gas, telecommunications,[1] and water – depends in no small part on the adoption of appropriate public policies and the effective implementation of these policies. Central to these policies is development of a regulatory apparatus that provides stability, protects consumers from the abuse of market power, guards consumers and operators against political opportunism, and provides incentives for service providers to operate efficiently and make the needed investments.

Because the way regulation is done plays such a vital role in infrastructure development and use, most discussions of utilities policy focus on how regulation should be done, for example, how to introduce and facilitate competition, how to provide operators with incentives for improved performance, and how regulators should involve stakeholders. The academic literature calls such work normative theories of regulation, but we will simply refer to this as normative work for purposes of this ARL. Normative work is the primary focus of this Overview and the following chapters. We say that our "primary" focus is on normative work because we would be in error if we failed to recognize why regulation occurs. For example, there is always a political context within which a country chooses to initiate, continue, or change its regulation of utilities. The motivations for regulation affect how regulation occurs and are considered by a second basic school of thought on regulatory policy, namely, positive theories of regulation. Positive theories focus on the roles of stakeholders in the policy-making process, the results of their advocacy of solutions that address their individual interests, and broader motivations, such as the public interest.[2]

The purpose of this Overview is to provide a broad description of the motivations for regulation and the issues that regulation addresses.[3] We begin by describing the regulatory problem, which includes issues of market power, opportunism, and asymmetric information. We then discuss the basic approaches of regulation for dealing with these issues. We first cover

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[1] Arguably, telecommunications no longer qualifies as a "utility" in the traditional sense. However, for purposes of this ARL, we include telecommunications as a utility to simplify discussion.

[2] Section A of Chapter I examines theories of regulation and the rationale for regulation. Section H of this Overview and Chapter VIII that follows specifically examine how regulators can address this political context of regulation.

[3] In this narrative, we generally refer to the "government" when we discuss the development of policies and refer to the "regulator" or "agency" when we discuss the implementation of policy. We recognize that the institutional arrangements for developing and performing regulation vary across countries. For example, in some countries regulatory agencies take initiative in opening markets to competition, while in other countries all such work is done within a ministry. However, it is too cumbersome to try to reflect all possible divisions of responsibilities for regulatory policy in this narrative, so we simplify our language.

market structure, which examines monopoly power and competition. We then examine financial analysis, which regulators use to ensure financial viability, guard against cross-subsidy, and protect against excessive price levels. Regulating the overall price level is considered next, followed by issues of rate design. We then turn to non-price issues, such as service quality, environmental impacts, and social issues. We next cover information issues and close with a discussion of the regulatory process.

The remainder of this Overview is organized as follows. Section B defines the regulatory problem from different perspectives and identifies three basic approaches for overcoming the information issues that tend to underlie many regulatory policies. Section C describes the first approach, namely the use of competition. Section D summarizes the second approach, which is the gathering and use of information on markets and operators. Section E examines the last approach, the use of incentive regulation. The remaining sections examine related issues. Section F describes issues in tariff design. Section G covers service quality, environmental, and social issues. Section H examines the regulatory process. Section I provides concluding observations.

B. The Regulatory Problem

It seems fair to say that governments establish regulation of utilities to improve sector performance relative to no regulation. What might be meant by "improve sector performance," however, can be subject to considerable debate. Often "improve sector performance" means that the government wants to control market power and/or facilitate competition. It may also mean that the government wants to address commitment issues; that is to say, the government may adopt regulation to protect operators and customers from politically-driven decisions that would sacrifice long run efficiency for short term political expediency. "Improve sector performance" might also mean that the government has chosen to regulate in order to favor particular types of customers or to protect operators from competition. In one country, for example, regulation has been used to subsidize electricity for farmers. In many countries regulation imposed prices that led large users of long distance telecommunications to subsidize customers who used primarily local telephone services. In the 1900s, many counties used regulation to protect monopoly telephone companies from competition.

Except where otherwise noted, this narrative addresses normative issues of regulation, with the perspective that regulation is intended to improve welfare.[4] In this context, welfare

[4] Focusing primarily on welfare is not meant to imply that distributional issues in regulation are unimportant. We have already mentioned situations where governments use regulation to benefit some groups over other groups. We also devote portions of Chapters V, VI, and VIII to distributional issues, namely, assisting the poor. We focus on welfare because this is the measure of benefit most often used in research and because policies that emphasize welfare do not preclude also adopting policies that address distributional issues.

means the aggregate benefit that utility services provide, including benefits to consumers,[5] benefits to operators, and externalities.[6] Externalities are benefits or costs from a transaction that are received or born by third parties who are not part of the transaction. Air pollution produced by electricity generation is an example of a negative externality.

We should note at this point that some observers make convincing arguments that policy makers sometimes have more nefarious motives than maximizing welfare, for example, to gain short term political advantage or to benefit political supporters. Such motives raise the issue of how citizens can regulate their government and the regulator. Discussion of this issue is reserved to Section H of this Overview and to Chapter VIII.

From a normative perspective, regulation of a utility operator may be desirable if (1) the welfare objectives of the government are different from the objectives of the operator, and (2) the operator has an information advantage over the government. To illustrate why regulation may be appropriate when the government and the operator have different objectives, consider a situation in which the government and the operator each has a single objective, namely, the government wants service expansion in rural areas and the operator wants to maximize profits. An unregulated operator with market power would restrict output to maximize profits and would invest capital in areas that give the highest profits. It is unlikely that either of these outcomes would be consistent with the government's objectives, so the government may want to take steps that would make it in the operator's best interest to expand service in rural areas.

Now consider a situation where the government and operator have the same objective, say to offer service of a particular quality throughout the country at the lowest possible cost. In this case, the government could simply give the operator whatever relevant information the government had and let the operator pursue this objective on its own. Regulation would not be needed in this situation because the government could not improve results by regulating the operator, that is to say, regulation, if designed to persuade the operator to do what the government wants the operator to do, would be redundant with the operator's own strategic objectives.

In practice a government's objectives are typically different from an operator's objectives. For example, the government may be primarily concerned with new investments, service expansion, and low prices. In contrast, a privately owned operator is likely to want to maximize profits, an objective that, left unchecked, is generally understood to be inconsistent with widely available services and low prices across the board if the operator has market power. State-owned operators may want to satisfy key political supporters, maintain high levels of employment for

[5] Benefits to consumers is generally measured as net consumer surplus, which is the difference between the gross value that the customer receives when consuming the service (called willingness to pay) and the amount the customer pays.

[6] This narrative does not address the individual weight that the government may give to each element. These weights are important, but we are able to set them aside for this narrative because each regulator can use her or her government's own weighting system to determine which tools described herein to apply and how to apply them.

politically powerful unions, or secure large budgets, which would also be inconsistent with government's objectives. Because of these differences in objectives, governments typically adopt instruments to induce operators to achieve the government's objectives.

To illustrate the importance of the operator having an information advantage – a situation generically referred to as an information asymmetry[7] – suppose that the government and the operator have different objectives and that the government knows just as much as the operator about customer demand and the operator's ability to satisfy customer demand. In this case, the government could simply micro-manage the operator – i.e., tell the operator when to maintain lines, how many workers to employ, etc. – to achieve the government's objectives. This approach is called command and control regulation, and is in effect complete government management of the operator.

Furthermore, it is also generally the case that there is an information asymmetry between the government and the operator. Asymmetric information in this context means that the operator has what economists call private information about its ability to operate efficiently, about patterns of customer demand, or about the amount of effort that is required for the operator to be efficient.

There are three basic approaches to dealing with the asymmetries described above, namely, (a) overcoming market power by subjecting the operator to competitive pressures, (b) gathering information on the operator and the market, and (c) controlling market power by applying incentive regulation. In the following sections, we describe each of these approaches and how regulators put them into practice. Regulators typically use some combination of these three approaches and the proper mix depends on the country's needs and objectives, institutional capabilities and arrangements, cost or difficulty of obtaining information, and potential for competition.

C. First Approach: Competition[8]

When operators are subject to competitive pressures, two things happen that help overcome the asymmetry problems described above. The first development is that the operator, in its pursuit of profits, has an incentive to provide service quality levels and price levels that are best for customers, subject to the operator's need to cover its costs. Competition can provide this result because fully informed customers will buy only from those operators that provide the most beneficial combinations of quality and price. In other words, each customer seeks to maximize his net consumer surplus. Even if the operator in a competitive market is state owned, competition presses the operator to act as a privately owned operator because the state-owned operator must be responsive to customers in order to finance its operations, unless the operator

[7] Information asymmetries are discussed in Chapter I Section H.
[8] Chapter II on Market Structure and Competition covers competitive issues, except for competition between markets, which is covered in Chapter IV on Regulating the Overall Price Level.

can use its status as a state-owned service provider to gain an advantage over rivals. For example, if a state-owned operator were allowed access to taxpayer-provided monies when cash flows are unable to support investments, the state-owned operator could have an incentive to make uneconomic investments that further the operator's political goals or reduce competitive pressures. The second result of subjecting the operator to competitive pressure is that competitive market outcomes reveal actual customer demand, the operator's innate ability to be efficient, and how much effort the operator is willing to exert to be efficient.

Competition has additional benefits. It limits a government's ability to use regulation to favor certain stakeholders or to sacrifice long term efficiency for short term political goals. It also limits operators' abilities to raise prices and creates opportunities for different firms to try innovative ways to attract customers.

Regulators subject operators to competitive pressures by liberalizing markets and facilitating competition. There are three basic approaches. The first approach is to have multiple operators compete in the market for customers. This is called competition in the market and examples include having multiple mobile telecommunications service providers and multiple electricity generation providers. The second method, called competition for the market, is to have operators compete for the market by having the operators bid for the right to be a service provider.[9] Franchise bidding to operate a city water system is an example of this second approach. The third technique is to have operators in different markets compete by comparing the efficiency and effectiveness of their operations and rewarding those operators that provide superior performance. Competition in the market is discussed next, followed by competition for the market. The third approach, called competition between markets, but also called benchmarking or yardstick regulation is covered in the section on Incentive Regulation.

1. Competition in the Market[10]

There are several approaches to facilitating competition in the market. When all elements of the utility service can be competitive, then generally a primary job of the regulator is to remove barriers to entry or competition. Typical steps include removing licensing restrictions or large licensing fees, reducing switching costs, and requiring access to essential inputs, such as telephone numbering resources.

When some elements of the utility service have monopoly characteristics, such as gas distribution lines, and other elements can be competitive, such as gas production, then regulators also use tools such as structural separation and unbundling to facilitate competition. Structural separation separates the potentially competitive portions of the utility service from the non-

[9] Operators may also bid for the right to be a service provider in situations of competition in the market. This might be the case in mobile telephony, for example, where radio spectrum limits the number of possible operators.
[10] Chapter II Section B covers competition in the market.

competitive portions. For example, electricity generation is generally considered to be potentially competitive, but electricity distribution is not. These non-competitive, yet essential portions of the service are called essential facilities.[11] Structural separation prohibits a single operator from providing both the competitive and non-competitive portion of the service in an attempt to ensure that the provider of the essential facility does use its control of the essential facility to hinder competition. Structural separation is sometimes called unbundling, but some forms of unbundling may be less severe than structural separation. With simple unbundling, for example, the regulator may allow a single operator to combine competitive and non-competitive elements to provide bundled service, but also require the operator to allow rivals access to the essential facility so that the rivals are not disadvantaged relative to the operator's own competitive service. For example, some regulators require incumbent fixed line telephone operators to allow rivals to lease local telephone lines, but the regulators also allow the incumbent operators to continue to offer a retail service that bundles the local telephone line with usage. Regulators that want to facilitate competition generally take steps to remove barriers to entry, even if structural separation or unbundling is required

When structural separation or unbundling do not involve separate ownership, regulators often require accounting separations or ring fencing to ensure that there is no cross-subsidization from the non-competitive operations to the competitive operations. Accounting separation is discussed in more detail below in the subsection on Financial Analysis and in Chapter III. .

Access pricing is an important element of regulatory policies designed to facilitate competition in the market. When a utility service is unbundled, the rivals often pay the operator an access price for use of the non-competitive element of the service. Because this price is a source of revenue for the incumbent operator – the operator that provides both the competitive and non-competitive portions of the service – and a cost for the incumbent's rivals, the incumbent has an incentive to raise this price to a level that limits competition. In cases such as telecommunications where competitors must interconnect their networks in order to allow customers of rival networks to communicate, regulators generally require service providers to negotiate such interconnection arrangements and adopt cost-based prices.

2. Competition for the Market[12]

Competition for the market may be desirable when competition in the market is infeasible or impractical. In such cases, the right to be the monopoly provider of the service[13] could be auctioned off through an efficient auction. An efficient auction is one in which (1) the most efficient firm wins the auction, and (2) the winning operator gives up most of its monopoly

[11] A facility is considered to be an essential facility if it is necessary for the provision of the final product and cannot be economically produced by rivals to the essential facility provider.
[12] Chapter II Section C covers competition for the market.
[13] Chapter II Section A examines monopoly market structures.

profits. An efficient auction achieves cost efficiency because the most efficient firm is the only firm that can afford to pay the highest price for the right to be the monopoly. In paying this high price, the successful bidder gives up at least some portion of its monopoly profits, which can be distributed to customers. In general, monopoly profits are profits above the operator's cost of capital[14] that result from the operator having market power. Post-auction regulation may still be necessary if prices need to adjust to unanticipated events, but periodic re-bidding may substitute for typical price regulation.

D. Second Approach: Obtaining and Analyzing Information[15]

In addition to using competition to overcome asymmetries in information and objectives, regulators can also decrease information asymmetries by obtaining information on the operator and markets, typically including financial data and operating statistics. The financial data that regulators require from operators typically include balance sheets, capital structure, income statements, cash flow statements, and depreciation schedules. Regulators can gather financial data from a variety of sources, including reports to shareholders and taxing authorities, but the most common approach is to require the operator to provide the regulator with financial statements annually in accordance with a uniform system of accounts, which is a set of regulator-determined accounting rules that define the accounts and the accounting practices that the operator must follow when reporting financial information to the regulator. Operating statistics typically include information on prices, quantities of individual services sold, numbers of customers, numbers of employees, quality of services provided, sources of fuel or water, electricity generator or water treatment operating statistics, etc. usually annually or monthly. In electricity markets, where competition among electricity generators takes the form of an auction for the right to sell electricity for a given time period, regulators may need to obtain information on bid prices and actual sales. Analysis of this information for purposes of regulating overall price levels is described below in the subsection on Financial Analysis.

Information is also important for the regulator whose job it is to monitor or facilitate competition. In these cases, the regulator would need information on such things as prices, sales, market shares, essential facilities, services offered, and geographic areas served.

E. Third Approach: Incentive Regulation[16]

[14] Cost of capital is discussed in the subsection on Financial Analysis in this Overview and in Section F of Chapter III on Financial Analysis.
[15] Chapters III (Financial Analysis) and VII (Information Issues) focus on obtaining and using information.
[16] Chapter IV on Regulating the Overall Price Level provides the primary information on incentive regulation, although Chapter VI on Quality, Social, and Environmental Issues also examines incentives.

The third approach to dealing with information asymmetries is for the regulator to design and implement incentive schemes that reward the operator for using its private information to achieve the government's objectives. To be most effective, the reward should (1) provide the operator with additional units of something it wants – for example, profits – when the operator gives the government something it wants – for example, lower prices; (2) give the operator performance options that provide higher rewards for accepting more challenging performance goals; and (3) allow the operator to keep only a minimal reward – for example, accounting profits that are no greater than the operator's cost of equity – when the operator chooses the least challenging performance goal. Cost of equity is the financial return that the operator must give to its investors to induce them to provide capital for the firm.[17]

1. Basic Approaches to Incentive Regulation[18]

Incentive regulation is generally implemented by controlling the overall price level of the operator. There are four basic schemes to regulating overall price levels. The first approach is generally called rate of return regulation or cost of service regulation. This regulatory instrument establishes an overall price level that allows the operator to receive accounting profits that are just equal to the operator's cost of equity at the time the price level is set. Actual profits may deviate from the cost of equity until the next time the regulator reviews the operator's profits. The second approach is called price cap regulation or RPI-X regulation, which is a method that establishes the operator's overall price level by indexing the price level according to inflation minus an offset, called an *X*-factor.[19] The *X*-factor should reflect the difference between this operator and the average firm in the economy with respect to their abilities to improve efficiency and to changes in input prices. Directly measuring these efficiency and input price inflation differences to establish an *X*-factor is called pure price cap regulation.

The third approach to regulating the overall price level is called revenue caps. This is similar to price caps except that the inflation-minus-X formula applies to revenue rather than prices. The fourth approach is called benchmarking or yardstick regulation. This form of regulation provides competition between markets by comparing operators across markets, in effect forcing the operator to compete against the performance of comparable operators in other markets.

Many regulators adopt hybrid incentive schemes, which are approaches that combine features of the three basic methods of incentive regulation described above. For example, the U.S. Federal Communications Commission once combined elements of rate of return regulation and price cap regulation. Under its scheme, operators could choose from a menu of options. Each option included an *X*-factor and a formula that determined the proportion of accounting

[17] Chapter III Section F discusses how to estimate the cost of equity.
[18] Section A of Chapter IV covers this topic in more depth.
[19] As we explain below, some regulators using price cap regulation incorporate elements of rate of return regulation.

profits that the operator would be allowed to keep. Options with more aggressive (larger) *X*-factors allowed operators to keep larger proportions of their accounting profits. Regulators in the U.K. use elements of rate of return regulation to establish *X*-factors in price cap regulation. This is described in the subsection Financial Analysis.

2. Financial Analysis[20]

In practice, most forms of incentive regulation involve extensive financial analysis, which includes determining the operator's cost of capital, historical costs, and projected costs. The cost of capital consists of two elements, the cost of debt and the cost of equity. Regulators typically obtain debt costs from operators' financial reports, where the operators list their long-term debt instruments and the interest rates paid. Estimates of the operator's cost of equity can be obtained using financial models, such as an expanded Capital Asset Pricing Model (CAPM), that consider elements of risk, such as country risk and market risk, and the risk-free cost of capital. Regulators combine the operator's cost of debt and cost of equity into a weighted average, called the Weighted Average Cost of Capital (WACC).

Some regulators, such as those in the U.K., use historical and projected operating and investment costs to set *X*-factors. (Historical information alone is generally used in rate of return regulation.) The operator's historical operating and investment costs can be obtained from the operator's accounting records. Care must be taken when using historical accounting data in situations where accounting standards were historically weak or inconsistent over time. In the U.K. approach, projected operating and investment costs, existing net investment in regulatory assets or rate base, and projected net investment are used in a net present value or equivalent analysis to establish *X*-factors. This method involves making demand forecasts, identifying investment requirements to meet the projected demand, and the forecasting of associated operating expenses. These projections are analyzed and adjusted by the regulator to determine how the operator's overall price level should be allowed to change relative to inflation.

When using accounting costs, whether they are historical or projected, regulators place below the line any costs that are not needed to provide the utility service or that are considered excessive. Costs for items needed to provide the utility service are considered to be used and useful and so are kept above the line, which means that they can be recovered through prices charged for regulated services. Costs that are excessive, perhaps because the operator paid too much for an item or made an avoidable mistake in an investment are considered imprudent and the excess is placed below the line.

3. Ring Fencing and Accounting Separations[21]

[20] Financial analysis is covered in Chapter III.
[21] Section D of Chapter III examines ring fencing and control of cross-subsidization.

Accounting separations, which is the process of separating costs and revenues of regulated operations from non-regulated operations, is another important aspect of financial analysis. It is not unusual for an operator to provide services that the regulator does not regulate. For example, an operator may provide utility services in another country, offer utility services that have been deregulated, or offer non-regulated, non-utility services such as data processing. Accounting separations places the associated costs and revenues of these operations below the line. A regulator's accounting separations policies typically prescribe (1) accounts used to record only regulated activities, accounts used only for non-regulated activities, and accounts used for both types of activities; (2) how the costs and revenues in accounts that are used for both regulated and non-regulated activities are to be divided between the two types of activities; (3) how the operator is to value transactions between the regulated portion of the business and the non-regulated portions of the business (called transfer pricing); and (4) reporting and auditing requirements.

Some regulators use the term "ring fencing" to be synonymous with accounting separations. Other regulators use the term ring fencing more broadly by including such practices as providing different regulatory treatment for different services. Throughout the rest of this document, we will use the terms ring fencing and accounting separations interchangeably.

4. Benchmarking or Yardstick Regulation[22]

The third form of incentive regulation provides competition between comparable operators in separate markets. When using this form of regulation, regulators generally should choose performance measures that are general in nature and that operators can affect. An example of a general performance measure might be cost per kilowatt hour and an example of a more granular performance measure might be line maintenance cost per kilowatt hour. General performance measures allow operators to make economic tradeoffs – for example, between capital investments and operating expenses – while granular performance measures restrict the means by which operators can improve measured performance. In addition to being used for regulating overall price levels, benchmarking can be used for regulating such items as service quality and network expansion.

F. Tariff Design[23]

Once the overall price level has been established for the operator, the work of establishing the rate (or price) structure still remains. This work is called tariff design or rate design and refers to relationships among the individual prices (or rate elements) that the operator charges. In some instances, the regulator may choose not to regulate the price structure. Examples include

[22] Section D of Chapter IV covers benchmarking and yardstick regulation.
[23] Chapter V covers tariff design.

(1) situations where the objectives of the operator are in line with, or at least do not contradict, the objectives of the regulator, at least as they relate to rate design, and (2) situations where the regulator's resources are limited and regulating price structure is a low priority.

Most economists agree that efficient price structures cover total cost and align prices with marginal costs. Marginal cost is the additional capital and operating cost that results from increasing output by a single unit.[24] Marginal cost pricing may be difficult in situations where there are economies of scale or economies of scope because prices equal to marginal costs would not cover all of the costs of the operator. In these situations, regulators and operators generally favor multipart pricing or Ramsey pricing. Multipart pricing is an arrangement where the operator charges separate prices for different elements of the service. For example, a water provider may charge a connection fee plus a usage fee. With Ramsey pricing, which is also called differentiated pricing or the inverse elasticity rule, the operator charges higher prices to customers with inelastic demand and lower prices to customers with elastic demand. Customers have inelastic demand if they do not change the amount they purchase by very much if the operator changes its prices. Conversely, customers have elastic demand if they respond to changes in prices by making large changes in the quantities that they purchase. More precisely, inelastic demand means that a one percent change in price results in a percentage change in the quantity demanded that is less than one percent, while elastic demand means that the one percent change in price results in a greater than one percent change in quantity demanded.

G. Service Quality, Environmental, and Universal Access/Service Issues[25]

In addition to addressing pricing issues, regulators address issues of service quality, environmental protection, infrastructure development, and access to services for the poor. An operator with market power may have an incentive to degrade retail service quality if doing so increases profits, or to degrade quality for inputs sold to competitors if doing so decreases competitive pressures. Regulators often adopt schemes for regulating service quality to address these problems. Service quality regulation generally includes quality standards, mechanisms for monitoring quality, and penalties for not meeting the quality standards. It is less typical for the operator to receive a reward for exceeding service quality standards.

Environmental regulation is similar to service quality regulation in that it often includes standards, monitoring, and penalties or rewards. In some instances markets can be used for environmental regulation. For example, the government may issue tradable emission permits to electricity generators so that a generator that has low pollution control costs can profitably decrease its emissions and sell some portion of its permit to a generator which has higher pollution control costs. In many countries, the utility regulator does not have direct responsibility

[24] If the system is capacity constrained, meaning that capacity cannot be increased, marginal cost would also include the marginal congestion cost.
[25] Chapter VI covers service quality, environmental, and universal access and service issues.

for environmental regulation. Where this is the case, the regulator generally should be aware of the country's environmental policies and regulations because the utility regulator's incentive mechanisms and decisions on above- or below-the-line treatment of environmental protection costs affects the operator's incentives to cooperate in reaching the country's environmental goals.

In some instances, the regulator may want the operator to provide services that are not commercially viable. The most common examples are infrastructure expansion and service or service access to the poor. In the case of infrastructure expansion, the regulator may desire a rapid system expansion, beyond what profit-maximizing operator in a competitive market would choose, or desire network expansion into a rural area, where customers are unwilling or unable to pay prices that would cover the cost of developing the rural infrastructure. The most common solution is a requirement in the operator license or concession contract that sets out network deployment expectations and the rewards or penalties that apply to encourage the operator to meet the expectations. Other approaches include special franchises for rural areas and subsidies for rural areas.

Policies for services to the poor generally use some combination of three basic elements – competition, service quality standards specific to services for the poor, and subsidies. Research has shown that competition provides operators with incentives to find ways to profitably provide service to the poor. For example, competition in mobile telecommunications in developing countries provided operators with an incentive to develop prepaid service, which made it possible for the poor, who are generally unable to establish credit for post-paid service, to obtain service.[26] Competition among entrepreneurs who transport water from wells or streams has also increased the supply of water to the poor in some instances. Situations also arise where services to the poor can be made affordable by offering services that are of a lower quality than services provided to wealthier customers. For example, a shared sewage system provides a lower level of service than a system that gives each customer his or her own connection, but may be more affordable for the poor than the higher quality system.

Subsidies are also a common feature of policies designed to assist the poor. These generally take the form of service or infrastructure development obligations for operators. (Infrastructure development issues are described above.) In these situations, the operator internalizes the subsidies. In other instances, the subsidies may be explicit. For example, water customers living in low-income areas of Columbia receive credits on their bills. Customers in wealthier areas have surcharges on their bills to fund the subsidies to the poorer customers. Subsidy arrangements should be approached with caution. Research has shown that traditionally higher income customers benefit more from subsidies than do poorer customers.

H. Regulatory Process[27]

[26] Prepaid service was subsequently adopted even in markets where there was no competition.
[27] Chapter VIII covers the regulatory process.

An important feature of utility regulation is the institutional arrangement within which it occurs because these arrangements affect stakeholders' beliefs and abilities to influence regulation, the incentives and capabilities of the regulatory agencies, and the role of politics in the regulatory process. In fact, the institutional structure of regulation takes us back to an earlier point about objectives because this institutional structure plays a significant role in determining the regulator's objectives.[28] If the regulatory agency is subject to daily political pressures, for example, then the agency may place more weight on short-term political goals than on long-term infrastructure development goals identified in the country's laws. A consequence of the regulator pursing short-term political goals may include prices that are so low as to discourage investment or the politically powerful benefiting more from regulatory policies than the politically weak. There is also a danger that the agency may be subject to capture by operator interests and so serve the interests of the industry rather than pursue the provision of efficient utility services. To avoid these and other outcomes that serve the needs of special interests, experts generally recommend institutional arrangements that (1) focus the country's political efforts on establishing laws under which the regulator performs her function, and (2) make it easier for customers and other stakeholders to regulate the regulator and policy makers. These arrangements are designed to ensure, to the extent practical, that the regulator's objectives correspond to the objectives of the population. These arrangements regulate the regulator and policy makers by encouraging regulation under the law and independence, transparency, predictability, legitimacy, and credibility of the regulatory system.

1. Institutional Arrangements

Institutional arrangements in regulation include institutional design, methods for review and appeal of regulatory decisions, mechanisms for encouraging ethical conduct, and processes for managing relationships with stakeholders. The design of regulatory institutions includes such features as appointment processes for regulators, agency financing, scope of responsibilities and authority of the agency, regulatory processes for protecting stakeholders' rights and providing stakeholders with information, and the management structure of the regulatory agency. Appointment and removal processes for regulators and financing of the regulatory agency affect the regulator's ability to operate independently of short-term political interests and the government's ability to ensure that the regulator is following the government's established policies. For example, if the president, parliament, or ministry of a country can remove the regulator at will, then absent extraordinary self control on the part of politicians, the regulator has an incentive to serve the politicians' short-term interests. On the other hand, a regulator-for-life who has control of her own budget would have extraordinary power and, absent strong judicial oversight, would be able to pursue personal agendas that may conflict with the policies and laws of the country. Policies that provide due process for stakeholders ensure that the persons affected

[28] This topic is covered in both normative theories of regulation and positive theories of regulation.

by regulation are able to provide the regulator with information and opinions that are relevant to the regulator's decisions. Policies that require the regulator to keep records, make the records publicly available, and provide substantive explanations for regulatory decisions allow customers and other stakeholders to observe how the regulator makes decisions and facilitate appeals of regulatory decisions.

2. Review and Appeal

The review and appeal processes for regulatory decisions includes decision making processes, choices of regulatory instruments, stakeholder and government roles in regulatory decision making, mechanisms for appeal of regulatory decisions, and alternative dispute resolution processes. Regulatory instruments include legislation and licenses, the choice of which is often determined by the legal traditions of the country and the methods by which these instruments can be changed. For example, the regulatory process is politicized if a license is the regulatory instrument and the ministry can change the license at will. In some countries, regulatory decisions are subject to ministry review, which can also politicize regulation. To avoid such situations, some countries provide only judicial review of regulatory decisions or establish administrative tribunals. For example, in the UK most major regulatory decisions can be appealed to the Competition Commission, as well as the courts. Some countries allow courts to overrule the regulator only on legal or procedural grounds and not on the substantive grounds of the regulatory decision itself. In some situations legal processes can delay regulatory decisions to such an extent that the decisions cannot be made in a timely fashion, which degrades sector performance. To avoid such delays, some countries use alternative dispute resolutions procedures, such as binding arbitration, to speed resolution of conflicts.

3. Ethical Conduct

Ethical conduct of regulators is important because control mechanisms, such as appeals and due process, are imperfect and may be costly. Instruments for encouraging ethical conduct include adopting conflict-of-interest standards and codes of conduct. A conflict of interest may occur if, for example, the regulator or the regulator's family members having financial stakes in operators or if the regulator has recently worked for an operator or another stakeholder, has served as a consultant for a stakeholder, or negotiated future employment or business arrangements with a stakeholder. In the UK, for example, regulators have to obtain permission from ministers to work in their area of regulation after leaving the regulatory authority. Codes of conduct often cover such issues as meetings with stakeholders, record keeping procedures, and political activities.

4. Stakeholder Relations

Stakeholder relations affect the independence of the agency and include the use of advisory boards, communication strategies, grievance procedures, and relationships with the government, consumers, operators, and investors. Some regulators use advisory boards to facilitate stakeholder input, especially on issues of long-term planning and on issues that require ongoing surveillance, such as service quality regulation. Care must be taken when using advisory boards to ensure that the stakeholders represented do not obtain privileged positions for influencing the regulator. Regulators generally receive complaints from consumers related to prices and service quality, and often regulators have special staff designated to handle these complaints. Some of the regulator's interactions with stakeholders can take the form of negotiations. Such circumstances make it important for regulators to develop strategic negotiation skills, such as identifying parties' interests and win-win solutions. Lastly, regulators generally dedicate trained staff to dealing with the press because the public receives most of its information about regulation through newspapers and other media. This reliance upon journalists makes it important for regulators to develop good press relations, provide effective press releases, and learn how to provide timely and accurate information to the press.

I. Concluding Observations

Regulation is performed in a network of relationships among persons and institutions that differ in their objectives, incentives, and sets of information. For regulation to result in effective and efficient sector performance – which is necessary for customers to receive their maximum benefit from the sector – decision making procedures should be in place to limit information asymmetries and that provide incentives for operators, government, and regulators to work for the best interest of customers and the economy. This generally means that (1) effective competition should be encouraged whenever possible, (2) the regulator should gather information about the sector and should provide stakeholders with information on the regulator and her decisions, (3) incentive regulation should reward the operator with the opportunity for higher profits when he accepts performance goals that make customers better off, (4) requirements should be established for service quality and access for the poor, and (5) regulatory processes should align the goals and capabilities of the regulator with the welfare of customers.

Chapter I. General Concepts

Introduction

As the Overview explains, utility regulation can occur for several reasons. Common arguments in favor of regulation include the desire to control market power, facilitate competition, or stabilize markets. In general, though, regulation occurs when the government believes that the operator, left to his own devices, would behave in a way that is contrary to the government's objectives.[29] In some countries an early solution to this perceived problem was government provision of the utility service. However, this approach raised its own problems. Some governments used the state-provided utility services to pursue political agendas, as a source of cash flow for funding other government activities, or as a means of obtaining hard currency. These and other consequences of state provision of utility services often resulted in inefficiency and poor service quality. As a result, governments began to seek other solutions, namely regulation and private participation in service provision.

This chapter on General Concepts in utility regulation covers general themes in utility regulation. It is organized as follows. The following paragraphs describe recent utility market reforms, the development of utility regulation, market structure and how it relates to sector performance, and theories of regulation. References are organized by topic.

Utility Market Reforms

In the early and mid twentieth century many countries, especially in the developing world, sought to provide utility services by forming state-owned monopolies. By the latter part of the century, it became clear that state-owned monopolies were generally inefficient providers of utility services and ineffective in making these services broadly available to the public. Micro-management from politically-motivated government officials led state-owned operators to have excessive numbers of employees, provide service primarily to politically powerful groups, cross-subsidize services, and charge non-commercially-viable prices. Weak institutions allowed two types of political opportunism. In some instances, prices were kept artificially low so that state-owned operators needed government subsidies to finance investments and cover other costs. If fiscal constraints prevented the government from providing the subsidies consistently, then there was under investment and poor service quality. In other instances, the utility services would be used as cash cows to fund other government functions. This also resulted in under investment and poor service quality for the utility services. During the 1980s and 1990s, policy makers

[29] Recall that there is also a concern about the government's objectives. This concern implies a need for regulatory processes that enforce commitments, ensure that long term efficiency is not sacrificed for short term political expediency, and treat all stakeholders fairly.

began to conclude that regulated, privately-owned service providers might be more effective than state-owned operators because private operators might be less subject to political opportunism and might operate more efficiently than state-owned enterprises, especially if subjected to competitive pressures, because profit motives provide clear and consistent incentives to control costs, deploy infrastructure where demand is sufficient to cover costs, offer prices that encourage efficient utilization of the infrastructure, and innovate when customers find the innovation sufficiently valuable to pay for the improvement.[30] As part of this trend, countries began to introduce competition wherever possible and developed utility regulatory agencies that would enforce concession or licensing agreements and regulate prices.[31]

The shape of market reform has varied across sectors and countries. In telecommunications, liberalization and privatization have been the most prevalent features of market reform, although countries have varied in their degrees of market liberalization and privatization. Telecommunications regulators have generally focused on removing barriers to entry, ensuring efficient network interconnection,[32] rebalancing prices[33] to reflect new competitive realities, and promoting access to telecommunications for the poor and for rural areas.[34] In electricity, industry restructuring[35] and privatization have been the most prevalent market reforms. Restructuring has generally involved structural separation that separates the sector into competitive generating companies and monopoly transmission and distribution companies. Establishing efficient market mechanisms for electricity has been particularly challenging. Markets for natural gas have experienced reforms along the lines of the electricity reforms – production and transport are separated from distribution, gas production has been opened to competition, and gas distribution is typically left to a local monopoly. Water reforms have varied greatly, ranging from complete privatizations as in the case of the U.K., to build-operate-transfer arrangements, to private management contracts, to incentive systems for state-owned monopolies.[36]

Development of Regulation

Countries almost always establish regulatory agencies to improve sector performance relative to no regulation.[37] This means that the regulators generally focus on controlling market power and/or facilitating competition, although regulators are also often charged with ensuring

[30] The references in Section B discuss these trends.
[31] Chapter II Section A examines the regulation of monopolies. Section G of Chapter I provides information on various regulatory instruments, such as license and concession agreements, as does Chapter VIII Section B.
[32] Chapter II Section B covers market liberalization, including barriers to entry and interconnection.
[33] Chapter V covers tariff issues.
[34] Chapter V Section C and Chapter VI Section C cover issues of providing service to the poor.
[35] Chapter II Section B covers approaches to market restructuring. Section B in Chapter I examines the motives for restructuring.
[36] Incentive mechanisms are covered in Chapter IV and in Chapter VI.
[37] Section A covers the rationale for regulation.

service availability and system expansion, improving cost efficiency, attracting capital to the sector, improving sector stability, and generating government revenues from licenses and concessions.[38]

In general, the overarching purpose of regulation is to improve sector performance relative to no regulation.[39] Sector performance can be measured in terms of net consumer surplus, service availability and system expansion, cost efficiency, affordability of prices, range of services offered, quality, and the rate of innovation.[40] In fulfilling this purpose, regulators are often called upon to implement policies for attracting capital to the sector and increasing investment, generating government revenues from licenses and concessions, encouraging the development of and effectiveness of competition in the market, increasing government success in issuing licenses, providing incentives for operators to improve efficiency, and facilitating universal access. Regulation has failed when it has not provided the stability and commercially viable tariffs needed by investors.

Regulatory agencies vary in their scope of authority and responsibilities. The three main issues in defining a utility regulator's role are the sector(s) covered, the regulator's role in relation to ministers, and the regulator's role in relation to other regulatory entities such as the competition agency. Sometimes the regulatory agency is sector specific, but multi-sector regulatory agencies are also popular. Typical duties include standard setting, regulating prices and service quality,[41] monitoring performance, licensing, handling consumer complaints, providing policy advice to ministries and parliament, monitoring market competition, and settling industry disputes, such as inter-operator interconnection or payment disputes.[42]

Because private and public sector participation in infrastructure can take several forms, ranging from state ownership to service and supply contracts to concession arrangements to full privatization, and because countries have varied legal systems and institutional endowments, regulators vary in the type of regulatory instruments they apply.[43] Regulation of state-owned enterprises is discussed below. Some countries issue licenses that set out the regulatory conditions under which the operator will provide its service. Other countries enter into contracts with operators, such as concession contracts or franchises.[44] Service and supply contracts include technical assistance contracts and complete management contracts. The government maintains

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[38] Section C covers common roles for regulators. Chapter VIII examines agency responsibilities and other issues in managing the regulatory process.
[39] Section D covers regulatory objectives and priorities.
[40] We will set aside for the moment the possibility that the government may want to use regulation to favor particular political constituents.
[41] Pricing is covered in Chapter II Section B and Chapter V. Service quality is covered in Chapter VI Section A.
[42] In Chapter VIII, Section D discusses handling consumer complaints, other relationships, and negotiation, and Section A covers independence.
[43] Section F identifies special issues related to regulation of state-owned enterprises and Section G summarizes regulatory instruments. Chapter VIII Section B also provides information on choices of regulatory instruments.
[44] Chapter II Section C covers techniques for contracting and franchising.

ownership of the assets. Concession approaches include leasing and build-operate-transfer arrangements in which the private operator owns or is at least responsible for the assets for a set period of time. Privatization includes divestiture by the government and the development of new enterprises, often called build-own-operate, in which the private operator owns the assets until the operator chooses to retire or sell them.

Legislation may be needed to authorize the government to enter into service and supply contracts or to issue licenses or let concessions, however, the terms included in the contracts, licenses, and concession agreements govern the details of the private operators' and the government's rights and obligations. With privatization, legislation oftentimes governs the parties' rights and obligations, but these may be further defined in a license. Regardless of the form of ownership, some countries rely primarily upon statutes and laws that define the roles and responsibilities of all operators.

Market Structure and Performance[45]

Market structure refers to the number of firms in a sector and the nature of their interactions. Governments regulate market structure in various ways, including removing barriers to entry, restrictions on market concentration, and restrictions on vertical integration. Governments may also regulate market conduct, which includes controlling operators' pricing and production practices or providing incentives for appropriate conduct. Regulation of market conduct is traditionally viewed as a poor substitute for competition. As a result, regulators often encourage competition whenever practicable. The advantages of competition over regulated conduct include limited opportunities for political rent seeking, fewer information asymmetries, and better incentives to serve customer interests. When an operator is subject to at least some competitive pressures, regulators generally allow the operator pricing flexibility, ranging from deregulation to the opportunity to lower prices to long run marginal cost.

Sometimes regulators share responsibility for ensuring competitiveness of markets with a competition authority.[46] The competition regulator is generally concerned with all sectors and generally has three functions. The first function is to remedy anticompetitive conduct, such as collusion.[47] This function is generally ex post, meaning that the competition authority responds to activities that have already occurred. In contrast, utility regulators generally address competitive issues ex ante, meaning that they act to prevent anticompetitive conduct. The second function of the competition authority is to ensure that industry mergers do not significantly decrease

[45] Section E discusses the regulation of market structure versus the regulation of market conduct. Chapter II examines various market structures and related regulatory issues.
[46] See Chapter II Section B and Chapter VIII Sections A and D for information on relationships with other agencies, such as competition authorities.
[47] Chapter II Section B examines anticompetitive conduct.

competition. The third function is consumer protection, such as enforcing warrantees and advertising claims. Sector regulators and competition authorities often cooperate in their efforts.[48]

Regulating Public vs. Private Operators[49]

Whether the regulator is regulating a publicly-owned operator rather than a privately-owned operator changes the nature of some issues. For example, government interference may be greater with a government-owned operator. It may also be less costly for the government to use direct control of a public enterprise to pursue the government's objectives, rather than use economic incentives for a private operator. However, direct control may lower operating efficiency for reasons indicated above. Also, a government's promise to not engage in political interference with utility operations is less credible with public ownership than with private ownership.

Incentive regulation can be more difficult with a publicly-owned operator. Because the government delegates day-to-day decisions to management, principal-agent problems arise even with public ownership. Using incentives to address these problems requires regulators of public enterprises to identify the objectives of the managers and provide incentives for improved performance. This problem is simplified in the case of private operators because they generally seek to maximize profit and the regulatory techniques of using profit incentives are well known. However, managers of public enterprises are generally more affected by political influence, government budgeting, and bureaucratic management than are their counterparts in privately-owned operators.[50]

Ownership also affects other issues. Pricing is generally more efficient with private enterprises because the government must allow private operators' prices to cover costs over time in order to encourage investment.[51] Competition is more complicated with public enterprises than with private enterprises. Public enterprises have had success thwarting competitive entry, but experience has shown that subjecting public enterprises to competition improves efficiency relative to public ownership with no competition. Also, the absence of equity markets for public enterprises complicates estimating the cost of capital. On the other side, the public sometimes raises concerns about private ownership of infrastructure industries, such as concerns about private investment incentives not capturing public needs for services and about foreign owners not understanding local markets and local needs.[52]

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[48] Chapter VIII Section D discusses approaches for regulators to relate with customers.
[49] See Section F.
[50] Chapters IV and VI cover these techniques.
[51] See, for example, the case study of India electricity in Bakovic, Tenenbaum, and Woolf, March 2003.
[52] Section F of Chapter III covers issue of estimating the cost of capital.

Theories of Regulation[53]

The development and techniques of regulation have long been the subject of academic research. Two basic schools of thought have emerged on regulatory policy, namely, positive theories of regulation and normative theories of regulation. Positive theories of regulation examine why regulation occurs. These theories of regulation include theories of market power,[54] interest group theories that describe stakeholders' interests in regulation,[55] and theories of government opportunism that describe why restrictions on government discretion may be necessary for the sector to provide efficient services for customers.[56] In general, the conclusions of these theories are that regulation occurs because 1) the government is interested in overcoming information asymmetries with the operator and in aligning the operator's interest with the government's interest,[57] 2) customers desire protection from market power when competition is non-existent or ineffective, 3) operators desire protection from rivals, or 4) operators desire protection from government opportunism. Normative theories of regulation generally conclude that regulators should encourage competition where feasible, minimize the costs of information asymmetries by obtaining information and providing operators with incentives to improve their performance,[58] provide for price structures that improve economic efficiency,[59] and establish regulatory processes that provide for regulation under the law and independence, transparency, predictability, legitimacy, and credibility for the regulatory system.[60]

Principal-agent theory addresses issues of information asymmetry, which in the context of utility regulation generally means that the operator knows more about its abilities and effort and about the utility market than does the regulator.[61] Principle-agent theory is applied in incentive regulation and multipart tariffs.[62]

Concluding Observations

Even though regulation is often described as a principal-agent problem between the government and the operator, there are actually several principal-agent relationships involved.

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[53] See Sections A and H.
[54] Chapter II addresses market power issues.
[55] Chapter VIII Sections A, C, and D address issues relevant to the effects of stakeholders in regulation.
[56] Limits to regulatory power and institutional mechanisms designed to limit opportunism are examined in Chapter VIII. Incentive regulation techniques discussed in Section IV include restrictions on regulatory discretion that are intended to limit opportunism.
[57] See Section H.
[58] See Chapters II, III, IV, and VII for techniques for overcoming information asymmetries.
[59] See Chapter V.
[60] See Chapter VIII.
[61] See Section H. See Productivity Commission of Australia (2003) for a case study in how information issues affect regulatory policy.
[62] Chapter IV covers incentive regulation and Chapter V discusses multipart pricing.

The regulator is an agent for the government, serving as the principal in the government's principal-agent relationship with the operator. The government seeks to control its regulator-agent through laws, courts, budget control, fixed terms, and transparency requirements rather than through incentives. There is also a principal-agent relationship between the customers, serving as the principal, and two agents, namely the government and the regulator. Customers regulate the government and the regulator through political processes and regulatory processes discussed in Chapter VIII.[63]

The following chapters describe numerous mechanisms of regulation. Chapter II covers the Market Structure and Competition techniques. Chapter III is on Financial Analysis, which relates to both the information gathering and incentive regulation solutions to the information asymmetry between the regulator and the operator. Chapter IV focuses on using incentive regulation in Regulating Overall Price Level and Chapter V covers the related Tariff Design issues. Chapter VI focuses on Quality, Social, and Environmental Issues and Chapter VII examines additional Information Issues. Chapter VIII completes the discussion by examining the Regulatory Process, which is the public's main instrument for regulating the regulator.

[63] See Chapter VIII for a discussion of mechanisms used to address these principal-agent relationships.

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Chapter I Cases by Topic Area

Table 1. Chapter I Cases by Topic Area

	Cases												
	Bakovic, Tenenbaum, and Woolf, March 2003	Florida Public Service Commission, 2003.	Garg, Kabra, and Kacker, 2003.	Guasch and Spiller, 1999, Chapter 4.	Hill and Abdala, 1996.	Mota, January 2003.	OFWAT, November 1999.	OFWAT, 2004.	Paredes, June 2001.	Productivity Commission of Australia, 2003.	Spiller and Sampson, 1996.	Toba, 2003.	Torero and Pasco-Font, June 2001.
Chapter I. General Concepts													
A. Rationale for regulation					X								
B. Rationale for reform of utility markets			X			X			X			X	X
C. Common roles of regulators		X	X										
D. Regulatory objectives and priorities		X					X	X					
E. Regulation of market structure vs. regulation of conduct													
F. Regulation of public vs. private companies, of existing vs. new firms													
G. Regulatory instruments				X							X		
H. Information asymmetry and limits to regulation													
I. Law and Economics													

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A. Rationale for regulation, including regulation of monopolies and oversight of competitive markets, public interest theory, interest group theory, and the difference between normative and positive theories of regulation.

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Baldwin, Robert, and Martin Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapters 2-3.

Examines the rationale for regulation, including issues of monopoly and market power, externalities, information asymmetries, and public goods. Also summarizes positive theories of regulation, including public interest theories, interest group theories, and private interest theories.

Guasch, J. Luis, and Pablo Spiller, Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story, Washington, D.C.: The World Bank Group, 1999, Chapter 2.

Explains contracting issues that give rise to regulation, including problems of government commitments to the operator, market failure, desire for cross subsidies, and interest group politics.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapter 1.

Explains common reasons cited for regulation, including the importance of the sector, the existence of natural monopoly or market failure, the desire of government to use franchises or to encourage non market-based outcomes (such as service distribution), problems with destructive competition or undesirable discrimination, cream-skimming, and excessive non-price rivalry. Also describes the legal rationale for regulation in the U.S.

Newbery, David M., Privatization, Restructuring, and Regulation of Network Industries. Cambridge, MA: MIT Press, 1999, Chapters 1 and 4.

Describes normative and positive theories of regulation. Explains that "regulation … is inevitably inefficient because of problems of information and commitment and, more fundamentally, because of inefficient bargaining between interest groups over potential utility rents."

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Provides and overview of options for restructuring the electricity sector.

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Juris, Andrej, "Competition in the Natural Gas Industry: The emergence of spot, financial, and pipeline capacity markets." Note no. 137 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, March 1998.

Describes basic restructuring and trading arrangements in gas and pipeline markets.

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Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 1.

Provides an overview of reasons for regulation of private telecommunications operators.

Wellenius, Björn, "Telecommunications Reform – How to Succeed," in Public Policy for the Private Sector. Washington, D.C.: World Bank, October 1997.

Explains role of regulation in telecommunications reforms.

WATER

Water Toolkit Module 1: Selecting an Option for Private Sector Participation. Washington, D.C.: World Bank, 1997.

Describes options for private sector participation in the provision of water services. Also gives a brief overview of why some countries choose private participation.

Key Words

Privatization, Regulation, Liberalization, Market Reform

B. Rationale for reform of utility markets (e.g. fiscal constraints, technological change, policy innovations, incentives for efficiency) and the elements of market reform, including private participation, liberalization, and regulation

Core References

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> Explains the rise and fall of both public sector monopolies and private participation in infrastructure. Describes when private sector participation improves results and how important regulatory issues, such as pricing and competition, need to be addressed if private participation in infrastructure is to succeed.

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> Describes the cycles of private and public provision of infrastructure. Examines role of regulation in providing stability to the sectors.

Newbery, David M., Privatization, Restructuring, and Regulation of Network Industries. Cambridge, MA: MIT Press, 1999, Chapter 1.

> Argues that the proper mode of provision of utility services – including private participation, public sector provision, liberalization, and regulation – can vary over time and depends on a country's political, cultural, and institutional features. Examines the U.K. utility reforms in depth and contrasts with U.S. experience.

Sectoral References

ELECTRICITY

Hunt, Sally, Making Competition Work in Electricity. New York: Wiley & Sons, 2002, Chapters 1-2.

Describes reasons for restructuring electricity markets and the economics of the alternative industry structures.

GAS

Juris, Andrej, "Competition in the Natural Gas Industry: The emergence of spot, financial, and pipeline capacity markets." Note no. 137 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, March 1998.

Describes basic restructuring and trading arrangements in gas and pipeline markets.

TELECOMMUNICATIONS

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 1.

Provides an overview of reasons for regulation of private telecommunications operators.

Smith, Peter, "What the Transformation of Telecom Markets Means for Regulation," Note no. 121 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

Examines the implications of dynamics of telecommunications technologies and markets for regulation.

WATER

Savedoff, William, and Pablo Spiller. "Government Opportunism and the Provision of Water," in Spilled Water: Institutional Commitment in the Provision of Water Services, edited by William Savedoff and Pablo Spiller. Washington, D.C.: Inter-American Development Bank, 1999, pp.1-34.

Describes roles that regulation may play in decreasing government opportunism for both private operators and public operators.

Other References

Wallsten, Scott J, "An Empirical Analysis of Competition, Privatization, and Regulation in Telecommunications Markets in Africa and Latin America," *Policy Research Working Paper 2136*. Washington, D.C.: World Bank, May 1999.

Examines the effects of telecommunications reforms in Africa and Latin America. Finds that privatization and an independent regulator together improve sector performance. Privatization alone yields few benefits and has some negative effects. Competition increases per capita number of mainlines, payphones, and connection capacity, and decreases the price of local calls.

Key Words

Market Reform, Competition, Regulation, Franchising, Cross-subsidization, Privatization.

C. Common roles of regulators

Note: Readers should cross-reference this section with Chapter I Section D on objectives and priorities and with Chapter VIII Section A Subsection 2 on agency responsibilities.

Core References

Guasch, J. Luis, and Pablo Spiller, Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story, Washington, D.C.: The World Bank Group, 1999, Chapters 2 and 3.

Describes the design of regulatory agencies and relates the design to the reasons for regulation. Provides a case study of Jamaica.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapter 2.

Describes the basic economic functions of the utility regulator, focusing primarily on service quality, controlling the overall price level, and determining rate structure.

Smith, Warrick, "Utility Regulators: Roles and Responsibilities." Note no. 128 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

Examines issues of sector coverage, relationships with ministers, and relationships with other government agencies.

Sectoral References

ELECTRICITY

Brown, Ashley C., and Ericson De Paula, "Strengthening of the Institutional and Regulatory Structure of the Brazilian Power Sector," World Bank Report on the PPIAF Project for Brazil Power Sector, Task 4, December 2002.

> Examines regulatory roles in granting concessions, conducting auctions, and sector planning. Roles in auctions include setting the terms and conditions and ensuring that auctions are conducted fairly and transparently. Describes potential conflicts of interest in having regulators involved in concessions and auctions. Also describes key considerations in deciding whether regulators should have roles in sector planning.

TELECOMMUNICATIONS

Henten, Anders, Rohan Samarajiva, and William H. Melody, "Designing Next Generation Telecom Regulation: ICT Convergence or Multisector Utility?" Center for Information and Communication Technologies, Technical University of Denmark, Lyngby, January 2003.

> Examines how convergence raises new regulatory issues such as security, privacy and consumer protection. It may also lead to the integration of telecom and broadcast media regulation. Also examines advantages and disadvantages of multi-sector regulators.

Min, Wonki, "Telecommunications Regulations: Institutional Structures and Responsibilities." Working Paper no. 237, Organization for Economic Co-operation and Development (OECD), Washington, D.C., 26 May 2000.

> Explains that there is a lot of variety among nations on the roles of regulators. Typical responsibilities of the regulator (or ministry) include licensing, interconnection, spectrum management, numbering, price regulation, universal service, and service quality.

Schwarz, Tim, and David Satola, "Telecommunications Legislation in Transitional and Developing Economies," World Bank Technical Paper No. 489, October 2000.

> Examines the design of telecommunications legislation in transitional and developing economies for liberalizing and privatizing telecommunications.

Provides a framework for debate on a policy level about a variety of issues. Also examines international best practice.

WATER

OFWAT, "The Role of the Regulator," 2002.

Describes Ofwat's roles and practices in the U.K.

Other References

Hayek, F.A., The Road to Serfdom. Chicago: University of Chicago Press, 1944 (reprinted 1994), Chapter 6.

Explains how expert agencies necessarily apply their value systems in carrying out their responsibilities.

Key Words

Regulation, Regulatory agencies, Service quality, Rates, Prices, Planning

D. Regulatory objectives and priorities, including trade-offs in objectives and achieving balance in pursuing objectives.

Note: Readers should cross-reference this section with Chapter I Section C on roles of regulators and Chapter VIII Section A Subsection 2 on agency responsibilities.

Core References

Baldwin, Robert, and Martin Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapters 2 and 4.

Describes theories of how regulators should regulate and basic regulatory strategies, such as command and control, self-regulation, incentive regulation, and competition.

Guasch, J. Luis, and Pablo Spiller, Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story, Washington, D.C.: The World Bank Group, 1999, Chapters 2 and 16.

Describes the design of regulatory agencies and relates the design to the reasons for regulation. Summarizes lessons in regulatory design.

Kahn, Alfred, The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, vol. I, Chapters 1 and 2.

Explains the traditional reasons for regulation. Describes the basic economic functions of the utility regulator, focusing primarily on service quality, controlling the overall price level, and determining rate structure.

Sectoral References

ELECTRICITY

Newbery, David M., Privatization, Restructuring, and Regulation of Network Industries. Cambridge, MA: MIT Press, 1999, Chapter 6.

Describes the goals and objectives of electricity regulation and electricity market reform. Summarizes U.K. case of electricity reform.

GAS

Armstrong, Mark, Simon Cowan, and John Vickers, Regulatory Reform: Economic Analysis and British Experience, Cambridge, MA: The MIT Press, 1999, Chapter 8.

Describes the goals and objectives of gas regulation and gas market reform. Summarizes U.K. case of gas reform.

TELECOMMUNICATIONS

Armstrong, Mark, Simon Cowan, and John Vickers, Regulatory Reform: Economic Analysis and British Experience, Cambridge, MA: The MIT Press, 1999, Chapter 7.

Describes the goals and objectives of telecommunications regulation and telecommunications market reform. Summarizes U.K. case of telecommunications market reform.

WATER

Shirley, Mary M., and Claude Ménard. "Cities Awash: A Synthesis of the Country Cases," in Thirsting for Efficiency, edited by Mary M. Shirley. Washington, D.C.: The World Bank, 2002, pp.1-41.

Describes the major issues facing water regulators and water sector reformers. Identifies lessons from a series of case studies.

Key Words

Bargaining, Information, Monopoly, Negotiation, Competition, Efficiency, Fairness, Objectives

E. Regulation of market structure vs. regulation of conduct

Core References

Baldwin, Robert, and Martin Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapters 4 and 16.

> Describes basic regulatory strategies, such as command and control, self-regulation, incentive regulation, and competition. Examines basic approaches that regulators use to facilitate competition.

Klein, Michael, and Philip Gray, "Competition in Network Industries – Where and How to Introduce It." Note no. 104 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

> Explains concepts of competition for the market, competition over existing networks, and competition among networks with practical examples. Describes various options for using competition in these sectors, including franchising, open access, pooling, and timetabling. Explains that how network competition is introduced and how effectively and easily it is implemented will vary from one network industry to another. General rules for deciding where and how to introduce competition are discussed.

Klein, Michael, and Neil Roger, "Back to the Future: The Potential in Infrastructure Privatization." Note no. 30 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1994.

> Describes problems of monopoly provision of utility services. Explains that competition can overcome some of the institutional weaknesses that limit the effectiveness of regulation.

Sectoral References

ELECTRICITY

Hunt, Sally, Making Competition Work in Electricity. New York: Wiley & Sons, 2002, Chapters 1-2.

> Argues that competition is more effective than regulated monopoly for efficiently providing services. Competition assigns risks to shareholders while

regulated monopoly assigns risks to customers. Technical complexity of electricity industry needs to be understood before adopting reforms.

TELECOMMUNICATIONS

Smith, Peter, "What the Transformation of Telecom Markets Means for Regulation." Note no. 121 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

States that it is also becoming increasingly difficult to regulate telecommunications services separately due to increased substitutability of goods across sectors and a convergence within industries. Governments are finding it beneficial to use competition rather than regulation of conduct to improve sector performance.

Key Words

Competition, Cross-subsidization, Privatization, Regulation

F. Regulation of public companies vs. regulation of private companies, regulation of existing vs. new firms

Note: Readers should cross-reference this section with chapters on market structure, financial analysis, and pricing for information on these issues as they relate to public enterprises.

Core References

Eberhard, A. and M. Mtepa, "Rationale for restructuring and regulation of a low priced public utility: a case study of Eskom in South Africa," *International Journal of Regulation and Governance* 3(2): 77-102.

Uses the case of Eskom in South Africa to examine the rationale for reforming oversight of a publicly-owned operator. Examines issues of financial performance, price levels and trends, investment, labor costs, and incentives.

Irwin, T. and C. Yamamoto, "Some Options for Improving the Governance of State-Owned Electricity Utilities," The World Bank, Discussion Paper No. 11, February 2004.

Examines performance issues in state-owned electricity distributors and suggests options for improving performance. Considers applying private-sector company law, legislation and contracts, public reporting, corporate culture,

pressure from lenders, listing minority shares, and techniques for alleviating the government's conflict of interest as owner and policy-maker.

Jones, Leroy P., "Performance Evaluation for State-owned Enterprises," in Privatization and Control of State-owned Enterprises, edited by Ravi Ramamurti and Raymond Vernon. World Bank Economic Development Institute, 1991, pp. 179-205.

Describes an approach for regulating state-owned enterprises. The approach consists of a performance evaluation system, a performance information system, and an incentive system.

Newbery, David, Privatization, Restructuring, and Regulation of Network Utilities. Cambridge, MA: MIT Press, 2001, Chapters 3 and 5.

Compares incentives and performance of public versus private enterprises. States that public enterprises are subject to greater government control and so serve the interests of the government. Private enterprises respond to profit incentives and so are governed by incentive regulation. Empirical studies find that public enterprises have lower prices than private enterprises, but studies of cost differences are inconclusive. Liberalization is complicated by public enterprises.

Ramamurti, Ravi, "Controlling State-owned Enterprises," in Privatization and Control of State-owned Enterprises, edited by Ravi Ramamurti and Raymond Vernon. World Bank Economic Development Institute, 1991, pp. 206-233.

Examines why state-owned enterprises have in general not been successful. Suggests a contracting system that could improve performance.

Ramamurti, Ravi, "The Search for Remedies," in Privatization and Control of State-owned Enterprises, edited by Ravi Ramamurti and Raymond Vernon. World Bank Economic Development Institute, 1991, pp. 7-25.

Provides an overview of problems and possible solutions in privatizing and regulating state-owned enterprises.

Sectoral References

GAS

Productivity Commission of Australia, "Review of the Gas Access Regime: Draft Report," Melbourne, Australia, 2003.

Examines the regulation of established systems versus “greenfield” systems.

WATER

Nigel Annett, Chris Jones, and Jeremy Liesner, "Glas Cymru - harnessing the fundamentals of water service delivery," Regulatory Review, P. Vass, ed., Centre for Regulated Industries, Bath University, 2002/3.

Describes the strategy, operations, and financial make-up of Glas Cymru, a not-for-profit water operator in the U.K.

Key Words

Public enterprise, Private enterprise, State-owned enterprise, Competition, Liberalization

G. Regulatory instruments (primary and secondary legislation, licenses, concessions)

Core References

Baldwin, Robert, and Martin Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapter 4.

Describes basic regulatory strategies, such as command and control, self-regulation, incentive regulation, and competition. Examines basic approaches that regulators use to facilitate competition.

Guasch, J. Luis, and Pablo Spiller, Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story, Washington, D.C.: The World Bank Group, 1999, Chapter 3.

Describes the basic regulatory instruments and provides examples of where they have been used. Considers legislation, presidential decrees, and contracts.

Gómez-Ibáñez, José, Regulating Infrastructure: Monopoly, Contracts, and Discretion. Cambridge, MA: Harvard University Press, 2003, Chapters 1-2.

Views infrastructure regulation as a contracting problem and examines the choice of regulatory instrument. Considers contract completeness, private contracts, concession contracts, and discretionary regulation. Also examines variants of these contract types and hybrids.

IPART, "Review of Electricity and Gas Licensing Regimes in NSW – Final Report," Independent Pricing and Regulatory Tribunal of New South Wales, January 2003.

Examines IPART's licensing scheme, considering transparency, compliance and monitoring costs, and incentives.

Sectoral References

ELECTRICITY

Bakovic, T., B. Tenenbaum, and R. Woolf, "Regulation by Contract: A New Way to Privatize Electricity Distribution?" Energy and Mining Sector Board Discussion Paper Series Paper no. 7, March 2003.

Describes a contracting approach to regulating electricity distribution companies. Identifies the key characteristics of this approach, how contracts deal with various financial issues, and how regulators deal with disputes.

TELECOMMUNICATIONS

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 2.

Describes how to write and issue a license to provide telecommunications services, including the objectives of licensing, the relationship with other regulatory instruments and with trade agreements, licensing new entrants versus incumbents, designing and auctioning spectrum licenses, and how to maintain transparency.

Schwarz, Tim, and David Satola, "Telecommunications Legislation in Transitional and Developing Economies," World Bank Technical Paper No. 489, October 2000.

Examines elements of telecommunications legislation for developing economies. Considers privatization, liberalization, WTO agreement, licensing, numbering, infrastructure sharing, competitive issues, property law, spectrum, and the structure and role of the regulatory agency.

WATER

Water Toolkit Module 1: Selecting an Option for Private Sector Participation. Washington, D.C.: World Bank, 1997.

Outlines the broad-brush analysis required to assess the need and potential for introducing private participation and selecting a mode of private sector participation.

The World Bank, New Designs for Water and Sanitation Transactions Making Private Sector Participation Work for the Poor, Washington, D.C.: The World Bank (undated).

Examines regulatory instruments and policies for improving water and wastewater services to the poor. Considers elements of water reform, legal and policy frameworks, contracts, tariff design, and reform strategies.

Key Words

Contract regulation, License, Regulation, Legal frameworks, Franchise, Concession, Legislation, Statute

H. Informational asymmetry, limits to regulation, and implications for using incentives versus command and control

Core References

Newbery, David. Privatization, Restructuring, and Regulation of Network Utilities. Cambridge, MA: MIT Press, 2001, Chapter 2.

Explains that the interaction between the regulator and the regulated firm can be modeled as a game in which the regulated firm has private information. The regulator chooses and announces the incentives that the regulator will provide the firm. Then the firm decides how it will operate. Next the regulator observes the operations and allows the firm the incentives promised. If the firm does not believe that the regulator will keep her commitment, the firm will not perform optimally.

Sappington, David E.M., and Dennis L. Weisman, Designing Incentive Regulation for the Telecommunications Industry. Cambridge, MA: MIT Press, 1996, Chapter 1.

Explains that incentive regulation is useful because the firm has (or can acquire) better information than the regulator about important aspects of the industry and the firm's objectives and the consumers' objectives are different. If the regulator had the same information that the firm has, then the regulator could simply micromanage the firm. If the firm had the same goals as consumers, then the firm would naturally do exactly what the regulator wanted the firm to do. In most situations, however, the firm has better information than the regulator and seeks to maximize its profits (whereas consumers seek to maximize their surplus), so incentive regulation can be used to improve the operator's performance.

Vickers, John, and George Yarrow, Privatization: An Economic Analysis. Cambridge, MA: MIT Press, 1988, pp. Chapter 2.

Explains that information asymmetry is at the heart of the economics of regulation. A fully informed regulator with complete authority could simply order the firm to choose the first-best outcome. However, regulators are never fully informed and have limited powers. "The problem for regulatory policy is one of incentive mechanism design – how to induce the firm to act in accordance with the public interest (which will depend on the state of technology and demand) without being able to observe the firm's behavior."

Key Words

Information, Information Asymmetry, Accountability, Forms of regulation, Price cap regulation, Rate-of-return regulation, Regulatory procedures, Commitment, Incentive Regulation

I. Law and Economics

Core References

Buscaglia, Edgardo, "Judicial Corruption in Developing Countries: Its Causes and Economic Consequences," Berkeley Olin Program in Law & Economics, Working Paper Series, University of California, Berkeley, 1999.

Provides an overview of the economics of development and corruption. Describes how corruption affects economic development and remedies for corruption.

Buscaglia, Edgardo and William Ratliff. Law and economics in developing countries. Stanford, Calif.: Hoover Institution Press, 2000.

Examines the link between legal systems and reform of economic institutions and practices in developing countries. States that poverty largely results from flaws in legal institutions. Recommends substantive and procedural legal factors for developing countries, including recommendations on judicial review and dispute resolution.

North, Douglass C. Institutions, Institutional Change and Economic Performance. Cambridge, U.K.: Cambridge University Press, 1990, Chapters 12 and 13.

Explains the importance of institutions to the stability and performance of the economy.

Posner, Richard A. Economic Analysis of Law. Fifth Edition, New York, NY: Aspen Publishers, 1998, Chapters 1, 2, 9, 10, 12, 13, 19, and 20.

Explains economic principles that underlie laws in the common law context, specifically the U.S. Chapters cited cover basic economic approaches, monopoly, competition law, utility regulation, the choice between regulation and common law, the adversary system, and the process of rulemaking.

Key Words

Institutions, Law, Regulation, Corruption, Opportunism, Legal Process

Chapter II. Market Structure and Competition

Introduction

As we explain in the Overview, basic problems addressed by regulation include the control of market power and an asymmetry between the government and the operator with respect to objectives and information. We also indicate that there are three basic approaches to dealing with these problems, (a) subjecting the operator to competitive pressures, (b) gathering information on the operator and the market, and (c) applying incentive regulation.[64] Regulators typically use some combination of these three approaches and the proper mix depends on the country's needs and objectives, institutional capabilities and arrangements, cost of obtaining information, and potential for competition.

In this chapter we examine issues of subjecting the operator to competitive pressure. Competition is useful because it reveals actual customer demand and induces the operator to provide service quality levels and price levels that customers want, subject to the operator's need to cover its costs. In other words, competition can align the operator's interests with the customers' interests and can cause the operator to reveal his true costs and other private information.

The remainder of this chapter is organized as follows. We first examine issues of monopoly and market power, explaining factors that give rise to monopoly and market power, and the effects of these market structures. Market structure refers to the number of firms involved in supplying a market and the relationships among those firms. We then cover competition in the market, which is the traditional view of competition. We discuss issues of facilitating competition, structuring a utility industry for competition, and assessing market competition. Then issues of competition for the market are discussed. Competition for the market is an approach used when it is impractical or inefficient to have more than one operator serve a market. This discussion examines issues such as auctions, bidding, and contracting. Chapter IV considers competition between markets. Following this chapter's narrative is a list of references that is organized by topic.

Monopoly and Market Power[65]

A monopoly exists when a single provider serves the entire market demand. Even though there are several concepts of natural monopoly, they possess a common thread, namely, that rivalry in a particular market cannot be sustained and perhaps is even inefficient. One idea of

[64] See Chapters III, IV, VI, and VII for information on incentives and information.
[65] Section A covers this topic.

natural monopoly is that in some situations competition self-destructs, resulting in a single firm supplying the entire market demand. This idea led to the cost-based definition of natural monopoly, which states that a firm is a natural monopoly if it is able to serve the entire market demand at a lower cost than any combination of two or more smaller, more specialized firms. If the monopoly firm serves a single market, then economies of scale are sufficient for the firm to be a natural monopoly, although other cost characteristics may also result in a single-product firm being considered a natural monopoly. Economies of scale imply that the firm's average cost declines as the firm increases output. If the firm is a monopoly in several markets, more complex cost concepts, such as economies of scope and cost subadditivity come into play. Economies of scope exist when it is less costly for a single firm to provide two or more products jointly than for multiple firms to provide the products separately. Cost subadditivity exists when a single firm is able to satisfy the entire market demand(s) for its product(s) at a lower cost than two or more smaller, more specialized firms.[66] The most recent definition of natural monopoly states that a firm is a natural monopoly in a market if no more than one firm can serve the market and receive non-negative profits.

Operators providing utility services have certain cost characteristics that sometimes make some portion of their service a natural monopoly or at least make competition difficult to sustain at any appreciable level.[67] For example, operators tend to have high capital costs relative to firms in other sectors. Sometimes capital costs constitute a sunk cost, which means the cost is unrecoverable if the operator decides to exit the market. Sunk costs are a barrier to entry, which means that they make it less likely for firms to enter the market. Some portion of the utility operations may also have high fixed costs, which are costs that do not vary with the output of the firm. High fixed costs can lead to economies of scale, which may lead to natural monopoly.

If an operator in a market is a natural monopoly – in the sense that a single firm can serve the entire market demand at a lower cost than two or more smaller firms – then the operator cannot recover all of its costs if its prices are set at incremental cost. Left unregulated and without a threat of government intervention, a profit maximizing monopoly operator would limit output to receive monopoly profits, which results in what economists call a deadweight loss. If the natural monopoly operator were regulated, the regulator would need to allow prices to exceed incremental cost for the operator to be commercially viable.

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[66] Although technically complex, cost subadditivity is the key to identifying natural monopolies under the cost-based view.

[67] A utility network is a distribution system over which the utility service is provided. In the case of water, electricity and gas, the service includes a commodity that is supplied over the network. The network is the system of pipes that carry the water or natural gas, or the system of wires that transmit the electricity. In the case of telecommunications, the service is primarily the use of the network, which may consist of switches, routers, wires, and radio transmitters and receivers. The cost structure of a utility service provider generally consists of fixed costs, capacity costs, and usage costs. Fixed costs are often high. There may also be externalities. Environmental pollution from power production is an example of a negative externality. When a person or business subscribes to telecommunications service, the new subscriber provides a positive externality to the other subscribers who can now call this person or business.

If a firm has economies of scale, economies of scope, or both, it may be difficult to develop prices that encourage allocative efficiency. Allocative efficiency means that the optimal mix of outputs is provided. This form of economic efficiency is said to exist when the price that customers pay for each product is equal to that product's marginal cost. Marginal cost is the cost of increasing output by one unit. Setting prices equal to marginal cost is difficult when there are economies of scale because such prices would not result in sufficient revenue to cover the firm's total cost. Likewise, with economies of scope, if prices for each product cover only the incremental cost of producing that product, the firm would not receive sufficient revenue to cover its common costs. Incremental cost in this context is the additional cost of producing the entire amount of a product, given that the firm is already producing all of his other products. Common costs in this context are the costs that are necessary for the firm to produce its n products, but that are unaffected by the dropping up to $n - 1$ of its products.[68] Chapter V on Tariff Design examines possible solutions to this pricing problem.

Even if the operator is not a monopoly, it may not be subject to significant competitive pressure. In this situation, the firm is said to have market power because the firm is able to receive profits above its cost of equity by limiting output. Profits in this context refer to the income left for shareholders (or the state) after all input suppliers, debt providers, and taxes have been paid. The cost of equity is the rate of return that shareholders must be paid for them to continue to supply equity capital for the firm. The difference between these profits and the cost of equity is called economic profit. A firm with market power can receive economic profits because the firm can limit output below a competitive level, which causes prices to rise.

Regulators have several tools available for detecting market power, such as the Herfindahl-Hirschman Index (HHI), the Lerner Index, watching for collusive activities, and assessing barriers to entry. The HHI is an index of the number of firms in the market and their market shares. The Lerner Index measures the degree to which prices exceed marginal cost. Collusive activities include fixing prices and dividing markets. Barriers to entry include sunk costs, switching costs, restricted access to essential facilities, and anticompetitive practices. Switching costs exist when it costs more for a customer to change to a competitive supplier than it does to stay with the customer's existing supplier. Essential facilities are elements of the utility system, such as electricity distribution lines that are needed to provide the utility service and that are uneconomical for a rival to supply for itself. Anticompetitive practices are activities that a dominant firm may engage in to drive rivals from the market.[69]

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[68] Other definitions for incremental cost and common cost exist, so the reader needs to always be aware of the context and use of the terms to ensure that the reader understands how they are being used.

[69] Chapter I Section E and Chapter VIII Sections A and D examine the regulator's relationships with other government authorities, including the competition authority.

Competition in Utility Markets[70]

Regulators and policy makers implement competition in the utility market by removing legal and technical barriers to entry, monitoring anticompetitive conduct, restructuring the sector, and providing access to essential facilities. Legal barriers to entry include licenses restrictions and high license fees that sometimes limit the number of firms that can serve a market.[71] Technical barriers to entry include sunk costs and other barriers to entry discussed above.

Restructuring the industry generally involves a) separating the potentially competitive portions of the sector from the non-competitive or natural monopoly[72] portions and b) providing rivals with access to the non-competitive portions, which should be considered essential facilities. This separation of competitive from non-competitive may be accomplished through structural separations or unbundling. With structural separations, the competitive and non-competitive components of the sector are provided separately and may have separate ownership. For example, the government may not allow competitive electricity generation operators from providing monopoly electricity distribution services. In a least severe form, structural separations may simply mean that the components are owned by separate subsidiaries of the same corporation. Structural separation is also called unbundling, but some forms of unbundling are less severe than structural separation. For example with unbundling, the regulator may allow the provider of the non-competitive component to provide a single service that combines the competitive and non-competitive portions of the service, but the regulator would also require the operator to provide rivals with equal access to the essential facilities under the same terms and conditions as the operator does its own competitive service. This is a common approach in telecommunications. Regulators generally require accounting separations if the regulator allows common ownership of competitive and non-competitive components. The accounting separations require this operator to separate its accounting records between the competitive portion (which is often deregulated) and the non-competitive portion (which is regulated).

To illustrate these restructuring options, consider the electricity industry. It is generally believed in many situations that electricity generation can be competitive and that electricity transmission and distribution should be provided by monopolies. Under a form of structural separations, electricity transmission and distribution are provided by separate monopolies and generation is provided by operators that provide neither transmission nor distribution. If the electricity operator is allowed to remain vertically integrated, which means that it continues to provide both the upstream competitive electricity generation and the downstream, non-competitive transmission and distribution, then the operator is required to unbundle transmission and distribution and allow rival generators to have access to these unbundled essential facilities. The vertically integrated operator is also often required to perform accounting separations.[73]

[70] Section B covers this topic.
[71] Licenses are discussed in Chapter I Section G.
[72] Natural monopoly is defined in Section A.
[73] Chapter III Section D covers accounting separations or ring fencing.

Introducing competition raises issues of how to "buy out" the old regime by addressing issues of stranded costs and uneconomic subsidies.[74] Stranded costs are costs that the operator has properly incurred and that the operator does not have a reasonable opportunity to recover given the introduction of competition. Stranded costs are calculated as the difference between sunk costs and operating earnings from sunk assets. Potential funders of stranded costs include shareholders, taxpayers, customers of this company, customers of competitors, and competitors. Another transition issue is how to convert monopoly price structures to competitive price structures. Traditional utility pricing contains a number of cross-subsidies that cannot be maintained when there is competition. Some of these subsidies are unproductive in the sense that they do not assist the poor or lead to network development. Such subsidies generally need to be removed with an appropriate transition and productive subsidies funded by a competitively neutral means.[75]

Because existing customers already have access to the utility network, introducing competition for these customers raises issues of access to essential facilities and switching costs. Competition for new customers may have these same issues if network access is a natural monopoly. However, if there are no existing facilities for these new customers and if facilities can be competitive, then essential facilities and switching costs are not an issue.

The pricing of access to essential facilities is important for the success of competition in the market for existing customers. There are three basic forms of access. The first is exclusive use of unbundled facilities or capacity. The second is one-way access, which is the situation where the competitive operator pays the essential facility provider for transporting the competitive operator's commodity (as in the case of gas or electricity) or service (as in the case of telecommunications). The third is two-way access, which is the situation where the rival operators both need access to each other's network facilities for transporting their utility services. At present, two-way access occurs primarily in telecommunications where competing telecommunications operators interconnect their networks so that their customers can communicate with each other. If the essential facility provider offers only the non-competitive portion of the service, then regulators establish prices that cover the total cost of the operator. Otherwise, regulators typically price access at incremental cost.

The economics of access pricing depends in part on the nature of the relationship between the firms.[76] Vertical relationships are those where a network provider sells access to its network to a downstream service provider, who is providing a retail service. The two operators involved in the transaction may (or may not) compete in the retail market. Horizontal relationships are those where there are two or more rival networks and the networks interconnect. This is most common in telecommunications. The appropriate pricing rules depend upon whether the

[74] See Section B. Chapter V also covers issues of cost recovery and how competition affects pricing.
[75] Chapter V Section C and Chapter VI Section C also examine pricing for universal access and universal service.
[76] See Section B.

relationships are vertical (one-way interconnection) or horizontal (two-way interconnection), the nature of competition, and the features of the regulatory system, to name a few. Common pricing options include no regulation, the Efficient Component Pricing Rule (ECPR), global price caps, and cost-based prices, such as fully distributed cost and long run incremental cost. The three models of short-term trading arrangements in electricity are the integrated, wheeling, and decentralized models. In telecommunications, most regulators use long run incremental cost for establishing interconnection charges.

Sometimes sector regulators share responsibility for ensuring competitiveness of markets with a competition authority.[77] In principle, competition policy tries to ensure that markets are competitive while regulation attempts to control conduct when markets are not competitive. This difference in roles leads to differences in primary functions. The competition regulator is generally concerned with all sectors and generally has three functions. The first function is to remedy anticompetitive conduct, such as collusion. This function is generally ex post, meaning that the competition authority responds to activities that have already occurred. In contrast, utility regulators generally address competitive issues ex ante, meaning that they act to prevent anticompetitive conduct. The second function is to ensure that industry mergers do not significantly decrease competition. The third function is consumer protection. In practice, regulation attempts to control the conduct of firms with market power so that they cannot take advantage of their market power to limit output, raise prices, or limit rivals' abilities to compete. Regulation may conflict with the goals of competition policy to pursue particular government objectives.

Sector regulators and competition authorities often cooperate in their efforts. Sector regulators may adopt ex ante competition rules that complement the competition authority's goals. Sector regulators may share sector expertise with the competition authority when the competition authority is investigating anticompetitive conduct or a proposed merger. The sector regulator may also investigate a proposed merger if the regulator has responsibility for managing the sector licenses. Lastly, the sector regulator generally also plays a significant role in consumer protection.

Competition for the Market[78]

When elements of the utility system exhibit natural monopoly characteristics,[79] customers can still gain some benefits of competition through effective use of competition for the market. In these situations, the government often auctions off the right to be a monopoly. Doing so can improve the efficiency of the utility services because: (1) cost efficiency is achieved because the

[77] See Chapter II Section B and Chapter VIII Sections A and D for information on relationships with other agencies, such as competition authorities
[78] Section C covers this topic.
[79] Section A contains definitions of natural monopoly.

firm able to "pay" the most for the market would also be the firm that could serve the market at the lowest cost; and (2) monopoly rents can be distributed to customers. This latter feature occurs if firms bid their retail prices (with the lowest bid winning) or if the firms' bid payments for the franchise and the franchise fees are returned to customers.

The goal of an auction is to provide the potential operators with an incentive to reveal their private information, which is in this case their ability to serve the market efficiently. Said another way, the goal of an auction is to learn which operator is best able to provide value to customers and the value that this operator places on the opportunity to serve. Several auction models exist, including the English auction and the Vickrey auction. In a modified English auction, the auctioneer begins with a high price (to be charged to the customers). All firms who are willing to provide service at this price signal that they are active. If there is more than one active firm, the auctioneer lowers the price one step and again the bidders signal whether they are active. This process continues until there is only one active firm. Another approach is the Vickrey auction, in which all firms submit their bids and the firm with the best bid wins, but receives the price of the second lowest bidder.

Regardless of the type, an auction must be both well run and well designed to be successful. Key design features include transparency and objective criteria for evaluating bids. Furthermore, to avoid significant renegotiation and to reduce risk, the concession contracts should clearly set rights, obligations, risks and incentives for the operator. Renegotiation is especially problematic if regulators have incomplete information and weak monitoring capabilities. Firms with market power are able to exploit these weaknesses.

If there are a large number of bidders, open auctions and fixed price contracts are more desirable; otherwise, first-price sealed bid auctions may be preferable. Risk aversion on the part of bidders also increases the desirability of sealed bids.

Negotiations are generally unavoidable with franchises, even with auctions. This does not mean, however, that auctions have no value because using even some auction processes in concession letting can improve results. Auctions reveal information about operators and markets. Also, having a large number of bidders or diversity among bidders decreases the likelihood of collusion and lowers the danger of the winner's curse.

Regulatory involvement in the operator procurement process has advantages and disadvantages. On the plus side, the regulator can provide sector expertise in pre-qualification and bid evaluation, ensure transparency, and ensure continuity between the procurement phase and the contract enforcement phase. On the negative side, the regulator may lose some objectivity in enforcement if the regulator becomes concerned about the appearance of success of the procurement phase.

Contract design is critical for the successful implementation of a competition-for-the-market policy. Concession contracts should clearly set rights, obligations, risks and incentives. However because of uncertainty, it is generally impossible to write a complete contract, which is a contract that covers all possible contingencies. As a result, some contracts provide for ongoing or periodic review of prices, service obligations, investments, and the like so that adjustments can be made for conditions that could not be anticipated at the outset of the concession. If such reviews are difficult for a country, it is sometimes possible to rebid the contract. Rebidding allows operators to adjust to changes in the economy or operating environment. With any rebidding, whether frequent or infrequent, if there are significant fixed costs then the transfer of assets to new franchisees may be necessary. The terms and conditions for these transfers should be set out in advance. Furthermore, because there can be significant costs in conducting an auction and in preparing bids for an auction, small systems may need to combine into a single auction to minimize such transaction costs.

The regulatory framework and the institutional capabilities the regulator affect the success of concession and franchising arrangements. Research has shown that renegotiation problems result from regulators having incomplete information and weak monitoring capabilities, allowing the operator to leverage its superior information to press for the renegotiation. Firms with market power are especially able to exploit these weaknesses because the information asymmetry is greater, all other things being equal, and they may be better able to influence the political process than firms with less market power. Frequent rebidding may help remedy these problems, but concession and franchising agreements need to have detailed provisions for renewal and asset transfer.

Concluding Observations

Facilitating competition is one regulatory instrument for overcoming market power and asymmetries in objectives and information.[80] Competition in the market is generally the preferred form of competition, but competition for the market is often effective if competition in the market is infeasible or impractical because of natural monopoly. Generally if competition in the market is the policy choice, the regulator has an ongoing role of regulating access to essential facilities, ensuring that barriers to entry do not interfere with competitive dynamics, and monitoring the effectiveness of the competition. If one or more of the firms have significant market power, then regulators may use price cap regulation to control the residual market power until competition develops more fully.

Competition for the market involves having operators bid for the right to be the monopoly provider of the service. Because the future is uncertain, ongoing regulation of prices and renegotiation of the concession contract are common. Frequent rebidding of the concession may be an option for reducing the need for ongoing regulation and for renegotiation.

Case Studies

Aldaba, Rafaleta A.M., "Opening the Philippine Telecommunications Industry to Competition, Part I," and "Opening the Philippine Telecommunications Industry to Competition, Part II," The World Bank, May 2000.

Au, M. H., "Managing the Introduction of Competition," in Proceedings of the SAFIR Workshop on Regulatory Strategy, S. K. Sarkar, editor, New Dehli, India: Tara Energy Research Institute, 2001, pp. 25-34.

Econ One Research, Inc. and EMCON Consulting Group, "Northern Electricity Distribution Service in Northern Namibia: A Case Study in the Private Provision of Rural Infrastructure," July 31, 2002.

Garg, A., M. Kabra, and R. Kacker, Regulatory Reforms in India: Effectiveness, Efficiency, and Impacts, The Energy and Resources Institute, New Delhi, India, 2003.

Joint UNDP/World Bank Energy Sector Management Assistance Programme, "Introducing Competition into the Electricity Supply Industry in Developing Countries: Lessons from Bolivia," August 2000.

[80] Chapter I Section H covers information asymmetries.

Newbery, David, Privatization, Restructuring, and Regulation of Network Utilities. Cambridge, MA: MIT Press, 2001, Chapter 5, 8, 9.

Office of Telecommunications Authority, Hong Kong (OFTA), Report on the Effectiveness of Competition in Hong Kong's Telecommunications Market: An International Comparison, June 2003.

Office of Utilities Regulation, "Determination Notice: Assessment of Dominance in Mobile Call Termination," OUR, Kingston, Jamaica, September 2, 2004.

OFWAT, Competition Act 1998: Application in the Water and Sewerage Sectors, January 2000. (Office of Fair Trading Guideline).

Pittman, Russell, "Competition Law and Policy in the United States," United States Department of Justice (undated).

Ramanathan, K. and S. Hasan, Privatization of Electricity Distribution: The Orissa Experience, Tata Energy Research Institute, New Delhi, India, 2003.

Sharpe QC, Tom, "Concurrency or Convergence? Competition and Regulation Under the Competition Act of 1998," in Utility Regulation and Competition Policy edited by Colin Robinson, Cheltenham, UK: Edward Elgar Publishing Limited, 2002, pp. 164-175.

Strategic Policy Research, "Economic Analysis of Interconnection Charge Policy: A Report by Strategic Policy Research, Inc. for OSIPTEL," February 12, 1999.

Um, Paul Naumba, Laurent Gille, Lucile Simon, Christophe Rudelle, "A model for Calculating Interconnection Costs in Telecommunications," Washington, D.C.: PPIAF and the World Bank, 2004.

Chapter II Cases by Topic Area

Table 2. Chapter II Cases by Topic Area

	Cases																
	Aldaba, May 2000.	Au, 2001.	Econ One Research, Inc. and EMCON Consulting Group, 2002.	Garg, Kabra, and Kacker, 2003.	Joint UNDP/World Bank Energy Sector Management Assistance Programme, 2000	Kemp and Stephen, 2003.	Newbery, 2001, Chapter 5.	Newbery, 2001, Chapter 8.	Newbery, 2001, Chapter 9.	Office of Telecommunications Authority, Hong Kong (OFTA), June 2003.	Office of Utilities Regulation, 2004.	OFWAT, January 2000.	Pittman, (undated).	Ramanathan and Hasan, 2003.	Sharpe, 2002.	Strategic Policy Research, 1999.	Um, Gille, Simon, and Rudelle, 2004.
Chapter II. Market Structure and Competition																	
A. Monopoly Power				X		X				X	X			X			
B. Competition in Utility Markets	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
C. Competition for the Market				X								X		X			

References

A. Monopoly and Market Power

1. Factors leading to monopoly

Core References

Baldwin, Robert, and Martin Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapter 15.

Explains cost-based definition of a natural monopoly that produces a single product. Provides practical illustrations and describes pricing implications.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. II, Chapter 4.

Explains that natural monopoly is a situation where the potential economies of scale in an industry are so pervasive that the best way to take advantage of them is to have one firm serve the entire market. Further states that it may be that these economies of scale are not achieved efficiently; rather, they may result from imperfect regulation or a lack of incentives for the firm to operate efficiently.

Viscusi, W. Kip, John M. Vernon, and Joseph E. Harrington, Jr., Economics of Regulation and Antitrust. Cambridge, MA: MIT Press, 2000, Chapters 4 and 11.

Explains that an industry is a natural monopoly if a single firm can serve the market at a lower cost than multiple firms. Further explains that the natural monopoly condition may be temporary if economies of scale are exhausted at low levels of demand and demand grows over time. Economies of scale are not required for a multi-product firm to be a natural monopoly because the firm may have large economies of scope.

Other References

Faulhaber, G., "Cross-Subsidization: Pricing in Public Enterprises," *American Economic Review* 65: 1975, pp. 966-977.

Seminal paper on cost-based definition of natural monopoly for a multi-product firm. Uses technical economics.

Faulhaber, G.R., "Cross-subsidization: Pricing in Public Enterprises," in The Political Economy of Privatization and Deregulation edited by Elizabeth E. Bailey and Janet Rothenberg. Brookfield, VT: Elgar, 1995, pp. 233-244.

Less technical paper on cost-based definition of natural monopoly for a multi-product firm.

Jamison, Mark A., Industry Structure and Pricing: The New Rivalry in Infrastructure. Norwell, MA: Kluwer, 1999, Chapter 3.

Supplements Faulhaber's work with the idea that firms from other markets may be able to enter the monopoly market and compete for at least some of the customers.

Key Words

Monopoly, Natural Monopoly, Economies of Scale, Economies of Scope, Cost Subadditivity

2. Pricing under monopoly – efficiency aspects and cost recovery

Note: Readers should cross-reference this section with Chapter V.

Core References

Baldwin, Robert, and Martin Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapter 15.

Explains cost-based definition of a natural monopoly that produces a single product. Provides practical illustrations and describes pricing implications.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapter 5 and vol. II, Chapter 4.

Explains that natural monopoly in a single product implies decreasing average costs. Decreasing average costs can arise from several

factors, but should not be confused with costs decreasing over time. Marginal cost pricing, in the presence of decreasing average costs, results in revenues that do not cover total cost. Solutions to this problem include price discrimination and subsidies.

Viscusi, W. Kip, John M. Vernon, and Joseph E. Harrington, Jr., Economics of Regulation and Antitrust. Cambridge, MA: MIT Press, 2000, Chapters 4 and 11.

Describes how monopolists restrict output, which results in a deadweight loss relative to perfect competition. Explains that marginal cost pricing, in the presence of decreasing average costs, results in revenues that do not cover total cost. Solutions to this problem include non-linear pricing, Ramsey pricing, subsidies, franchise bidding, price discrimination, and public ownership.

3. Basic economics of network industries

Core References

Baldwin, Robert, and Martin Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapter 16.

Explains the choice between monopoly and competition. Considers the factors that determine which market structure may be more desirable and transitions from monopoly to competition.

Berg, Sanford V. "Fundamentals of Economic Regulation." Working Paper 03-17, Public Utility Research Center, University of Florida, 2003.

Explains that infrastructure industry networks consist of links, nodes, and branches, with heavy fixed costs associated with each point. Competition may be feasible in the market, but even with natural monopoly competition is feasible for the market.

Viscusi, W. Kip, John M. Vernon, and Joseph E. Harrington, Jr., Economics of Regulation and Antitrust. Cambridge, MA: MIT Press, 2000, Chapter 11.

Describes cost structure of traditional utility services.

Sectoral References

ELECTRICITY

Hunt, Sally, Making Competition Work in Electricity. New York: Wiley & Sons, 2002, Chapter 2.

Describes the traditional physical functions in the electricity industry, namely generation (production), transmission, system operations, and distribution. Explains each function. Further explains that electricity is different from other commodities in that it cannot be stored, it takes the path of least resistance, and transmission of power over the network is subject to complex series so that what happens in one place can affect the network many miles away.

Viscusi, W. Kip, John M. Vernon, and Joseph E. Harrington, Jr., Economics of Regulation and Antitrust. Cambridge, MA: MIT Press, 2000, Chapter 12.

Describes cost characteristics of electric power and its regulation.

GAS

Viscusi, W. Kip, John M. Vernon, and Joseph E. Harrington, Jr., Economics of Regulation and Antitrust. Cambridge, MA: MIT Press, 2000, Chapter 18.

Describes cost characteristics of oil and natural gas and the regulation of natural gas.

TELECOMMUNICATIONS

Economides, Nicholas, "The Economics of Networks," *International Journal of Industrial Organization* 14 (6), October 1996, pp. 673-699. Available at http://www.stern.nyu.edu/networks/site.html.

Provides a summary of the economics of networks. Explains network externalities in telecommunications, including their sources and their effects on pricing and market structure. Examines issues of compatibility, technical standards, and interconnection, including their effects on pricing and quality of services and on the value of network links in various ownership structures.

Viscusi, W. Kip, John M. Vernon, and Joseph E. Harrington, Jr., Economics of Regulation and Antitrust. Cambridge, MA: MIT Press, 2000, Chapter 15.

Describes cost characteristics of traditional telecommunications and describes telecommunications regulation in the U.S.

WATER

Noll, Roger G., "The Economics of Urban Water Systems," in Thirsting for Efficiency, edited by Mary M. Shirley. Washington, D.C.: The World Bank, 2002, pp.43-63.

> Describes the economics of water in developing countries. Considers issues of supply costs, the political economy of water, externalities in supply, water demand, and usage externalities.

Savedoff, William, and Pablo Spiller. "Government Opportunism and the Provision of Water," in Spilled Water: Institutional Commitment in the Provision of Water Services, edited by William Savedoff and Pablo Spiller. Washington, D.C.: Inter-American Development Bank, 1999, Chapter 1.

> Explains that "potable water services share three basic characteristics with other utilities that make it difficult to provide them through perfectly competitive markets: large sunk costs, economies of density and/or scale, and massive consumption. The combination of these characteristics leads to significant politicization of the sector's pricing and operations." Each item is explained in detail. Later chapters provide case studies to illustrate these concepts.

Key Words

Competition, Monopoly, Costs, Externalities, Network

4. Definition and measurement of market power, including factors influencing extent of market power, such as barriers to entry

Core References

Gal, Michal S., Competition Policy for Small Market Economies, Cambridge, MA: Harvard University Press, 2003, Chapters 3-4.

> Describes the implications of small economies for competition policy and the regulation of a single dominant firm. Considers the goals of competition policy, how small size limits the effectiveness of structural remedies, the difference between rules that can be applied in large versus

small economies, the definition of market dominance, the effects of market dominance in a small economy, and the regulation of market dominance.

Posner, Richard A., Economic Analysis of Law, Fifth Edition, New York: Aspen Law & Business, 1998, Chapter 10.

Explains the economics of competition laws. Considers cartels, horizontal restrictions, mergers, market definition, predation, foreclosure, tie-ins, and barriers to entry.

Viscusi, W. Kip, John M. Vernon, and Joseph E. Harrington, Jr., Economics of Regulation and Antitrust. Cambridge, MA: MIT Press, 2000, Chapters 5-6.

Explains how to define markets, assess market concentration, consider scale economies, examine entry conditions and market contestability, and identify dominant firms and anticompetitive activities such as raising rivals' costs and predatory pricing. Describes classic U.S. cases of monopolization.

Sectoral References

ELECTRICITY

Hunt, Sally, Making Competition Work in Electricity. New York: Wiley & Sons, 2002, Chapters 4-6.

Explains that market power can be exercised by restricting output. In general, "the best solution to market power is to … hav(e) enough competitors in the first place." Discusses second best solutions. States that markets must be designed with a mechanism for allowing consumers to ration usage in response to high prices. Explains problems of using the HHI in energy. Describes how studies have tried to measure market power by estimating marginal costs and comparing them to prices, but accurately estimating marginal costs is very difficult.

GAS

Kemp, Alexander, G., and Linda Stephen, "Prospects for Gas Supply and Demand and their Implications with Special Reference to the UK," in Competition and Regulation in Utility Markets, edited by Colin Robinson, Cheltenham, UK: Edward Elgar, 2003, pp. 91-120.

Provides a case study of analyzing the U.K. gas markets. Considers location of production and consumption, imports, infrastructure, and gas contracts.

TELECOMMUNICATIONS

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 5.

> Explains general principles for competition policy and how to define the market, identify barriers to entry, define market power and market dominance, and identify essential facilities. Explains remedies for anticompetitive conduct, such as abuse of dominance, restricting access to essential facilities, and engaging in cross-subsidization, predatory pricing, and price squeezes. Also describes how to assess mergers and joint ventures.

Oftel, "Competition in the Provision of Fixed Telephony Services," Director General of Telecommunications, Office of Telecommunications, London, U.K., 2001.

> Describes how the U.K. telecommunications regulator assesses competition by defining relevant markets; assessing existing levels of competition in each relevant market using comparisons with similar countries, consumer satisfaction surveys and complaints, the extent to which prices reflect underlying costs, the extent to which consumers are knowledgeable about different market opportunities and/or face barriers to switching, the absence of inefficient suppliers, the absence of anticompetitive behavior and entry barriers, and the extent to which market structure has changed over time, and active price, quality, and innovation competition.

Romania National Regulatory Authority for Communications, Rules for Conducting Market Analysis and Identifying the Significant Market Power, December 12, 2002; and Rules for the Identification of the Relevant Markets within the Economic Communications Sector, December 12, 2002, http://www.anrc.ro/en/index.htm.

> Details how the Romanian telecommunications regulator determines significant market power under European Union guidelines. Describes how the relevant market is defined in terms of product and geography, and the criteria used to assess competition, including market share and its stability, vertical integration, number of competitors, users' countervailing power, price evolution and profit level, and control over a network or infrastructure that is difficult to duplicate.

Key Words

Competition, Market power, Anti-competitive, Entry, Barriers to Entry

B. Competition in utility markets

1. Approaches to competition in utility markets

Core References

Baldwin, Robert, and Martin Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapters 13 and 16.

> Explains competition between regulatory agencies and how this competition affects market outcomes. Describes models for coordination. Also explains the choice between monopoly and competition. Considers the factors that determine which market structure may be more desirable and transitions from monopoly to competition.

Gal, Michal S., Competition Policy for Small Market Economies, Cambridge, MA: Harvard University Press, 2003, Chapter 4.

> Explains regulation of monopolies in a small economy context. Defines monopoly and describes approaches to regulating a pure monopoly (a monopoly that does not also compete against other firms) and to regulating a monopoly that competes with downstream rivals. Considers the viability of these downstream rivals.

Guasch, J. Luis, and Pablo Spiller, Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story, Washington, D.C.: The World Bank Group, 1999, Chapter 10.

> Examines alternative market structures, transfer pricing, private sector access, and the sequencing of reforms.

Klein, Michael, and Philip Gray, "Competition in Network Industries—Where and How to Introduce It." Note no. 104 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

> Explains concepts of competition for the market, competition over existing networks, and competition among networks with practical

examples. Describes various options for using competition in these sectors, including franchising, open access, pooling, and timetabling. Explains that how network competition is introduced and how effectively and easily it is implemented will vary from one network industry to another. General rules for deciding where and how to introduce competition are discussed.

OECD, Restructuring Public Utilities for Competition. Washington, D.C, 2001.

Provides a systematic review of alternative approaches to promoting competition in public utilities. First discusses the relationship between the market structure of these industries and the likely emergence of competition and emphasizes the problem of access to the natural monopoly segment. Then outlines the pros and cons of various policies that address this issue. Surveys some countries' experiences in restructuring their public utility sectors.

Sectoral References

ELECTRICITY

Hunt, Sally, Making Competition Work in Electricity. New York: Wiley & Sons, 2002, Chapter 3.

Explains that electricity generation is the major candidate for being made competitive, but the retail function can also be competitive. Describes four models of industry structure, namely, (1) vertically integrated monopoly, (2) integrated monopoly buys power from competing generators, (3) a fully competitive generating sector but with the distribution company having a monopoly over small final customers, and (4) retail competition. Explains how to determine the appropriate structural change.

OECD/IEA, Competition in Electricity Markets. Washington, D.C.: International Energy Agency, 2001.

Describes the reforms implemented in OECD countries aimed at developing competition in the electricity supply industry and discusses the issue of designing the regulatory framework that would enhance competition. Assesses the emerging model of electricity supply reform and evaluates its relative efficiency. Considers the challenge for electricity market reform and the future outlook for reform.

World Energy Council, "Electricity Market Design and Creation in Asia Pacific," 2001.

Examines electricity market reform in the Asia Pacific. Considers objectives of reforms and issues of customer choice, stranded assets, attracting investment, maximizing asset value, universal access agreements, integration of the grid, and debt. Describes market design options, including competition to build versus competition to operate generating plants.

GAS

OECD/IEA, Regulatory Reform: European Gas. Washington, D.C.: International Energy Agency, 2000.

Considers the type of regulatory reform approach that is best suited for developing effective competition and increased trade and liquidity in European gas markets. Discusses the current institutional system and makes a case for a deep reform of this system. States that reform should take security of supply as a key issue for this constitutes an important feature of the European gas industry. Assesses the situation and outlook for natural gas demand and supply in Europe.

TELECOMMUNICATIONS

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 5.

Explains how to identify barriers to entry, define market power and market dominance, and identify essential facilities. Explains remedies for anticompetitive conduct, such as abuse of dominance, restricting access to essential facilities, and engaging in cross-subsidization, predatory pricing, and price squeezes.

Smith, Peter, "What the Transformation of Telecom Markets Means for Regulation." Note no. 121 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

Explains that regulators need to set the rules regarding entry (if there are to be such rules), allocate licenses through bidding mechanisms, resolve network interconnection issues, authorize rate rebalancing to better align prices with underlying costs, and better target subsidies and administer them in a way that does not advantage certain operators. State that in many cases, competition through the sale of property rights (such as radio spectrum) can eliminate the need for regulation, and the market can be regulated in a way more in line with antitrust regulation.

Newbery, David, Privatization, Restructuring, and Regulation of Network Utilities. Cambridge, MA: MIT Press, 2001, Chapter 7.

Examines difficulties of introducing competition for local telecommunications.

WATER

Collignon, Bernard, and Marc Vezina, "Independent Water and Sanitation Providers in African Cities: Full Report of a Ten-Country Study," UNDP-World Bank Water and Sanitation Program. Washington, D.C., World Bank, April 2000.

Examines role of small and independent water providers (vendors, water truckers and network providers) in providing water to the urban poor in Africa. States that small-scale providers respond to market niches and meet the needs of both the poor and other unserved communities. Explains how such services are provided and funded; the relationships between small-scale providers, local authorities, and larger-scale water providers; and policy issues.

Solo, T. M., "Competition in Water and Sanitation." Note no. 165 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, December 1998.

Explains that efficient, large-scale, monopolistic companies may be the best alternative in Europe and the United States, but it is hard to replicate such efficiencies in the utility companies of developing countries. States that small-scale operators tend to be customer-driven, financially viable, and ready to apply innovative technologies and marketing methods. They also provide appropriate solutions in appropriate places, assume all investment risks, reach the poor, charge market prices, cover costs, and respect willingness to pay.

Webb, M., and Ehrhardt, D., "Improving Water Services through Competition." Note no. 164 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, December 1998.

Describes four means of introducing product market competition: competing networks, private supply, retail competition, and common carriage competition. Explains that to promote competition, governments may have to develop an efficient bulk supply or network access regime. Concludes that the most important part of such a regime is the price of bulk supply or network access. Considers differences in water quality and how they affect common carriage arrangements. Concludes that the case for common carriage competition in water is less compelling than in other industries.

Other

Noll, Roger, "Telecommunications Reform in Developing Countries," Stanford Institute for Economic Policy Research Discussion Paper No. 99-31, Stanford University, June 2000.

> Examines prospects for reform in developing countries and conditions that lead to reform.

2. Competition for existing consumers vs. competition for new consumers

Core References

Klein, Michael, and Philip Gray, "Competition in Network Industries—Where and How to Introduce It." Note no. 104 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

> Explains concepts of competition for the market, competition over existing networks, and competition among networks with practical examples. "Open access occurs when allowing competition in one segment of the industry requires ensuring access to the remaining natural monopoly bottlenecks, provided that there is available capacity." To prevent the incumbent from precluding competition in other markets, access regulation or matching price principles may need to be used.

Sectoral References

ELECTRICITY

Armstrong, Mark, Simon Cowan, and John Vickers, Regulatory Reform: Economic Analysis and British Experience, Cambridge, MA: The MIT Press, 1999, Chapter 9.

> Describes how the U.K. government restructured the country's electricity sector. Considers the economic characteristics of the sector and how the government resolved issues of system operation, competition, industry structure, privatization, transmission pricing, and the role of regulation.

Belt, Juan A. B., "Telecommunications and Power Sector Reforms in Latin America: Lessons Learned," InterAmerican Development Bank (undated).

Describes power sector reform in Argentina and the deregulatory approaches of El Salvador and Guatemala in telecommunications. Found positive results in all three sets of reform.

Hunt, Sally, Making Competition Work in Electricity. New York: Wiley & Sons, 2002, Chapter 3.

Explains that electricity generation is the major candidate for being made competitive, but the retail function can also be competitive. Describes four models of industry structure, namely, (1) vertically integrated monopoly, (2) integrated monopoly buys power from competing generators, (3) a fully competitive generating sector but with the distribution company having a monopoly over small final customers, and (4) retail competition. Explains how to determine the appropriate structural change.

GAS

Armstrong, Mark, Simon Cowan, and John Vickers, Regulatory Reform: Economic Analysis and British Experience, Cambridge, MA: The MIT Press, 1999, Chapter 8.

Describes how the U.K. government restructured the country's gas sector. Considers the economic characteristics of the sector and how the government resolved issues of industry structure, transport, privatization, competition, price control, and the role of regulation. Provides assessments of the reforms.

TELECOMMUNICATIONS

Belt, Juan A. B., "Telecommunications and Power Sector Reforms in Latin America: Lessons Learned," InterAmerican Development Bank (undated).

Describes the deregulatory approaches of El Salvador and Guatemala in telecommunications. Found that minimal regulation led to positive results because networks were undeveloped.

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 5.

Explains how to identify barriers to entry and essential facilities. Explains remedies for anticompetitive conduct, such as restricting access to essential facilities and engaging in price squeezes.

Smith, Peter, "What the Transformation of Telecom Markets Means for Regulation." Note no. 121 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

States that regulators need to resolve network interconnection issues, that competition through the sale of property rights (such as radio spectrum) can eliminate the need for regulation, and that the market can be regulated in a way more in line with antitrust regulation than with traditional utility regulation.

WATER

Armstrong, Mark, Simon Cowan, and John Vickers, Regulatory Reform: Economic Analysis and British Experience, Cambridge, MA: The MIT Press, 1999, Chapter 10.

Describes how the U.K. government reformed the country's water sector. Considers the economic characteristics of the sector and how the government resolved issues of vertical structure, horizontal competition, yardstick competition, price control, service quality, environmental effects, metering, and privatization. Provides assessments of the reforms.

Key Words

Competition, Anti-competitive behavior, Efficiency, Cross-subsidization, Access pricing, Unbundling, Market foreclosure

3. Main forms of market and transaction organization

Core References

Gómez-Ibáñez, José, Regulating Infrastructure: Monopoly, Contracts, and Discretion. Cambridge, MA: Harvard University Press, 2003, Chapters 10 and 13.

Examines the tradeoffs between competition and coordination in policies for vertical unbundling. Considers the advantages and disadvantages of vertical unbundling, the determinants of vertical integration, and regulatory mechanisms for improving coordination with unbundling, namely regulated access charges and markets for capacity rights. Examines how to determine if unbundling is appropriate. Considers costs of competition, potential for innovation, and industry costs.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. II, Chapter 6.

Covers the role and definition of competition. Discusses financial integration and vertical integration of utilities, conglomerates, horizontal and geographic integration, and intercompany coordination.

Sectoral References

ELECTRICITY

Hunt, Sally, Making Competition Work in Electricity. New York: Wiley & Sons, 2002, Chapters 3 and 7.

Explains that electricity generation is the major candidate for being made competitive, but the retail function can also be competitive. Describes four models of industry structure. Explains how to determine the appropriate structural change. Examines trading arrangements to ensure access.

Littlechild, Stephen C., "Competition in Retail Electricity Supply," DAE Working Paper WP 0227, Department of Applied Economics, University of Cambridge, 2002.

Explains benefits of retail competition in electricity. Further explains that competition is a process over time that has important entrepreneurial, learning, and marketing elements. States that not understanding these features of competition could have contributed to the problems some jurisdictions have experienced with electricity competition.

Wolak, F., "Lessons from the California Electricity Crisis," CSEM Working Papers, CSEMWP-110, 2003.

Illustrates the relationship between market and regulatory design and the functioning of electricity markets through the episode of the California electricity crisis during the summer of 2000. Identifies the role of the regulatory institutions in both the development and resolution of the crisis. Draw lessons and makes recommendations for preventing such events to occur in the future.

Wolak, F., and R.H. Patrick, "The Impact of Market Rules and Market Structure on the Price Determination Process in the England and Wales Electricity Market," POWER Working Papers, PWP-047, 1997.

Examines how organized market rules affect firms' market power in the short term. Illustrates the argument through analysis of the England and Wales electricity market, a market dominated by two generators, National Power and PowerGen, who compete in price bids and for generation sets and capacity level of these sets every half an hour. Finds that strategic use of capacity availability declarations gave these two generators the opportunity to obtain prices for their output substantially in excess of their marginal costs of generation.

GAS

Juris, Andrej, "Competition in the Natural Gas Industry: The emergence of spot, financial, and pipeline capacity markets." Note no. 137 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, March 1998.

Explains that introducing open access to pipeline transportation or unbundling supply from transportation creates two distinct markets: the gas market, where participants trade natural gas as a commodity and minimize price and supply risks, and the transportation market, where participants trade transportation services for shipping gas through the pipeline system. Describes how trades occur in each market and the importance of assigning property rights.

Newbery, David, Privatization, Restructuring, and Regulation of Network Utilities. Cambridge, MA: MIT Press, 2001, Chapter 8.

States that one of the unique aspects of the gas industry is that production costs are not well defined. Furthermore, gas can only be produced at certain sites and can only be transported via pipelines and thus

an initial investment in pipelines must be made in order to serve a particular area. Describes other characteristics of gas production, such as large start-up costs and large sunk costs. Describes one possible production chain for the gas industry is that the gas producer sells the gas to pipeline operators, who deliver the gas to either large customers or local distributors. States that the main instrument for deregulation of the gas industry has been the development of spot and futures markets for gas.

TELECOMMUNICATIONS

Boylaud, O., and G. Nicoletti, "Regulation, Market Structure and Performance in Telecommunications," *OECD-Economic Studies* 32: 2001, pp. 99-142.

Uses a database on 23 OECD countries to examine the effects of liberalization and privatization on productivity, prices and quality of service in long-distance (domestic and international), and mobile cellular telephony services markets. Found that while liberalization, viewed both as prospective and effective unambiguously enhances productivity and quality and reduces prices, no clear-cut effect was found for privatization.

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 3.

Explains interconnection principles, how to establish and negotiate interconnection arrangements, how to establish interconnection charges, and technical aspects of interconnection arrangements.

WATER

Rivera, D., Private Sector Participation in the Water Supply and Wastewater Sector: Lessons from Six Developing Countries, Directions in Development Series. Washington, D.C.: World Bank, 1996.

Investigates six recent experiences in developing countries with private-sector participation in the water and wastewater sectors. Presents the economic context, the nature of the arrangement between the government and the private sector, and the impact on service level, quality, and price for each of the six experiences. Assesses the performance of the private sector and gives some recommendations on how to increase the likelihood of its success.

Savedoff, William, and Pablo Spiller. "Government Opportunism and the Provision of Water," in Spilled Water: Institutional Commitment in the Provision of Water Services, edited by William Savedoff and Pablo Spiller. Washington, D.C.: Inter-American Development Bank, 1999, pp.1-34.

Presents case studies of Mexico, Chile, and Argentina to provide lessons on market structure for water. Holds that Mexico shows that decentralization can improve performance and Chile shows that publicly owned water utilities can improve performance through private subcontracting. Later chapters examine these cases in more detail.

Spulber, N., and A. Sabbaghi, Economics of Water Resources: From Regulation to Privatization, 2nd ed., Natural Resource Management and Policy Series. Dordrecht, Netherlands: Kluwer, 1998.

Presents the fundamentals of the economics of water resources, including the components of water resource management, the types and quantities of water demand and supply, market processes in water allocation, the nature of pollutants and their specific impact, the interactions in the economic-ecological system, and the problem of water

re-use and recycling. Discusses the issues of public control through regulation and enforcement, privatization of water resources, and franchise competition.

Other References

Armstrong, Mark, Simon Cowan, and John Vickers, Regulatory Reform: Economic Analysis and British Experience, Cambridge, MA: The MIT Press, 1999, Chapters 4-5.

Examines the economics of competition, liberalization, and vertically related markets.

Newbery, David, Privatization, Restructuring, and Regulation of Network Utilities. Cambridge, MA: MIT Press, 2001, Chapter 5.

Describes how to introduce competition in utility markets.

Key Words

Competition, Monitoring, Regulation, Efficiency, Risk allocation, Unbundling, Access pricing, Interconnection,

4. Transition aspects to introducing competition (stranded assets, subsidized consumers)

Note: Readers should cross-reference this section with Chapter V Sections C and E, and Chapter VI Section C.

Core References

Baxter, Lester, Eric Hirst, and Stan Hadley. "Transition Costs: Who Should Pay?" *Electricity Journal* 10 (5): 1997, pp. 68-77.

Argues that to be efficient, stranded cost recovery mechanisms should not affect customer choice of suppliers relative to the choices that would be made if there were no stranded costs to be recovered, not encourage high-cost suppliers to operate instead of low-cost suppliers, not make it profitable for incumbents to under price a new entrant that has

lower costs, encourage incumbents to lower stranded costs as much as possible, and be simple to administer.

Gómez-Ibáñez, José, Regulating Infrastructure: Monopoly, Contracts, and Discretion. Cambridge, MA: Harvard University Press, 2003, Chapter 10.

Examines the tradeoffs between competition and coordination in policies for vertical unbundling. Considers the advantages and disadvantages of vertical unbundling, the determinants of vertical integration, and regulatory mechanisms for improving coordination with unbundling.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapter 6.

Explains that price flexibility for all operators is important when there is competition. States that if the regulator refrains from lowering prices to levels where the less-efficient firms are unable to compete, the regulator in effect is creating a cartel-like situation where prices are based on the costs of the less-efficient firms. Describes how in some circumstances price discrimination by firms can increase efficiency.

Irwin, Timothy, "Price Structures, Cross-Subsidies, and Competition in Infrastructure." Note no. 107 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

Explains that price discrimination by regulated firms is common and is efficient in some cases. Considers how price discrimination generally does not withstand competition and cross-subsidies almost certainly do not. Describes price rebalancing and its effects on customer groups. Examines ways in which the government can preserve the old price structure through subsidies. Also considers other social safety nets.

Sectoral References

ELECTRICITY

Boyd, J., "The 'Regulatory Compact' and Implicit Contracts: Should Stranded Costs Be Recoverable?" *Energy Journal* 19(3): 1998, pp. 69-83.

Applies principles from law and economics to address stranded assets in the electricity sector. Focuses on theories of efficient breach and implicit contracts to address the desirability of utility cost recovery in the context of liberalization. Identifies the circumstances under which cost recovery should occur and concludes that, when called for, this recovery should be partial rather than full.

Hunt, Sally, Making Competition Work in Electricity. New York: Wiley & Sons, 2002, Chapters 3, 5, and 18.

States that in order to introduce competition, there may be a need to buy out the old regime. Examines effects of private ownership and generation divestiture on stranded costs. Discusses how to quantify stranded costs, including the bottom-up design and the top-down methods.

Joskow, Paul L., "Does Stranded Cost Recovery Distort Competition?" *Electricity Journal* 9 (3), 1996, pp. 31-45.

Defines stranded costs and describes how to calculate them.

TELECOMMUNICATIONS

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 4.

Explains price rebalancing options and gives case studies. Provides illustrative examples of price rebalancing and describes how to evaluate the welfare effects.

Guasch, J. Luis, and Pablo Spiller, Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story, Washington, D.C.: The World Bank Group, 1999, Chapter 7.

Describes transition issues in Latin America and the Caribbean. Considers pricing, market structure, access, and interconnection.

WATER

Brook Cowen, Penelope J., "Getting the Private Sector Involved in Water - What to Do in the Poorest of Countries?" Note no. 102 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, January 1997.

Examines the transitional issues in water reforms. Considers pricing, contracting, and competition.

Key Words

Competition, Costs, Cross-subsidization, Price structure, Stranded Costs, Price rebalancing

5. Vertical separation and service unbundling

Core References

Gal, Michal S., Competition Policy for Small Market Economies, Cambridge, MA: Harvard University Press, 2003, Chapter 4.

> Explains regulation of monopolies in a small economy context. Defines monopoly and describes approaches to regulating a pure monopoly (a monopoly that does not also compete against other firms) and to regulating a monopoly that competes with downstream rivals. Considers the viability of these downstream rivals.

Gómez-Ibáñez, José, Regulating Infrastructure: Monopoly, Contracts, and Discretion. Cambridge, MA: Harvard University Press, 2003, Chapters 10 and 13.

> Examines the tradeoffs between competition and coordination in policies for vertical unbundling. Considers the advantages and disadvantages of vertical unbundling, the determinants of vertical integration, and regulatory mechanisms for improving coordination with unbundling, namely regulated access charges and markets for capacity rights. Examines how to determine if unbundling is appropriate. Considers costs of competition, potential for innovation, and industry costs.

Newbery, David, Privatization, Restructuring, and Regulation of Network Utilities. Cambridge, MA: MIT Press, 2001, Chapter 5.

> Describes how to introduce competition in utility markets. Considers introducing competition for markets served by state-owned utilities and issues of vertical separation.

Viscusi, W. Kip, John M. Vernon, and Joseph E. Harrington, Jr., Economics of Regulation and Antitrust. Cambridge, MA: MIT Press, 2000, Chapter 8.

> Examines issues of vertical relationships. Considers vertical mergers, transaction costs, economies of vertical integration, successive monopolies, extension of monopoly, vertical restrictions, territorial restraints, exclusive dealing, tying, and price discrimination.

Sectoral References

ELECTRICITY

Guasch, J. Luis, and Pablo Spiller, Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story, Washington, D.C.: The World Bank Group, 1999, Chapter 11.

Examines reform of the power sector. Considers issues of private participation, regulation of prices, and power pools. Provides case studies of the U.K., U.S., Chile, Norway, and Argentina.

Gómez-Ibáñez, José, Regulating Infrastructure: Monopoly, Contracts, and Discretion. Cambridge, MA: Harvard University Press, 2003, Chapter 12.

Examines how to design capacity markets, using Argentina as a case study.

Hunt, Sally, Making Competition Work in Electricity. New York: Wiley & Sons, 2002, Chapter 3.

Explains that electricity generation is the major candidate for being made competitive, but the retail function can also be competitive. Describes four models of industry structure.

GAS

Juris, Andrej, "Competition in the Natural Gas Industry: The emergence of spot, financial, and pipeline capacity markets" Note no. 137 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, March 1998.

Explains that introducing open access to pipeline transportation or unbundling supply from transportation creates two distinct markets. Describes how trades occur in each market and the importance of assigning property rights.

Juris, Andrej, "Natural Gas Markets in the U.K.: Competition, industry structure, and market power of the incumbent" Note no. 138 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, March 1998.

Describes how deregulation of the U.K. natural gas industry facilitated new entry and competition in almost all segments, except pipeline transportation. The process of instituting competition has been difficult because the privatized incumbent was allowed to remain vertically integrated.

Lehmann, Peter, "Regulation in New Natural Gas Markets—The Northern Ireland Experience" Note no. 179 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, April 1999.

Argues that a competitive structure may be difficult in new markets. Describes Northern Island's attempt to use a period of exclusive licenses to phase in reforms.

TELECOMMUNICATIONS

Henderson, A., and S. Dounoukos, "Structural Separation in Telecommunications: A Review of Some Issues," *Agenda*, 10(1): 2003, pp. 43-60.

Discusses the trade-offs involved in structural separation and divestiture of the access network activities from the non-access activities of incumbent telecommunications operators. Presents alternative approaches of countering anticompetitive behavior of incumbents based on accounting separation. Reports on the Australian experience with these issues.

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Modules 3 and 5.

Holds that incumbents control essential facilities. Regulators often require incumbents to unbundle these essential facilities and provide rivals access to them. Examples of such policies include local loop unbundling and collocation. Explains that in extreme cases, regulators may require incumbents to divest themselves of essential facilities.

Laffont, Jean-Jacques, and Jean Tirole, Competition in Telecommunications, Cambridge, MA: MIT Press, Chapter 1.

Provides a background on the technology and regulatory policy debate in the new telecommunications competitive environment.

Key Words

Essential facility, Bottleneck facility, Vertical separation, Vertical integration, Unbundling

6. Access pricing and regulation of access to bottleneck facilities

Core References

Ergas, H., "Valuation and Costing Issues in Access Pricing, with Specific Applications to Telecommunications," in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 91-112.

> Holds that, with respect to the costing of access pricing, assets should be valued at replacement cost, using, whenever possible, entry prices for in-use assets; efficient recovery of common costs will require a mark-up over the attributable long-run costs of each service; and the cost of capital benchmarks need to reflect the effect of irreversibility in investment. Advocates ECPR.

Estache, A., and T. Valetti, "The Theory of Access Pricing: An Overview for Infrastructure Regulators." Centre for Economic Policy Research Discussion Paper 2133, London, 1999.

> Provides an overview of theoretical issues related to the pricing of access that are at the heart of the policy debate on reforms of infrastructures. Discusses in detail the importance of access pricing in the context of a liberalized and vertically separated industry, a liberalized but vertically integrated industries, and unregulated access (private negotiations).

Gans, J. and Williams, P., "A Primer on Access Regulation and Investment," in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 150-160.

> Holds that access prices exert an influence on investment incentives by directly affecting the rate-of return on the provider's investment. States that for regulation to be most effective, pricing policy must be stated prior to access being sought and indeed, prior to investment being made. In an unregulated environment, providers will limit optimal use of the facility so as to limit profit-reducing competition downstream.

Guasch, J. Luis, and Pablo Spiller, Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story, Washington, D.C.: The World Bank Group, 1999, Chapter 6.

Examines access pricing. Considers fully distributed cost, access deficit, ECPR, marginal cost, and price caps for telecommunications. Considers timetabling issues for energy.

Sectoral References

ELECTRICITY

Gómez-Ibáñez, José, Regulating Infrastructure: Monopoly, Contracts, and Discretion. Cambridge, MA: Harvard University Press, 2003, Chapter 12.

Examines how to design capacity markets, using Argentina as a case study.

Hunt, Sally, Making Competition Work in Electricity. New York: Wiley & Sons, 2002, Chapters 7 and 9.

States that detailed rules for assuring access to essential facilities—the trading arrangements—must take into account the problems of delivery. Further holds that trading arrangements must be made regarding how forward contracts are delivered and how spot sales are made and delivered. Describes three models of short-term trading arrangements, namely the integrated, wheeling, and decentralized models. Advocates the integrated model. Says market participants need to be assured that they will have access to use the transmission system on stable terms in the future. States that an ideal transmission pricing scheme is comprised of three parts: a transmission usage charge, a transmission connection charge, and a transmission access charge.

NARUC, "Model Interconnection Procedures and Agreement for Small Distributed Generation Resources," Washington, D.C.: National Association of Regulatory Utility Commissioners, 2003.

States that detailed rules for assuring access to essential facilities—the trading arrangements—must take into account the problems of delivery. Further holds that trading arrangements must be made regarding how forward contracts are delivered and how spot sales are made and delivered. Describes three models of short-term trading arrangements, namely the integrated, wheeling, and decentralized models. Advocates the integrated model. Says market participants need to be assured that they

will have access to use the transmission system on stable terms in the future. States that an ideal transmission pricing scheme is comprised of three parts: a transmission usage charge, a transmission connection charge, and a transmission access charge.

GAS

Juris, Andrej, "Competition in the Natural Gas Industry: The emergence of spot, financial, and pipeline capacity markets" Note no. 137 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, March 1998.

> Explains that introducing open access to pipeline transportation or unbundling supply from transportation creates two distinct markets: the gas market, where participants trade natural gas as a commodity and minimize price and supply risks, and the transportation market, where participants trade transportation services for shipping gas through the pipeline system. Describes how trades occur in each market and the importance of assigning property rights.

Juris, Andrej, "Natural Gas Markets in the U.K.: Competition, industry structure, and market power of the incumbent" Note no. 138 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, March 1998.

> Describes how deregulation of the U.K. natural gas industry facilitated new entry and competition in almost all segments, except pipeline transportation. The process of instituting competition was difficult because the privatized incumbent was allowed to remain vertically integrated. Eventually, the incumbent voluntarily split into two companies. Resulting access contracts are discussed.

TELECOMMUNICATIONS

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 3.

> Explains interconnection principles, how to establish and negotiate interconnection arrangements, how to establish interconnection charges, and technical aspects of interconnection arrangements.

Jamison, M., "Regulatory Techniques for Addressing Interconnection, Access, and Cross-Subsidy in Telecommunications, in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 113-129.

> Explains that regulators generally consider three basic approaches when setting prices for interconnection and access: (1) the ECPR; (2) cost-

based pricing; and (3) demand-based pricing or Global Price Caps. Further explains that the basic theory behind the ECPR is that, if the incumbent receives the same profits from interconnection and access as it does from sales of the retail product, then competitors can enter the market only if they are more efficient in providing retail functions than is the incumbent. In cost-based pricing, regulators generally choose a long-run-incremental-cost-plus-contribution approach. The demand-based approach uses Ramsey-Boiteux pricing principles.

Laffont, Jean-Jacques, and Jean Tirole, Competition in Telecommunications, Cambridge, MA: MIT Press, Chapters 3-5.

Describes economic pricing principles for one-way and two-way access. Provides both narrative explanation and technical descriptions.

Other References

Vogelsang, Ingo, "Price Regulation of Access to Telecommunications Networks," Department of Economics, Boston University (undated).

Provides an overview of the economic research on telecommunications interconnection pricing.

Key Words

Access pricing, Cost of capital, Competition, Investment, Ramsey Pricing, Incremental Cost, Interconnection, Unbundling

7. Application of competition rules and antitrust principles in regulation and models of interaction with competition /antitrust authorities

Core References

Gal, Michal S., Competition Policy for Small Market Economies, Cambridge, MA: Harvard University Press, 2003, Chapters 2 and 4.

Examines the implications of small economy size on competition policy. Explains regulation of monopolies in a small economy context. Defines monopoly and describes approaches to regulating a pure monopoly

(a monopoly that does not also compete against other firms) and to regulating a monopoly that competes with downstream rivals. Considers the viability of these downstream rivals.

Guasch, J. Luis, and Pablo Spiller, Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story, Washington, D.C.: The World Bank Group, 1999, Chapters 14-15.

Examines competition policies with an emphasis on Latin America. Considers the relationship between regulation and competition policy. Further considers regulating market structure, competition law and its enforcement, and the role of the judiciary. Examines cases of Chile and Peru.

Nutall, R., and J. Vickers, "Competition Policy for Regulated Utility Industries in Britain," Oxford Applied Economics Discussion Paper Series: 178, 1996.

Provides a theoretical and a descriptive approach to the role of competition policy in regulated utilities. First, it outlines the main features of public utilities hampering the application of competition policy. Then, it analyzes the principles and practice of competition policy related to price-discrimination, cross-subsidization, horizontal and vertical integration, and access pricing. Finally, it describes the British experience in those areas.

Smith, R., "Competition Law and Policy — Theoretical Underpinnings," in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 16-26.

Holds that competition policy and competition law are not about removing or outlawing monopolies, but are based on the belief that a competitive market will result in economic efficiency and increased social welfare. Examines types of conduct: a) contracts, arrangements and understandings between competitors; b) misuse of existing market power; c) exclusive supply arrangements and other vertical relationships (such as resale price maintenance); and d) mergers and acquisitions. Describes the typical structure-conduct-performance paradigm and advocates considering the dynamic interplay between current sellers and potential entrants.

Sectoral References

ELECTRICITY

Bushnell, J., "Looking for Trouble: Competition Policy in the U.S. Electricity Industry," CSEM Working Papers, CSEMWP-109, 2003.

> Discusses the shift in focus of electricity regulators from fostering a competitive market structure towards applying regulation to specific market outcomes since the summer 2000 California crisis. Investigates the extent to which this event is a failure of the policy or of the tools that were used to implement it. Describes the methods used by regulators to test for potential abuse of market power.

Newbery, D., "Mitigating Market Power in Electricity Networks," prepared for a conference titled "Towards a European Market of Electricity: What Have We Learnt from Recent Lessons? Spot Market Design, Derivatives and Regulation" held in Rome, June 2002.

> Examines four features of the policy that mitigates market power in European electricity networks: capacity divestiture, entry stimulation, network interconnection, and capacity to apply regulation to the competitive generation segment. Shows how each of these actions taken separately can improve competition in wholesale electricity markets, but also how, unless carefully designed, this can be in conflict with another action with possibly long-term undesirable consequences. Lessons are drawn from California, the UK, and other European countries.

TELECOMMUNICATIONS

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 5.

> Explains that governments adopt competition policies to respond to market failures. Intervention through competition policy may try to modify the behavior of firms or may try to control market structure. Holds that regulation can be both prospective (control future behavior) and retrospective (respond to past behavior). Competition policy is generally retrospective. Regulatory agencies sometimes coordinate activities with competition authorities and at other times serve as the competition authority.

Oftel, "Competition in the Provision of Fixed Telephony Services," Director General of Telecommunications, Office of Telecommunications, London, U.K., 2001.

Describes the U.K. telecommunications regulator's approach for protecting consumers in markets where competition is currently ineffective in constraining prices. States that the regulator first defines the relevant markets, then assesses the level of competition in each relevant market, and then determines the extent to which regulation is necessary in that market.

Min, Wonki, "Telecommunications Regulations: Institutional Structures and Responsibilities." Working Paper no. 237, Organization for Economic Co-operation and Development (OECD), Washington, D.C., 26 May 2000.

States that as the role of the competition authority has grown in telecommunications, the possibility of inconsistent regulatory rulings has increased. Holds that the principle of *lex specialis* usually applies. The three primary models for ensuring concurrent jurisdiction are: (1) Give full regulatory power to the competition authority (e.g., New Zealand); (2) Give the telecommunication regulator authority to apply competition rules to the telecommunication sector (e.g., U.K.); and (3) Establish a co-ordination mechanism to resolve competition issues. A number of countries have formal co-ordination mechanisms, for example, Switzerland.

Other References

Neumann, Manfred, Competition Policy: History, Theory and Practice. Cheltenham, U.K.: Elgar, 2001.

Provides an international perspective on the development of competition policy, its underlying theories, and its application.

Viscusi, W. Kip, John M. Vernon, and Joseph E. Harrington, Jr., Economics of Regulation and Antitrust. Cambridge, MA: MIT Press. 2000, Chapter 1.

Contrasts regulation and competition policy.

Key Words

C. Competition for the market

1. General concepts and efficiency impacts

Core References

Baldwin, Robert, and Martin Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapter 20.

> Examines both commercial and government franchising. Discusses methods of allocating franchises, such as auctions, and problems with franchises. Problems include specifying the franchised service, ensuring efficient competition for the market, enforcement, and terminating contracts.

Dnes, Antony W., "Franchising and Privatization." Note no. 40 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1995.

> Explains that franchise bidding is one way of having competition for the market when the market exhibits natural monopoly characteristics. Holds that the scheme can provide low prices for customers if the bid is for retail prices that will be charged.

Guasch, J. Luis, Granting and Renegotiating Infrastructure Concessions: Doing It Right, Washington, D.C.: The World Bank Group, 2004, Chapters 1-2.

> Provides an overview of concessions, including how they work, benefits, drawbacks, and experiences.

Guasch, J. Luis, and Pablo Spiller, Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story, Washington, D.C.: The World Bank Group, 1999, Chapters 8-9.

> Examines franchising and concessions. Examines cases in Argentina, Mexico, and Chile. Describes how to design concession arrangements.

Guislain, Pierre, and Michel Kerf, "Concessions – The Way to Privatize Infrastructure Sector Monopolies." Note no. 59 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1995.

States that concession-type arrangements can be used for privatizing sectors with monopoly characteristics. Under this approach, the government grants the private sector the right to provide the utility service, but retains some control through a concession contract or license. The continuum of private participation options ranges from short-term supply and service contracts to concessions to full privatization.

Sectoral References

WATER

Haggarty, Luke, Penelope Brook, and Ana Maria Zuluaga, "Water Sector Contracts in Mexico City, Mexico," in Thirsting for Efficiency: The Economics and Politics of Urban Water System Reform, Washington, D.C.: The World Bank, 2002, pp. 139-187.

Describes water service contracts in Mexico. Illustrates the use of multiple operators to provide competitive pressure. Considers the motivations for the water sector reforms, the policy decisions, and policy changes.

Webb, M. and Ehrhardt, D., "Improving Water Services through Competition." Note no. 164 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, December 1998.

States that many major water sector reforms in recent years have used competition for the market as an efficient way of introducing private sector participation, and the approach has delivered benefits to consumers. Holds that competition forces the bidders to reveal the minimum cost of providing water and sanitation, allowing efficiency gains to be realized and passed on to consumers. Competition for the market can be combined with other forms of competition. Requiring the concessionaire to contract out many services can keep up the pressure for efficiency during long-term contracts. And comparative competition between the concessionaire and other utilities can boost performance.

Other References

Vickers, John, and George Yarrow, Privatization: An Economic Analysis. Cambridge, MA: MIT Press, 1988, Chapter 3.

Describes the effects of competition.

Key Words

Competition for the market, Monopoly, Franchise

2. Basic auction theory

Core References

Klemperer, P., "Auction Theory: A Guide to the Literature," in The Economic Theory of Auctions, vol. 1. Cheltenham, U.K.: Elgar, 2000, pp. 3-62.

Surveys in a non-technical way the main topics related to auction theory and the development of its literature in the last decades. Introduces the basic analysis of optimal auctions, the revenue equivalence theorem, and marginal revenues. Covers more detailed topics with a specific attention devoted to those related to those related to competition-policy. Provides some technical details through some simple worked examples.

Klemperer, P., "What Really Matters in Auction Design," *Journal of Economic Perspectives* 16(1): 2002, pp. 169-89.

Gives examples where auction design failed to guarantee the absence of anti-competitive behavior, mainly, collusion, predation and entry deterrence. Highlights the drawbacks of the most popular auction models and proposes some solutions. Emphasizes the need for stronger antitrust policy in auction markets.

Viscusi, W. Kip, John M. Vernon, and Joseph E. Harrington, Jr., Economics of Regulation and Antitrust. Cambridge, MA: MIT Press. 2000, Chapter 13.

Describes the modified English auction, which leaves some rents for service providers unless there is sufficient competition at the bidding phase. The approach also results in average cost pricing unless bidding is

done in two part tariffs, although these pricing schemes require the government to know market demand. If products can be differentiated, then the government may need to specify quality or have multidimensional bidding.

Sectoral References

ELECTRICITY

Newbery, D., and T. McDaniel, "Auctions and Trading in Energy Markets -- An Economic Analysis," Working Papers in Economics, Department of Applied Economics, University of Cambridge, U.K., 2002.

Shows how auction design is an important issue in the operation and planning in British energy markets. Discusses the adjustments in the trading arrangements in the electricity industry, and presents some of their results to date. Looks at the merit of auctions in replacing regulation to manage natural monopolies in energy markets.

GAS

McDaniel, T., and K. Neuhoff, "Auctions to Gas Transmission Access: The British Experience," Auctions and Beauty Contests: A Policy Prospective, SEOR-Erasmus Competition and Regulation Institute, Rotterdam, 2002.

Investigates whether auctioning access rights is an adequate way of managing transmission constraints in natural gas networks. Describes the evolution of the liberalization process of the gas industry in the UK and argues that auctioning entry rights improves allocative efficiency provided that competitive production and supply markets exist. Expresses some reserve about the adequacy of auctioning mechanisms when deciding about transmission capacity expansion.

McAfee, R., and J. McMillan, "Analyzing the Airwaves Auction," *Journal of Economic Perspectives* 10(1): 1996, 159-75.

Explains the details of the design of the U.S. Federal Communications Commission spectrum license auction in light of the economic theory of auctions. Describes how auction theory helped address policy questions such as the type of auction to be run, the timetable and the bidding strategies, which would best guarantee efficiency in its final outcome. Shows how this auction has encouraged further theoretical advances.

Key Words

Auction, Bidding, Value

3. Practical applications of competition for the market

Core References

Guasch, J. Luis, Granting and Renegotiating Infrastructure Concessions: Doing It Right, Washington, D.C.: The World Bank Group, 2004, Chapters 2 and 7.

Provides an overview of concessions, including how they work, benefits, and drawbacks. Provides guidelines for optimal concession design, including award processes, award criteria, renegotiation clauses, concession length, commitments, tariffs and other financial issues, and dispute resolution.

Klein, Michael, "Bidding for Concessions – The Impact of Contract Design." Note no. 158 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1998.

Explains that concession contracts should set out the rights and performance obligations of concessionaires and the risks and incentives under which they operate, including pricing arrangements. The clarity with which these terms can be defined affects the likelihood of renegotiation after contract award. The design of incentives and risk allocation will

affect first the intensity of competition and then the sustainability of the original contract.

Klein, Michael, "Designing Auctions for Concessions: Guessing the Right Value to Bid and the Winner's Curse." Note no.160 in Public Policy for the Private Sector, Washington, D.C.: World Bank Group, 1998.

Explains that the choice of auction method is affected by arguments about the political sustainability of the outcome; firms' bidding strategies, including the risk of the winner's curse; and the risk of collusion among bidders. All these ingredients combine to determine whether an auction design yields value; how that value is distributed among bidders, consumers, and the government; and whether the deal will last.

Klein, Michael, and Philip Gray, "Competition in Network Industries—Where and How to Introduce It." Note no. 104 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

Explains that regulation may be necessary with franchising to allow prices to adjust in response to events, though rebidding the franchise periodically allows the regulator a way around typical price regulation. If there are significant fixed costs involved, then the necessary transfer of assets will involve complex asset valuation exercises. Term limits on the franchise and some rebidding can ensure regular challenges to the incumbent.

Klein, M., and N. Roger, "Back to the Future – The Potential in Infrastructure Privatization." Note no. 30 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, November 1994.

States that because monopolies can extract excessive profits, a sustainable ownership arrangement requires a rent-sharing system that protects consumers, provides owners with incentives to operate the network efficiently, and reduces the temptation for governments to exploit monopoly rents for political advantage. Holds that monopolies can be subjected to competition through repeated franchise bidding, under which monopoly service franchises are auctioned off from time to time and awarded to the firm offering acceptable service on the best terms. Franchise bidding can be effective for infrastructure services that do not require investments tied to a particular service area—for example, many forms of transport services or solid waste collection.

Welch, Dick, and Olivier Fremond, "The Case-by-Case Approach to Privatization: Techniques and Examples – Privatization Toolkits." World Bank Technical Paper No. 403, Washington, D.C., 1998.

In the context of sale of a state-owned enterprise, discusses how to prepare for and organize an auction.

Sectoral References

ELECTRICITY

Jadresic, Alejandro, "Auctioning Subsidies for Rural Electrification in Chile." Note no. 214 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 2000.

Describes how Chilean regional governments allocate subsidy funds to private companies to help cover investment costs. These funds are allocated to proposed projects on the basis of a project cost-benefit analysis, the amount of investment covered by the companies, and the social impact of the project. Rural communities lacking electricity supply typically propose the projects along with distributors interested in providing the service. Describes sources of competition.

GAS

McDaniel, T., and K. Neuhoff, "Auctions to Gas Transmission Access: The British Experience," Auctions and Beauty Contests: A Policy Prospective, SEOR-Erasmus Competition and Regulation Institute, Rotterdam, 2002.

Describes how and under what conditions auctioning access rights in gas can increase efficiency relative to negotiation and grandfathering. Uses British gas network as a case study.

TELECOMMUNICATIONS

Doyle, Chris, and Paul McShane, "On the Design and Implementation of the GSM Auction in Nigeria - the World's First Ascending Clock Spectrum Auction," Telecommunications Policy, 27(5-6): 2003, pp. 383-405.

Describes the Nigerian GSM auction. Considers auction design, revisions to the design, and management of the auction.

Wellenius, Björn, "Extending Telecommunications Service to Rural Areas—The Chilean Experience: Awarding subsidies through competitive bidding." Note no. 105 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, February 1997.

Describes how Chile auctions subsidies for rural telecommunications. Considers overall design of the process and the results.

Wellenius, Björn, and Carlo Maria Rossotto, "Introducing Telecommunications Competition through a Wireless License: Lessons from Morocco." Note no. 199 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, November 1999.

Describes how Morocco auctioned a GSM license. Describes the process transparency and how it affected results.

WATER

Komives, Kristin, and Penelope J. Brook Cowen, "Expanding Water and Sanitation Services to Low-Income Households," Note no. 178 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1998.

Describes the La Paz and El Alto concession. Instead of asking bidders to specify the tariff they would require to meet pre-specified investment and service obligations as did earlier concession awards in the region, bidders for the this concession identified the number of water connections they would make in exchange for a pre-specified tariff.

Webb, M., and D. Ehrhardt, "Improving Water Services through Competition." Note no. 164 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, December 1998.

Sates that competition for the market as an efficient way of introducing private sector participation and the approach has delivered benefits to consumers. Describes special issues for small towns where the costs of preparing a tender and of preparing bids are disproportionate to their size. Describes how several small towns join together to overcome this problem. Competition for the market can be combined with other forms of competition. Examines requiring the concessionaire to contract

out services and using comparative competition between the concessionaire and other utilities.

Key Words

Competition, Franchising, Bidding, Natural Monopoly, Contract

4. Termination, renewal, rebidding and renegotiation

Core References

Basanes, Federico C., Eduardo Saavedra, and Raimundo Soto, Post-Privatization Renegotiation and Disputes in Chile. IFM-116, Washington, D.C.: Inter-American Development Bank, September 1999.

> Describes Chile's experience, which illustrates the importance of the design of the post-privatization market, the regulatory framework, and the institutional capabilities the regulator. Explains that disputes most often occur where regulation is incomplete, information asymmetry is high and regulatory institutions are less able to monitor the private operators. Conflict stemmed mostly from: (a) the existence of vertical integration, (b) the lack of definition of certain areas in regulation; and (c) the institutional weaknesses of regulatory bodies. Describes how a large vertically integrated conglomerate used its market power in the regulated market to reduce competition and raise its profits in the competitive segment.

Gómez-Ibáñez, José, Regulating Infrastructure: Monopoly, Contracts, and Discretion. Cambridge, MA: Harvard University Press, 2003, Chapter 5.

> Discusses the problems of having incomplete contracts. Uses case of railroads in Argentina.

Guasch, J. Luis, Granting and Renegotiating Infrastructure Concessions: Doing It Right, Washington, D.C.: The World Bank Group, 2004, Chapters 3-6.

> Describes renegotiation problems, why they arise, and how to engage in renegotiation.

Guasch, J. Luis, and Pablo Spiller, Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story, Washington, D.C.: The World Bank Group, 1999, Chapter 8.

> Examines franchising and concessions. Examines cases in Argentina, Mexico, and Chile.

Klein, Michael, "Rebidding for Concessions." Note no. 161 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1998.

Explains that the longer a concession lasts, the less effect the initial rounds of bidding will have on the concession over its full life. Periodic renegotiations or price reviews will be more influential. Holds that the market power of concessionaires can be limited by periodically re-auctioning a concession if contracts can be well written and rebidding is practical. Rebidding for concession-type arrangements is sometimes called a Chadwick-Demsetz auction.

Sectoral References

WATER

Ménard, Claude, and George R.G. Clarke, "Reforming Water Supply in Abidjan, Côte D'Ivoire: A Mild Reform in a Turbulent Environment," in Thirsting for Efficiency: The Economics and Politics of Urban Water System Reform, Washington, D.C.: The World Bank, 2002, pp. 233-272.

Examines the case of Abidjan, Côte D'Ivoire. Focuses on the motivations for the reforms, how the reforms affected performance and why, and why the system performs well.

Key Words

Competition, Franchising, Bidding, Negotiation, Natural Monopoly, Contract

5. Regulatory oversight of competitive procurement

Core References

Guasch, J. Luis, and Pablo Spiller, Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story, Washington, D.C.: The World Bank Group, 1999, Chapter 9.

Examines concession arrangements. Considers issues of sole source and competitive procurement, principal-agent problems within the government procurement process, types of procurements, and collusion.

Klein, Michael, "Designing Auctions for Concessions: Guessing the Right Value to Bid and the Winner's Curse." Note no. 160 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1998.

Examines reasons why regulators are involved in auctions, namely issues of technical expertise, consistency between contact award and contract enforcement, knowledge of bidders, independence, and information gathering, especially for future price reviews.

Sectoral References

TELECOMMUNICATIONS

Doyle, Chris, and Paul McShane, "On the Design and Implementation of the GSM Auction in Nigeria - the World's First Ascending Clock Spectrum Auction," Telecommunications Policy, 27(5-6): 2003, pp. 383-405.

> Describes the Nigerian GSM auction. Considers auction design, revisions to the design, and management of the auction.

Key Words

Competition, Franchising, Bidding, Negotiation, Natural Monopoly, Contract, Transparency

6. Negotiated bids

Core References

Klein, Michael, "Infrastructure Concessions – To Auction or Not to Auction?" Note no. 159 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1998.

> Examines whether the authority letting a concession should negotiate a contract for an exclusive private infrastructure deal or engage in an auction. Negotiations with a single supplier are faster than an auction, but having even a quick auction improves the authority's negotiating position.

Klein, Michael, "Designing Auctions for Concessions: Guessing the Right Value to Bid and the Winner's Curse." Note no. 160 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1998.

> "The private sector often uses some form of competitive negotiation, which in principle operates like an open auction. But for government procurement or procurement by regulated monopolies it is generally desirable to allow less discretion than is involved in competitive negotiation." Examines the merits and problems of open and sealed bids.

Welch, Dick, and Olivier Fremond, "The Case-by-Case Approach to Privatization: Techniques and Examples – Privatization Toolkits." World Bank Technical Paper No. 403, Washington, D.C., 1998.

Provides steps in auctions and explains that negotiated sales are necessary when there is a single bidder or when one bidder is clearly superior to all other bidders.

Key Words

Bidding, Negotiation

Chapter III. Financial Analysis

Introduction

Recall that a basic problem addressed by regulation is an asymmetry between the government and the operator with respect to objectives and information.[81] We note elsewhere that there are three basic approaches to dealing with these asymmetries, (a) subjecting the operator to competitive pressures,[82] (b) gathering information on the operator and the market, and (c) applying incentive regulation.[83] In this chapter we focus on the second of these techniques – gathering information on the operator and the market – with a view towards how this information affects the regulator's efforts to use incentive regulation.[84] Regulators use incentive regulation primarily to regulate the overall price level of the operator. Financial analysis assists the regulator in this work by providing the regulator with information on how various price levels affect the operator's ability to obtain capital for investment.

The remainder of this chapter is organized as follows. The paragraphs below describe net present value (NPV) analysis that operators use to make investment decisions and that regulators use (along with other analyses) to value cash flows. Next this narrative discusses financial statements, which are the tools that operators use to record the financial effects of their business decisions. Rules that regulators impose on operators to ensure that the financial statements are useful for regulators are discussed next. This narrative lastly describes how regulators determine whether the operator's earnings on the regulated operations are sufficient to attract capital for future investments, including techniques for estimating the cost of capital.[85] Following this chapter's narrative is a list of references, organized by topic.

Business Decision Making and its Financial Effects

When an operator considers two or more courses of action, he generally bases his choice on the cash flows that the different options offer.[86] These cash flows occur over time and cash flow that is farther into the future is less important than cash flow that is nearer to the present. To

[81] Chapter I Section H covers information asymmetries.
[82] Chapter II examines approaches for competition in the market and competition for the market. Chapter IV covers competition between markets.
[83] See Chapter IV for information on incentive regulation.
[84] Obtaining and managing information is covered in Chapter VII. The immediate chapter examines using financial information.
[85] Because financial analysis is central to some of the regulator's key functions, such as regulating prices, the regulatory processes that the regulator uses when conducting financial analyses affect operator performance and how stakeholders view the regulator. Chapter IV Section 6 and Chapter VIII discuss these regulatory processes
[86] See Section A.

quantify these relative differences, operators discount future cash flows to present values by dividing each year *t*'s cash flow by $(1+r)^t$, where *r* is the discount rate. *r* represents both the time value of money and the project risk. In other words, *r* represents what the operator needs to pay both debt holders and shareholders to obtain capital for this project. In general, the greater the risk in a project, the higher will be the discount factor that the operator would apply to the projected cash flows. The net of the present value of the cash inflow and the present value of the cash outflow is called NPV of the project. Unless there is a barrier to raising capital or to obtaining some necessary input, an operator generally is willing to implement any project that has a positive NPV.[87]

Once a project is chosen and implementation begins, the project has financial effects on the operator and the operator records these effects in its financial statements.[88] There are three basic financial statements that are of interest in regulation. The first is the cash flow statement, which records all of the cash inflows and outflows that result from the normal operations and projects that the operator undertakes. Cash flows are of interest to regulators in part because some regulators use projected cash flows to establish *X*-factors for price cap regulation. Price cap regulation that relies on projected cash flows to establish *X*-factors is called U.K.-style price cap regulation.[89] Revenue and operating expenses related to projects and normal operations are recorded on the income statement, along with interest, taxes, and depreciation expenses. Operating expenses are costs incurred for inputs that are used up within a year's time. Assets (plant, other property and investments, current assets, and deferred debts) and liabilities (stock, long-term debt, non-current liabilities, current and accrued liabilities, and deferred credits) are recorded on the balance sheet. The income statement and balance sheet are of particular interest in rate of return regulation. This is discussed further in Chapter IV.

Regulation of Financial Statements

Regulators apply two systems of rules for controlling how an operator reports its financial results. The first system of rules is called the Uniform System of Accounts (USOA), which outlines how operators are to keep and report their financial records for regulatory purposes.[90] Typical reports include balance sheets, income statements, cash flow statements, and operating statistics. Having a USOA decreases opportunities for abuse and helps in overcoming the operators' information advantage over the regulator. The objectives of accounting regulation are

[87] Some regulators also use NPV analysis in regulating overall price levels. Chapter IV Section B discusses these financial analysis techniques.
[88] See Section B.
[89] See Chapter IV Section B for information on price cap regulation and the financial modeling that U.K.-style price cap regulation entails.
[90] See Section C. Because standard accounting procedures may not give regulators all of the information they need to carry out their responsibilities, countries often give regulators authority to determine financial reporting requirements.

to provide accurate records for ratemaking, clearly identify assets and asset values (for ratemaking, stranded cost calculations, and asset transfer at the end of a franchise), assess operator earnings, separate utility from non-utility activities, benchmarking, monitoring performance on investment and other license requirements, and transparency for investors. All financial statements should be expressed for the utility operations of the operator, the operator's non-utility operations, and the operator's holding company, if there is one.

The second system of rules that regulators apply to control how an operator reports financial information is called accounting separations (sometimes called ring fencing) and is frequently applied when the operator has lines of business that the regulator does not regulate.[91] Chapter II on Market Structure and Competition provides examples of situations in which regulators frequently require accounting separations. The regulator generally requires the operator to provide financial statements for (1) the entire corporation, (2) country-specific operations, and (3) just the regulated operations. Financial statements for the entire corporation cover all domestic and international, regulated and non-regulated operations. Financial statements for country-specific operations cover all regulated and non-regulated operations related to the regulator's country. Financial statements for just regulated operations cover all of the services under the regulator's jurisdiction. Regulatory requirements for accounting separations generally include rules for keeping separate regulated and non-regulated accounts where feasible, allocating costs in accounts that the operator uses for both regulated and non-regulated operations, transactions between corporate affiliates, and procedures for compliance reporting. Costs for facilities and operations that are shared by regulated and non-regulated operations are allocated between the regulated and non-regulated operations according to rules set forth by the regulator. In some instances, the regulator uses pricing restrictions on regulated services or non-regulated services to control cross-subsidization. Pure price caps on regulated services may control cross-subsidization and price floors on competitive services may, too.

Accounting separations can be difficult to develop and implement well. Accounting separations provides operators with a mechanism for shifting costs from non-regulated to regulated operations. Regulators perform or require audits and perform comparative analyses to police cost shifting. Numerous factors are available for the cost allocations involved in accounting separations and the regulator generally must make trade-offs between priorities of practicality, accuracy, and auditability when selecting cost allocation factors. Because of these tradeoffs, the cost allocations lose accuracy and can give management incentives to make uneconomic investments. Also, accounting separations generally involves asset transfers between regulated and non-regulated operations and regulators set standards for how these transfers are to be valued and recorded. Because of these difficulties with accounting separations, and the cost of implementing it, regulators will sometimes not apply accounting separations if the operator's non-regulated business is very small relative to the regulated portion. In these

[91] See Section D. Chapter V Section E discusses other effects of competition in pricing.

situations, regulators will sometimes simply include the non-regulated costs and revenues in with the regulated books.

Earnings and Capital Costs

Once the regulator has accounting records in hand that comply with the USOA and accounting separations requirements, and if the regulator is using U.K.-style price cap regulation or some form of rate of return regulation, the regulator then determines who – customers or shareholders – will pay these costs and under what conditions. There are two components of this analysis. The first component is earnings assessment, which identifies the received rate of return on the regulated operations. The second component is the measurement of the cost of capital. Some forms of regulation, such as pure price cap regulation, do not rely on operator accounting information for establishing overall price levels, so earnings assessments and estimates of the cost of capital are unnecessary in these situations.

Determining the earnings of the operator's regulated operations involves asset valuation, assessing the prudency and usefulness of the operator's expenditures, setting depreciation rates, and determining the treatment of unpaid bills, customer or government-provided capital, and imputed revenue.[92] With respect to valuing assets for regulated services (called the rate base or regulated assets), there are two basic approaches: the cost-based approach and the value-based approach. The cost-based approach, also called original cost or historical cost accounting, values assets at what the operator originally paid for the assets. There are two value-based approaches. The first of these – the fair value approach – values the assets based on the profits they can generate for shareholders. This can create circularity when asset value also enters into the formula for determining profits. The second value-based approach is called current cost or replacement cost accounting, which values assets each year at what it would cost to acquire them that year.[93] The original cost approach is the most common approach used for assessing returns to shareholders. The current cost approach is most commonly used for determining economic costs for rate design.

When setting the overall price level for regulated services, the regulator generally allows capital and operating expenses that are prudently incurred – i.e., that are cost minimizing given the level of output and service quality required by the market and by regulation – and used and useful to be covered by regulated prices. Used and useful means that the inputs purchased are used for and needed for providing the regulated service. The regulator often allows amounts of unpaid bills to be reflected in prices if the amounts represent normal business experience. The justification for this is that the operator generally cannot expect all customers to always pay their bills, so the lost revenue must be recovered elsewhere if the operator is to remain financially whole. The regulator often disallows the recovery of excessive unpaid bills if the regulator

[92] See Section E.
[93] Section B also considers valuing assets in situations with high inflation.

believes the operator is not exerting sufficient effort to collect unpaid bills. The regulator may also impute revenue to the operator's regulated accounting books if the regulator believes that the operator failed to record on the regulated accounting books all of the revenue that should be attributed to regulated operations. An example might be a secondary business, such as directory advertising, that is profitable because the operator is a telecommunications provider.

Generally long-lived assets are capitalized and the regulator, when regulating the overall price level, allows investors an opportunity for return of the investment through depreciation and a return on the investment through the allowed rate of return. An exception is capital provided by customers or by the government, if it takes the form of an interest-free loan. An example of customer-provided capital would be customer contributions to pay for extension of the network to a remote area. The regulator may consider customer-provided capital to be an interest-free loan to the operator, in which case the operator receives no return on that portion of its regulated assets, or the regulator may impute to the operator an interest payment on the customer-provided capital, the effect of which is to lower the operator's regulated prices. Interest-free government-provided capital, such as a universal access subsidy, may be treated as interest-free capital.

The regulator generally allows the operator to recover corporate income or profit taxes that are related to regulated services, from customers of regulated services. However, differences between regulatory depreciation and tax depreciation cause a mismatch in cash flows. Regulators can address this by creating a special reserve account that "holds" the taxes that customers pay through prices until the operator actually pays the taxes. This reserve is customer-provided capital until the operator uses it, so it is deducted from the rate base.

Under rate of return regulation and some forms of price cap regulation, the rate base is the original cost minus depreciation. Only assets that are prudently obtained and that are used and useful for utility services are included in the rate base. If the assets are forecast, the treatment of differences between forecast and actual investment at the next price review are important. Over forecasts (or under investment) could be the result of the operator returning excess cash flow to investors or from improved efficiency. If the regulator believes forecast investment exceeded actual investment and that this resulted from a forecasting error or under investment, the regulator may use claw back, which returns the excess in amount to customers. Claw back gives the operator an incentive to over invest if forecasted investment exceeds actual investment needs.

Regulators generally incorporate income or profit taxes in the cost of capital. However, differences between regulatory deprecation and tax deprecation cause a mismatch in cash flows. Regulators can address this by creating a special reserve account that "holds" the taxes that customers pay through prices until the operator actually pays the taxes. This reserve is customer provided capital until the operator uses it, so it is deducted from the rate base. Other taxes, unless specifically passed through to customers on their bills, are part of the operator's cash flow and are generally considered as such during a price review.

To assess whether the rate of return the operator is able to receive is sufficient to attract investor capital, the regulator must determine operator's cost of capital.[94] Generally the cost of capital is estimated as the weighted average cost of capital (WACC), which is a weighted average of the operator's cost of debt and cost of equity. Unless the regulator believes that the operator has an inefficient capital structure, the weighting for debt (respectively, equity) is the amount of the operator's debt (respectively, equity) divided by the operator's total invested regulatory capital. Capital structure refers to the proportions of debt and equity that the operator uses to finance her operations. Typically a utility company will have 40 percent debt and 60 percent equity, although this can vary across countries and across businesses.

The calculation of WACC requires market data. If these data are unavailable, close comparators may be used. The capital asset pricing model (CAPM) is the most common model for estimating the cost of equity. Cost of equity is adjusted to reflect the operator's income tax rate. An adjustment for foreign currency risk may be needed if the operator obtains investment that is denominated in a foreign currency.

Concluding Observations

Although regulators gather and study financial data to at least partially overcome the information asymmetry between the operator and the regulator, the financial information provided by the operator reflects the extent to which the operator is willing to show the regulator how efficient it can operate. The operator's innate ability to be efficient and the amount of effort the operator exerts to be efficient are called private or hidden information because the regulator cannot observe it. The regulator often tries to peer into this hidden information by collecting financial information, conducting prudency reviews, and performing management audits, but these approaches involve second-guessing the operator and require the regulator to become somewhat of an expert on managing an operator.

Two dangers exist when the regulator relies only on his ability to overcome information asymmetries through information gathering. The first danger is that the regulator will never have the resources to fully understand the service provider's operations, with the result that the service provider is inefficient. The second danger is that the regulator over-steps her knowledge and does not allow the operator to recover from customers the costs that truly are prudent and used and useful. This situation encourages the operator to become inefficient by being overly cautious in its business decisions and to limit cash outflow in an effort to provide investors with a positive NPV.

To overcome these two dangers, the regulator generally adopts some form of incentive regulation, which rewards the operator with the opportunity to keep extra profits if the operator

[94] See Section F.

reveals its ability to operate efficiently, exerts the optimal amount of effort to be efficient, or both. Chapter IV on Regulating Overall Price Level examines these incentive techniques.

Case Studies

Australian Competition and Consumer Commission, "Decision: Statement of principles for the regulation of transmission revenues: Information requirements guidelines," 5 June 2002.

Australian Competition and Consumer Commission, Record Keeping Rules on Initial Reports Relating to Accounting Separation, June 2003.

Australian Competition and Consumer Commission, Imputation testing (Initial Reports) Record Keeping and Reporting Rules, August 2003; Explanatory Statement: Imputation Testing Record Keeping Rule, September 2003.

Australian Competition and Consumer Commission, Initial Reports Relating to Accounting Separations of Telstra, December 2003.

Australian Competition and Consumer Commission, Current Cost Accounting Methodology for Telstra's Subsequent Reports under the Accounting Separation Regime: Framework Document, January 2004.

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National Economics Research Associates (NERA), The Cost of Capital Estimation for Fixed Telecommunications Services: A Final Report for OFTA, August 2000.

NERA, "BGE's Cost of Capital: A Final Report for the Commission for Energy Regulation," 2003.

Ofgem, "Regulatory Accounts: Final Proposals," November 2000.

OFWAT, "RAG 1: Guideline for Accounting for Current Costs and Regulatory Capital Values: (Regulatory Accounting Guideline version 1.03,)" May 1992 (Revised January 2003).

OFWAT, "RAG 2: Guideline for Classification of Expenditure: (Regulatory Accounting Guideline version 2.03,)" November 1996 (Revised January 2003).

OFWAT, "RAG 3: Guideline for the Contents of Regulatory Accounting: (Regulatory Accounting Guideline version 3.05,)" May 1992 (Revised January 2003).

OFWAT, "RAG 4: Guideline for the Analysis of Operating Costs and Assets: (Regulatory Accounting Guideline version 4.02,)" May 1992 (Revised January 2003).

OFWAT, "RAG 5: Transfer Pricing in the Water Industry: (Regulatory Accounting Guideline version 5.03,)" April 1997 (Revised March 2000).

OFWAT Final Determinations. Future Water and Sewerage Charges 2000-05: Periodic Review 1999. November 1999.

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Wright, S., R. Mason, and D. Miles, "A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K.," Office of Fair Trading, London, U.K., 2003.

Chapter III Cases by Topic Area

Table 3. Chapter III Cases by Topic Area

	Cases																		
	Australian Competition and Consumer Commission, 2002.	Australian Competition and Consumer Commission, August/Sept. 2003	Australian Competition and Consumer Commission, December 2003.	Australian Competition and Consumer Commission, January 2004.	IPART, 1999.	National Economics Research Associates, August 2000.	National Economics Research Associates, August 2003.	Ofgem, 2000.	Office of Utilities Regulation, 2003.	OFWAT, RAG 1.	OFWAT, RAG 2.	OFWAT, RAG 3.	OFWAT, RAG 4.	OFWAT, RAG 5.	OFWAT, November 1999.	OFWAT, 2003.	Romanion National Regulatory Authority for Communications, 2003.	South African Telecommunications Regulatory Authority, 1999.	Wright, Mason, and Miles, 2003.
Chapter III. Financial Analysis																			
A. NPV Concepts																			
B. Basic Financial Statements																			
C. Regulatory System of Accounts								X		X	X	X	X	X				X	
D. Ring Fencing and Control of Cross-Subsidies	X	X	X													X	X		
E. Earnings Measurement				X	X										X				
F. Determination of Cost of Capital					X	X	X		X						X				X

References

A. NPV Concepts – Project Analysis and Risk Adjustments

Core References

Crum, Roy L., and Itzhak Goldberg, Restructuring and Managing the Enterprise in Transition, Washington, D.C.: The World Bank, 1998, Chapters 1 and 9.

> Focuses on transitioning economies. Explains time value of money and calculating rate of return, including adjusting for inflation, risk, and multiple periods (present value calculations. Defines risk. Examines project analysis, including sensitivity and scenario analysis, internal rate of return, discount rates, and risk.

Green, Richard, and Martin Rodriguez Pardina, Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapter 5.

> Describes net present value analysis in a regulatory context for conducting a price review.

Mansfield, Edwin, W. Bruce Allen, Neil A. Doherty, and Keith Weigelt, Managerial Economics. London: Norton & Co., 2002, Appendix A. (Any managerial economics or managerial finance text should have comparable information.)

> Considers issues of time value of money, calculating rate of return, and risk.

Key Words

Cash flow, Risk, Rate of return, Present Value, Net Present Value, Inflation

B. Basic Financial Statements

[NOTE: Any basic accounting text should provide adequate information on the meaning and use of balance sheets, income statements, and cash flow statements.]

Core Reference

Crum, Roy L., and Itzhak Goldberg, Restructuring and Managing the Enterprise in Transition, Washington, D.C.: The World Bank, 1998, Chapters 2-3.

Focuses on transitioning economies. Describes balance sheet and its elements (assets, debt, and equity), income statement and its elements, measurements of earnings, depreciation, cash flow statements, accrual versus cash accounting, generally accepted accounting principles, impact of inflation, restating financial statements, and basic financial analysis of an enterprise.

Key References

Accounting, Costs, Assets, Expenses, Information, Balance sheet, Income statement, Earnings, Depreciation, Cash flow, Accrual accounting, Inflation

C. Regulatory Systems of Accounts

Core References

"The role of regulatory accounts in regulated industries: A final proposals paper," by Chief Executive of Ofgem; Director General of telecommunications; Director General of water services; Director General of electricity and gas supply (Northern Ireland); U.K. Rail Regulator; U.K. Civil Aviation Authority; and U.K. Postal Services Commission. April 2001.

Describes a set of common regulatory accounting principles for regulators in the U.K. Principles applied include: (1) "regulatory accounts will be prepared and audited using the common regulatory accounting framework;" (2) consistency in formatting where practicable; (3) clarity in audit requirements; and (4) deadlines for publishing regulatory accounts.

NARUC Staff Subcommittee on Accounting and Finance, "Rate Case and Audit Manual," Washington, D.C.: National Association of Regulatory Utility Commissioners, 2003.

Describes auditing purposes and procedures. Includes studying the operator's accounting system, analyzing historical data, focusing the audit, reviewing past decisions of the regulatory agency, reviewing working papers, using external and internal audit reports, contacting other jurisdictions, managing the audit process, confidentiality procedures, and identifying records to be reviewed.

Sectoral References

ELECTRICITY AND GAS

Australian Competition and Consumer Commission, "Decision: Statement of principles for the regulation of transmission revenues: Information requirements guidelines," 5 June 2002.

Details information filing requirements for electricity transmission operators. Describes information needs of the regulatory instruments used by the regulator. Describes policies for information disclosure and future information policy issues.

Deloitte & Touche, "Regulatory Accounting Guidelines: Report to Ofgem," March 2001.

Provides an assessment of Ofgem's accounting guidelines at the time. Focuses on overhead allocations, transfer pricing (internal recharges), and capitalization policies. Also considers historical cost accounting, use of generally accepted accounting principles, need for regulatory accounts, asset valuation, reconciliation, and activity accounting.

Ofgem, "Regulatory Accounts: Final Proposals," November 2000.

Describes Ofgem's accounting requirements. Explains reasons and responsibilities for regulatory accounts. Describes regulatory accounts, monitoring procedures, enforcement procedures, and auditing policies.

TELECOMMUNICATIONS

South African Telecommunications Regulatory Authority, Chart of Accounts and Cost Allocation Manual: Detailed Requirements for Fixed-Line Telephone Operators, September 19, 1999.

Explains that the regulator imposes accounting rules to obtain information to evaluate regulated prices and to monitor compliance with public policy objectives. In the case of South Africa, the rules are designed with the intent of using the "lightest" regulatory approach consistent with the regulator's responsibilities. The accounting manual describes the structure of the Chart of Accounts, "the contents of each account, the segments for which revenue and cost information is required, the wholesale services for which fixed landlines Operators

are to provide cost visibility, the methodologies used for cost allocation and the requirement for reporting financial details and results."

WATER

OFWAT, "RAG 1: Guideline for Accounting for Current Costs and Regulatory Capital Values: (Regulatory Accounting Guideline version 1.03,)" May 1992 (Revised January 2003).

Ofwat's accounting guidelines regarding current costs and regulatory capital values. Considers infrastructure, operational assets, and other tangible assets; third party contributions, reserves, adjustments to historical cost operating profit, financing adjustments, exceptional and extraordinary items, content of accounts, and regulatory capital value.

OFWAT, "RAG 2: Guideline for Classification of Expenditure: (Regulatory Accounting Guideline version 2.03,)" November 1996 (Revised January 2003).

Ofwat's accounting guidelines for classifying expenditures. Considers asset and expense categories and allocations.

OFWAT, "RAG 3: Guideline for the Contents of Regulatory Accounting: (Regulatory Accounting Guideline version 3.05,)" May 1992 (Revised January 2003).

Ofwat's rules for content of regulatory accounts. Defines historical and current cost accounting for balance sheets, income statements, and cash flow statements (current cost only). Provides guidelines for accounting statements, profit analysis, transactions with affiliated businesses, and other items.

OFWAT, "RAG 4: Guideline for the Analysis of Operating Costs and Assets: (Regulatory Accounting Guideline version 4.02,)" May 1992 (Revised January 2003).

Ofwat's rules for analysis of operating costs and assets. Considers analyses of individual activities (for example, water supply), direct costs, general support costs, capital costs, service costs, tangible fixed assets, and allocations and apportionments.

OFWAT, "RAG 5: Transfer Pricing in the Water Industry: (Regulatory Accounting Guideline version 5.03,)" April 1997 (Revised March 2000).

Ofwat's accounting guidelines for transfer pricing. Describes basic principles, principles for transfers and market testing, cost allocations, and reporting requirements.

D. Ring Fencing and Control of Cross-Subsidization

Core References

Devlin, Timothy, Rebecca Phillips, and Thomas Ferris, Ring Fencing Mechanisms for Insulating a Utility in a Holding Company System. Washington, D.C.: National Association of Regulatory Utility Commissioners, 2003.

Describes U.S. regulators' practices for ring fencing.

Jamison, M., "Regulatory Techniques for Addressing Interconnection, Access, and Cross-Subsidy in Telecommunications," in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 113-129.

Describes approaches that regulators use for controlling cross subsidization.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapter 6.

Examines issues of pricing in the presence of competition. Discusses issues of cross subsidy and price flexibility.

Sectoral References

ELECTRICITY

Australian Competition and Consumer Commission, "Decision: Statement of Principles for the Regulation of Transmission Revenues: Transmission Ring-Fending Guidelines: Reporting Guidelines," 23 October 2002.

Describes accounting separations requirements for transmission provider in Australia. Includes accounting requirements, compliance, and reporting requirements.

Office of the Regulator-General, Victoria, "Ring-Fencing in the Electricity and Gas Industries – Issues Paper," July 2000.

Examines ring-fencing policies in electricity and gas. Considers objectives, cross subsidization, preferential access to essential facilities, joint

marketing, access to information, structural separations options, ring-fencing options, and criteria for evaluating options.

GAS

Australian Competition and Consumer Commission, "Ring Fencing Compliance Report Pro Forma," 23 October 2002.

> Form operators must complete showing compliance with the regulator's ring fencing requirements. Includes compliance statement, separation of accounts, allocation of shared costs, treatment of confidential information, and management of marketing staff.

Office of the Regulator-General, Victoria, "Ring-Fencing in the Electricity and Gas Industries – Issues Paper," July 2000.

> Examines ring-fencing policies in electricity and gas. Considers objectives, cross subsidization, preferential access to essential facilities, joint marketing, access to information, structural separations options, ring-fencing options, and criteria for evaluating options.

TELECOMMUNICATIONS

Australian Competition and Consumer Commission, Record Keeping Rules on Initial Reports Relating to Accounting Separation, June 2003.

> Sets out recording keeping and reports for accounting separations for dominant telecommunications provider.

Australian Competition and Consumer Commission, Imputation testing (Initial Reports) Record Keeping and Reporting Rules, August 2003; Explanatory Statement: Imputation Testing Record Keeping Rule, September 2003.

> Sets out rules and justification for imputation requirements for dominant telecommunications operator. Focuses on core services, namely local service, domestic access for originating and terminating calls, and retail services associated with the access services.

Australian Competition and Consumer Commission, Initial Reports Relating to Accounting Separations of Telstra, December 2003.

> Provides regulator's review of initial accounting separations reports provided by dominant telecommunications operator. Examines both accuracy of reports and the extent to which they comply with the accounting requirements.

Romanian National Regulatory Authority for Communications, "Decision for Approving the Regulation for the Realization, by 'Romtelecom' S.A., of Accounting Separation within the Internal Cost Accounting System," 2003.

Describes accounting separations required by the Romanian telecommunications regulator to control cross subsidization and to comply with the European Union directives.

WATER

OFWAT, "The completed acquisition of Northumbrian Water Ltd: A position paper," August 2003.

Sets out ring fencing requirements imposed on an operator as part of an acquisition.

E. Earnings Measurements

1. Asset valuation techniques

Core References

Armstrong, Mark, Simon Cowan, and John Vickers, Regulatory Reform: Economic Analysis and British Experience, Cambridge, MA: The MIT Press, 1999, Chapter 6.

Examines alternative methods for valuing assets. Considers issues of existing versus new assets, the sunken nature of assets, and valuation at privatization.

Crum, Roy L., and Itzhak Goldberg, Restructuring and Managing the Enterprise in Transition, Washington, D.C.: The World Bank, 1998, Chapters 2-3.

Focuses on transitioning economies. Describes asset valuation for the balance sheet and techniques for adjusting for inflation.

Green, Richard, and Martin Rodriguez Pardina, Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapter 7.

Considers regulatory treatment of investment, depreciation, and the asset base. Examines whether to value assets at historical cost or replacement cost. Also considers valuation at time of privatization.

Grout, Paul A., Andrew Jenkins, and Ania Zalweska, "Privatisation of Utilities and the Asset Value Problem," CMPO, University of Bristol, 2001.

Examines the effects of the market value approach to asset valuation. Finds that this approach magnifies and entrenches errors. Recommends the regulatory agency estimate its own value of the company.

Johnstone, D. J., "Replacement Cost Asset Valuation and Regulation of Energy Infrastructure Tariffs," ABACUS 39(1): 1-41, 2003.

Examines the consequences of valuing assets based on an optimized replacement cost methodology. Argues that the approach values sunk infrastructure as if it were new infrastructure.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapters 2 and 4.

Describes how to determine the rate base. Provides analysis of U.S. legal issues in rate base valuation. Considers fair value, current value, and original cost. Describes the problems of each for the regulatory process. Examines choices of replacement versus original cost in the context of efficient pricing.

Newbery, David, "Determining the Regulatory Asset Base for Utility Price Regulation," Utilities Policy 6(1): pp. 1-8, 1997.

Describes how asset valuation affects revenue streams. Considers allowable profits and depreciation. Argues for discounting both the original assets and their depreciation by the market-to-asset ratio.

Sectoral References

TELECOMMUNICATIONS

Australian Competition and Consumer Commission, Current Cost Accounting Methodology for Telstra's Subsequent Reports under the Accounting Separation Regime: Framework Document, January 2004.

Describes regulator's requirements for accounting separations for dominant telecommunications operator under a current cost accounting

scheme. Outlines government's requirements and regulator's objectives. Describes anti-competitive conduct that is of concern. Considers issues of asset valuation and capital maintenance. Summarizes international developments.

WATER

OFWAT, "Assessing Capital Values at the Periodic Review. A consultation paper on the framework for reflecting reasonable returns on capital in price limits." November 1992.

Describes issues considered in the U.K. regarding valuing water assets for a price review. Considered market value, initial value, and new investment.

OFWAT Final Determinations. Future Water and Sewerage Charges 2000-05: Periodic Review 1999. November 1999.

Describes policies for asset valuation and adjustment of asset values for price review.

OXERA, "The Capital Structure of Water Companies," October 11, 2002.

Examines appropriate capital structure for water companies in the U.K. Considers effects of capital structure on the cost of capital, whether an operator should be expected to choose an optimal capital structure from the regulator's perspective, and appropriate regulatory responses to capital structure issues.

Other References

Copeland, Thomas E., Tim Koller, Jack Murrin, Valuation: Measuring and Managing the Value of Companies, Wiley Publishers, 2000, Chapter 1.

Describes why valuing companies is important for all stakeholders and how shareholders move capital among enterprises based on return on investment.

Grout, Paul A. and Andrew Jenkins, "Regulatory Opportunism and Asset Valuation: Evidence from the US Supreme Court and UK Regulation," CMPO, University of Bristol, 2001.

Compares the evolution of the treatment of the asset base in the U.S. and the U.K. Finds that operators and regulators both behave opportunistically with respect to asset valuation policies, namely that policy preferences are influenced by how the policies affect prices.

Key Words

Rate base, Assets, Original cost, Replacement cost, Fair value, Current cost, Regulatory Assets

2. Principles and practices of cost accounting for the treatment of operating costs, capital expenditures, depreciation, unpaid bills, customer or government-provided capital, and imputed revenue

Core References

The Allen Consulting Group, "Principles for determining regulatory depreciation allowances," Note to the Independent Pricing and Regulatory Tribunal of New South Wales, September 2003.

> Develops guidelines for deprecation based largely on efficiency considerations. Examines the implications of these guidelines for regulatory depreciation policies.

Burns, P., and A. Estache, "Infrastructure Concessions, Information Flows, and Regulatory Risk." Note no. 203 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, December 1999.

> States that the regulator needs to evaluate operating costs, which may be based on other firms (exogenous information) or firm-specific information (historical or current). Considers how incentives affecting operating expenditure and investment work together. Explains that if operating expenditure is subject to strong incentives through yardstick competition but capital expenditure is automatically rolled forward into a regulatory asset base, this may distort efficiency incentives and input choices. Examines when privatized utilities sell assets at a value quite different from (usually less than) the current cost valuation. Says that where possible, regulators have steered away from using current cost values as a basis for regulation and instead have derived a regulatory value based on the flotation value of the assets, rolled forward by net investment.

Green, Richard, and Martin Rodriguez Pardina, Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapters 6 - 8.

Examines operating costs, investments, and revenues. Considers forecasting of operating expenses, yardstick competition, depreciation methods, and revenue forecasting.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapters 2 and 4.

Discusses the regulation of operating costs and investments. Considers incentives to overstate costs, effects of deprecation on earnings, transfer pricing, practical problems of overseeing expenditures, efficiency standards, the role of depreciation and the effects of technology change on depreciation, and taxes. Explains that regulators set standards for operating costs and conduct audits to ensure that operators do not inflate costs. Also explains that depreciation is the return of capital expenses to investors.

NARUC Staff Subcommittee on Accounting and Finance, "Rate Case and Audit Manual," Washington, D.C.: National Association of Regulatory Utility Commissioners, 2003.

Describes rate base development and expense and revenue items. With respect to rate base, considers general principles, plant held for future use, plant under construction, cash working capital, customer deposits, prepayments and aid to construction, deferred income taxes, and depreciation reserves. Regarding expenses, considers depreciation, salaries, fuel, pensions, postretirement benefits, regulatory expenses, contract services, and insurance. Regarding revenues, considers unbilled revenue, unregulated revenue, and unpaid bills. Also examines affiliate transactions.

Key Words

Assets, Valuation, Costs, Capital Expenses, Operating Expenses, Investment, Information, Accounting, Depreciation

3. Treatment of investment in price controls and the development of the rate base

Core References

Burns, P., and A. Estache, "Infrastructure Concessions, Information Flows, and Regulatory Risk." Note no. 203 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, December 1999.

Discusses how to treat investment over- or under-spend relative to forecasts at each regulatory review. Holds that investment may be

postponed or even canceled, often for legitimate reasons. Investment also is often lumpy, which makes forecasting investment difficult and wrought with errors. Examines the operator's incentive to pass the cash that would have been used for investment to shareholders and the effects of clawing back money on investment incentives.

Green, Richard, and Martin Rodriguez Pardina, Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapters 5 and 7.

Explains that the operator has an incentive to overstate future investment needs, so the regulator may need to assess the forecasts. Describes how to protect the operator from attempts by the regulator to reduce asset base. Describes how, after an opening asset base has been set, the future asset base level is calculated by adding actual investment and subtracting depreciation from the initial asset base. Discusses the effects of depreciation on the present value of the company and current and future consumers. Depreciation policies are examined.

IPART, "Rolling forward the regulatory asset bases of the electricity and gas industries: Discussion Paper," Independent Pricing and Regulatory Tribunal in New South Wales, 1999.

Examines issues of initial valuation of the rate base, customer provided capital, depreciation, indexation, stranded assets, incorporating new assets, and regulatory accounts.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapter 2.

Discusses the development of the rate base and how it is used to regulate price levels. Considers incentives to overstate costs. Considers various approaches to valuing assets.

NARUC Staff Subcommittee on Accounting and Finance, "Rate Case and Audit Manual," Washington, D.C.: National Association of Regulatory Utility Commissioners, 2003.

Describes rate base development and calculation. Considers general principles, plant held for future use, plant under construction, cash working capital, customer deposits, prepayments and aid to construction, deferred income taxes, and depreciation reserves.

Other References

Ofgem, "Asset Accumulation and its Effects on NIE's Transmission and Distribution Price Control: A Consultation Paper," Director General of Electricity Supply for Northern Ireland, 2000.

Studies an operator's investment patterns, benchmarks these patterns against other operators, and examines how these patterns affect prices and quality.

Key Words

Rate base, Costs, Assets, Asset valuation, Investment, Information, Prudency, Used and useful

4. Taxation

Core References

Green, Richard, and Martin Rodriguez Pardina, Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapters 5 and 7.

Discusses effects of corporate taxes on regulated companies, including the effects on cash flow and the cost of debt.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapter 2.

Discusses effects of corporate taxes on cash flow and the cost of debt.

NARUC Staff Subcommittee on Accounting and Finance, "Rate Case and Audit Manual," Washington, D.C.: National Association of Regulatory Utility Commissioners, 2003.

Describes treatment of taxes for calculating revenue requirement, applying tax reserves, and estimating tax effects.

Key Words

Taxes, Assets, Depreciation, Taxation, Cost of capital, Debt, Cash flow

F. Determination of cost of capital (debt and equity), including with scarce or unreliable cost information

1. **Estimating the cost of capital with limited or unreliable information**
2. **Cost of Debt**
3. **Cost of Equity**
4. **Role of Taxes**
5. **Weighted Average Cost of Capital, including the choice of weightings**
6. **Foreign Currency Risk**

Core References

Alexander, Ian, Cost of Capital: The Application of Financial Models to State Aid. Oxford, U.K.: Oxera Press. 1995.

Examines developing country context. Considers cost of capital for state aid to a private company, the cost of debt, the cost of equity, the fraction that debt and equity comprise of the total financing, the tax level, and differences across countries. Examines issues of whether the operator's stock is publicly traded, exchange rates, real exchange rates, and whether to use ex post or ex ante data. Discusses the composition of debt cost, including the risk-free rate and the debt premium. Examines data problems. Also explains using the Capital Asset Pricing Model.

Alexander, I., and A. Estache, "A Back- of- the- Envelope Approach to Assess the Cost of Capital for Network Regulators," The World Bank, December 1997.

Provides a description of how to estimate cost of capital in a developing country context.

Burns, P., and A. Estache, "Infrastructure Concessions, Information Flows, and Regulatory Risk." Note no. 203 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, December 1999.

Holds that regulators need to compute the weighted average cost of total capital (debt plus equity) to ensure a return to investors and sustain the asset base. Describes how to identify the cost of debt. Examines techniques for estimating the cost of equity with market data. Finds that in developing countries, however,

concessionaires are often unlisted, so market data are not available, or the concessionaires may be part of a larger conglomerate, so market data will cover not only the regulated activity but others as well. Examines using comparators to solve these problems. Also discusses using benchmark ratios based on international best practice.

Davis, Kevin, and John C. Handley, "The Cost of Capital and Access Arrangements," in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 161-184.

Analyzes cost of capital methodologies. Considers the importance of access arrangements, alternatives to the Capital Asset Pricing Model, factors affecting the derivation of beta risk and the feasibility of international benchmarks, determination of beta risk for an operator with markets with different levels of competition, the impact of price cap regulation, the treatment of depreciation in the cost of capital, the relationship between beta risk, pricing principles and asset valuation methodologies, and the treatment of stranded assets.

Independent Pricing and Regulatory Tribunal of New South Wales, "The Rate of Return for Electricity Distribution," IPART Discussion Paper, Sydney, Australia, November 1998.

Describes processes for estimating the cost of capital. Explains with cost of capital is important. Covers weighted average cost of capital, effective tax rate, cost of equity, cost of debt, and inflation.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapter 2.

Describes potential issues regarding how to measure the cost of capital, including benchmarks, historical vs. current cost of capital, method of estimating cost of equity, and the weightings of equity and debt.

OXERA, "The Capital Structure of Water Companies," October 11, 2002.

Examines appropriate capital structure for water companies in the U.K. Considers effects of capital structure on the cost of capital, whether an operator should be expected to choose an optimal capital structure from the regulator's perspective, and appropriate regulatory responses to capital structure issues.

Other References

Alexander, I., Mayer, C. and Weeds, H. "Regulatory Structure and Risk and Infrastructure Firms: An International Comparison," policy Research Working Paper Nº 1698, The World Bank, 1996.

Provides an econometric analysis of how forms of regulation affect cost of capital.

Campbell, John Y., "Understanding Risk & Return," 2001 Marshal Lectures, University of Cambridge, 2001.

Explains why simple models have difficulty explaining some puzzles in asset pricing.

Standard & Poor's, "Corporate Ratings Criteria," 2003.

Describes Standard & Poor's criteria for rating corporations, including industrials and utilities. Considers country risk, sovereign risk, cyclicality, regulation, and loan covenants.

Key Words

Cost of Capital, Equity, Debt, Taxes, WACC, CAPM, Risk

Chapter IV. Regulating Overall Price Level

Introduction

We are now ready to address incentive regulation, which is the third instrument that regulators use to control market power and address the asymmetry between the government and the operator with respect to objectives and information. In many instances this topic is intertwined with financial analysis, which is the subject of Chapter III.

Incentives can be used in several contexts. For example, the U.S. used a quid pro quo incentive when some of the U.S. incumbent local telephone companies were allowed to enter long distance markets only if they first cooperated in opening their local markets to competition. In this chapter we focus on incentives related to the regulation of the overall price level of the service provider. We begin by describing the basic forms of regulation used to regulate price levels. We then explain the underlying principles of incentive regulation and summarize how each form of regulation addresses those principles. Next we examine how each form of regulation is implemented and the issues that regulators face. We close by describing the regulatory processes used to review overall price levels. Following this chapter's narrative are a list of case studies and lists of references. References are organized by topic.

Basic Forms of Regulation[95]

There are four primary approaches to regulating the overall price level – rate of return (or cost of service) regulation, price cap regulation, revenue cap regulation, and benchmarking (or yardstick) regulation. Rate of return regulation adjusts overall price levels according to the operator's accounting costs and cost of capital. In most cases, the regulator reviews the operator's overall price level in response to a claim by the operator that the rate of return that it is receiving is less than its cost of capital, or in response to a suspicion of the regulator or claim by a consumer group that the actual rate of return is greater than the cost of capital. Chapter III Section F on Financial Analysis describes how rate of return and cost of capital are calculated. Once the regulator, using rate of return regulation, has decided to review the operator's price level, she estimates the operator's actual rate of return, applying the prudency and used and useful standards discussed in Chapter III Section E. The regulator also identifies what she believes to be the operator's cost of capital and orders a rate level change that is intended to bring the actual rate of return in line with the cost of capital.

[95] See Section A.

Price cap regulation,[96] which is sometimes called RPI-X regulation, allows the operator to change its price level according to an index that is typically comprised of an inflation measure, *I*, and a "productivity offset," which is more commonly called the *X*-factor. The precise meaning of the *X*-factor and principles for choosing *I* are described in more detail below. Typically with price cap regulation, the regulator groups services into price or service baskets and establishes an $I - X$ index, called a price cap index, for each basket.[97] Establishing price baskets allows the operator to change prices within the basket as the operator sees fit as long as the average percentage change in prices for the services in the basket does not exceed the price cap index for the basket.[98]

Revenue cap regulation[99] is similar to price cap regulation in that the regulator establishes an $I - X$ index, which in this case is called a revenue cap index, for service baskets and allows the operator to change prices within the basket so long as the percentage change in revenue does not exceed the revenue cap index. Revenue cap regulation is more appropriate than price cap regulation when costs do not vary appreciably with units of sales. An example might be electricity distribution where distribution lines drive costs, but prices are often based on kilowatt-hours of electricity sold. Revenue caps also relieve the regulator from the duty of overseeing price structures, which in some cases can be costly to regulate because they are complex.

Benchmarking is comparative competition in that the operator's performance is compared to other operators' performance and penalties or awards are assessed based on the operator's relative performance.[100] For example, the regulator might identify a number of comparable operators and compare their cost efficiency. The most efficient operators would be rewarded with extra profits and the least efficient operators would be penalized. Because the operators are actually in different markets, it is important to make sure that the operators' situations are similar so that the comparison is valid, and to use statistical techniques to adjust for any quantifiable differences over which the operators have no control.

The two most common forms of statistical analysis used in benchmarking are data envelope analysis (DEA) and regression analysis. DEA estimates the cost level an efficient firm should be able to achieve in a particular market. Using DEA analysis the regulator would reward operators whose costs are near the efficient frontier with additional profits. Regression analysis estimates what the average firm should be able to achieve. Using regression analysis the regulator would reward firms that performed better than average and penalize firms that performed worse than average.

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[96] See Section B.
[97] Because of this feature, some authors refer to price cap regulation as service basket or price basket regulation.
[98] As Chapter V explains, in many instances the regulator and the operator are in agreement on how prices should be designed. This feature of price cap regulation allows the operator to use his superior information to make decisions that the regulator would also make if she had the same information as the operator.
[99] See Section C.
[100] See Section D. See Chapter II for discussion of competition in the market and competition for the market.

Recently, regulators have begun using a virtual company approach in which analysts construct a simulation model of the operator and estimate the cost level of an efficient operator. The virtual company approach is subject to strategic behavior by analysts because the model represents what the analyst says the operator should do, which is by design not what the operator really does. With any approach, best practices indicate that the regulator should account for varying operating conditions across firms and that are beyond the operators' control. Such factors could include macroeconomic conditions, geography, demographics, and history.

Some regulators release benchmarking information to the media. If the media publish the information, this has the advantage of bringing public pressure on poorly performing operators.

Generally regulators use a combination of these basic forms of regulation. Combining forms of regulation is called hybrid regulation. For example, U.K. regulators combine elements of rate of return regulation and price cap regulation to create their form of *RPI-X* regulation. Some regulators use earnings sharing,[101] which is an approach that allows the operator to keep some portion of its earnings above its cost of capital and bear some portion of the difference if earnings are below the cost of capital. Revenue sharing is another option in which the operator keeps only some portion of revenue changes.

Incentive Features and Other Properties

The opportunity to keep additional profits is the incentive feature employed in the basic forms of regulation. The difficult challenges for the regulator are to know how much additional profit is needed to induce the operator to improve performance and to know whether the additional efficiency gained is worth the additional profits allowed. Smaller incentives are needed for easy efficiency gains than for more difficult efficiency gains.

Regulators use two approaches to allowing operators additional profits or losses. One approach is simply to commit[102] that the operator can keep at least some portion of its earnings that are above the cost of capital. In the case of pure price cap regulation,[103] the operator is allowed to keep all of these earnings, but the operator is also required to bear all of the cost of having earnings below the cost of capital. This is called a high-powered incentive scheme. With earnings sharing, the operator keeps or bears something less than 100 percent of the difference

[101] See Section E. In U.K.-style price cap regulation, financial modeling is used to estimate the *X*-factor. In these approaches, the cash outflows of the operator are forecasted as is the rate base value that will exist at the end of the price control period. These values are discounted back to the present. Then revenues are forecasted, using an iterative process until the net present value of the enterprise is zero.
[102] Chapter I includes discussion of the difficulty governments have with keeping commitments.
[103] See Section B.

between the actual earnings and the cost of capital. Schemes under which the operator keeps only a small percent are called low-powered incentive schemes.

The other approach that regulators use to allow operators to keep additional profits or losses is to allow the operator to keep the difference between its earnings and its cost of capital for some period of time before adjusting overall price levels. This is called regulatory lag. Rate of return regulation typically incorporates regulatory lag by using historical test years, which is a system by which price levels following the price review (or rate case) are based on costs incurred in a previous year. The time between when the costs are actually incurred and the time that prices are adjusted is called regulatory lag. U.K. regulators also use regulatory lag when they wait until a scheduled price review before establishing glide paths to adjust price levels in a way that aligns actual earnings with the cost of capital. A glide path is a transition period over which gradual price changes align earnings and cost of capital.

A mechanism that regulators may inadvertently use to allow operators to keep additional profits or losses is to misestimate the cost of capital. If the allowed rate of return, which is the regulator's estimate of the cost of capital, is greater than the actual cost of capital, then the operator has an incentive to increase returns to shareholders by increasing its investments. This is called the Averch-Johnson effect, or gold plating or padding the rate base, and is a common criticism of rate of return regulation. If the regulator errors in the opposite direction, the operator has an incentive to under invest.[104]

Allowing the operator to keep additional profits or losses has the additional effect of shifting risk from customers to shareholders.[105] If the operator's earnings are constantly kept in line with its cost of capital, then profits are stable, but the prices that customers pay change to match changes in the business. In this scenario, customers are bearing at least some portion of the business risk. In the other extreme, such as pure price cap regulation, shareholders must bear all of the fluctuations in earnings, so they bear most of the risk. In general, it is preferred that shareholders bear risk rather than customers because shareholders are generally in a better position than customers to diversify their risk by creating diversified investment portfolios. Furthermore, regulators sometimes use glide paths, which phase in price changes over time, to soften price impacts on customers or to distribute risk between customers and investors.

If the regulator is using both competition and incentive regulation to overcome information and objective asymmetries,[106] and if the incentive regulation includes elements of rate of return regulation, then the operator has a mechanism to shift costs from its non-regulated operations to its regulated operations. This has the effects of increasing total profit and possibly giving the operator a greater market share in the competitive market and decreasing risk.

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[104] See Section A.
[105] Chapter III Sections A and F examine risk.
[106] See Chapter I for a discussion of the basic approaches for overcoming information asymmetries.

Regulators attempt to control for this by employing sophisticated accounting separations techniques, as described in Chapter III Section D.

Features of Price Cap and Revenue Cap Regulation[107]

Price cap regulation adjusts the operator's prices according to the price cap index that reflects the overall rate of inflation in the economy, the ability of the operator to gain efficiencies relative to the average firm in the economy, and the inflation in the operator's input prices relative to the average firm in the economy.[108] Revenue cap regulation attempts to do the same thing, but for revenue rather than prices. The underlying theory is as follows.

Consider how the price (or revenue, in the case of revenue caps) level for the average firm in a competitive market changes relative to inflation. Inflation reflects two things, namely, the change in the value of the country's monetary unit and the change in the productivity of the firms in the economy. By definition, the input prices for the average firm in the economy change at the rate of inflation and its productivity changes at the average rate for the economy. As a result, the average firm's retail prices change at the rate of inflation and the firm continues to receive earnings that are equal to its cost of capital.

Now consider how a utility operator might be different from the average firm in the economy. First, assume that the operator is just like the average firm, except that the operator's input prices change at a rate that is different from the rate of change for the average firm. If the operator's input prices increase faster than (conversely, slower than) the rate of inflation, then the operator's retail prices (revenue) will need to increase faster than (conversely, slower than) the rate of inflation for the operator to be able to have earnings that are at least as great as the operator's cost of capital. Now assume that the operator is just like the average firm, except with respect to the operator's ability to improve efficiency. If the operator increases its productivity faster than (conversely, slower than) the average firm, then the operator's retail prices (revenue) will need to decrease (conversely, increase) relative to the rate of inflation. Combining these two possible differences between the operator and the average firm in the economy, we can see that the operator's retail prices (revenue) should change at the rate of inflation, minus (conversely, plus) the extent to which its input prices inflate less than (conversely, greater than) the rate of inflation, and minus (conversely, plus) the extent to which the operator's productivity is expected to improve at a rate that is greater than (conversely, less than) the average firm in the economy.

The above analysis tells us two things. First, the inflation rate I used in the price cap index represents the general rate of inflation for the economy. Second, the X-factor is intended to

[107] See Sections B and C.

[108] Only in pure price cap regulation do regulators explicitly compare the operator to the average firm in the economy. However, all price cap schemes effectively follow this logic by adopting a price cap index based on inflation and a productivity offset.

capture the difference between the operator and the average firm in the economy with respect to inflation in input prices and changes in productivity. That is to say, the choice of inflation index and of the *X*-factor go hand in hand. Some regulators choose a general measure of inflation, such as a gross national product price index. In this case, the *X*-factor reflects the difference between the operator and the average firm in the economy with respect to the operator's ability to improve its productivity and the effect of inflation on the operator's input costs. Other regulators choose a retail (or producer) price index. In these cases, the *X*-factor represents the difference between the operator and the average retail (or wholesale) firm. Lastly, some regulators construct price indices of operator inputs. In these cases, the *X*-factor reflects productivity changes of the operator.

The regulator typically constructs service baskets with an eye towards 1) allowing the operator to realign prices within the basket, and 2) restricting the operator's ability to realign prices between baskets.[109] When the operator is allowed to realign prices, the operator will generally change prices in accordance with their price elasticities of demand.[110] That is to say that prices for products whose price elasticity of demand is more inelastic will rise relative to the prices for products whose price elasticity of demand is more elastic. This improves economic efficiency, but may be contrary to certain regulatory goals, such as protecting poor customers or customers in the least competitive markets. Sometimes the regulator limit's the operator's ability to realign prices within a basket by placing restrictions on individual price changes, such as a maximum percentage by which a price may increase in a given year.

[109] Rate design is discussed in Chapter V.

[110] Elasticity of demand refers to the extent to which customers change the quantities they purchase in response to a change in price. If demand is inelastic, then customers' percentage change in the quantities they purchase is smaller in absolute terms than the percentage change in price. If the opposite is true, then demand is said to be elastic.

Earnings Sharing

Earnings sharing is a popular form of hybrid regulation. With earnings sharing, the regulator allows the operator to keep some portion of the earnings it receives from the market and requires the operator to give the rest to customers, perhaps through price reductions, refunds, or increased investment.

A typical earnings sharing mechanism might work as follows. The regulator establishes a price level that equates the rate of return r that the operator receives from the market with the operator's cost of capital k.[111] The regulator also establishes a range with endpoints above and below the cost of capital, say from r_l to r_h, within which the operator retains all of the earnings it receives from the market place, i.e., no earnings between k and r_h are given to customers through a price decrease or other mechanism, and the operator is not compensated for earnings between r_l and k. Below r_l and above r_h, the regulator establishes another range, say between r_L and r_H. For earnings between r_L and r_l, customers bear some of the difference between the r_L and r_l, and for earnings between r_h and r_H, the operator shares some of its earnings with customers. Customers bear the entire burden and receive all of the benefits for earnings below r_L and above r_H.

Issues in Regulating the Price Level

Two issues are common to most forms of incentive regulation. The first issue is how to treat extraordinary events that impact earnings. In rate of return regulation, where high or low earnings relative to the cost of capital trigger price reviews, it is unusual for the regulator to make price adjustments simply because of an extraordinary event. Instead, the regulator normalizes the financial impact of the event, which means that the regulator spreads the effect over time. With price cap regulation, the price cap index captures how the event affects the average firm in the economy, so the regulator considers the impact of the event only if the event affects the operator disproportionately relative to the average firm in the economy. If the effect on the operator is disproportionate, then the regulator considers the extent to which the effect of the event on the operator is within the operator's control because, for the incentives built into price cap regulation to be effective, the regulator should not intervene in areas where the operator should be taking action. Following this analysis, if the event affects the operator disproportionately and if the effects are beyond the operator's control, then the regulator may make a price adjustment. The situation for revenue cap regulation is the same as that for price cap regulation. With benchmarking, the regulator first considers whether the event affects this operator disproportionately relative to the other operators included in the benchmarking analysis. If the effect is disproportionate, then the regulator again considers the extent to which the operator can affect the impact of the event.

[111] See Chapter III Section F regarding estimating the cost of capital.

The second and related issue that is common to all of the forms of regulation, except pure price caps, is the treatment of controllable and non-controllable costs. Controllable costs are those that the operator can influence and, conversely, non-controllable costs are those that the operator cannot influence. In some instances the regulator allows the operator to pass through to customers changes in non-controllable costs. A historical example is the cost of fuel for electricity generation. This price was traditionally considered beyond the control of the electricity generator. For this reason, and because fuel was a significant portion of the cost of generation and fluctuated frequently, regulators frequently allowed changes in fuel prices to be passed through to customers.

Conducting a Price Review

A price review consists of four basic steps, namely, decide what to regulate, evaluate the existing price control scheme, choose how prices will be controlled going forward, and implement the new control.[112] The first of these steps applies primarily to telecommunications, where competition serves as an effective regulator in many instances. Chapter II on Competition and Market Structure and Chapter V on Tariff Design discuss how to assess the competitiveness of a market.

There are several approaches to completing the last three steps. The general practice in the U.K. is to follow a two-year process that begins with gathering and analyzing information on costs,[113] investment plans, and demand forecasts; forecasting revenue requirements;[114] choosing whether to use price caps or revenue caps;[115] projecting revenue and cash flows using different price control parameters; and making the announcement.[116] Time is allowed at the end of the process to complete appeals[117] before the old price control scheme expires. In the U.S., resetting the *X*-factor in price cap regulation often involves extensive productivity studies and other information gathering.[118]

Most price review processes include multiple opportunities for receiving stakeholder and informing stakeholders of decisions.[119] For example, Ofwat in the U.K. has followed a procedure that receives stakeholder input in the planning stages, data gathering stages, modeling stage, data

[112] See Section A. The references in Section A provide other ways of dividing the work of a price review into multiple steps.
[113] See Chapter III and Chapter VII for information on obtaining, managing, and using financial information.
[114] See Chapter V Section F for information on demand forecasting.
[115] See Section A for information on choosing the form of regulation.
[116] See Chapter VIII Section D for information on strategies for dealing with the press and communicating with the public.
[117] See Chapter VIII Section B for information on appeal processes of regulatory decisions.
[118] See Section B.
[119] See Chapter VIII Sections A and D for approaches to involving stakeholders in regulatory processes.

analysis stage, and conclusion stage. The regulator issues numerous preliminary conclusions, explains the reasons for those conclusions, and asks for comments.

With most forms of price control, the regulator fixes the time between price reviews. Typical time periods are four and five years. The length of time depends on the confidence the regulator has in her price control parameters, the stability of the economy and industry, and the desired power of the incentive scheme. Setting the duration of the price controls involves a trade-off between the efficiency incentives and the need to keep the overall price level in line with the overall cost level, but in general, high confidence, a stable economy, and high power indicate long times between price reviews. Low confidence, unstable economy, and low power imply short times. Agency and operator resources must also be considered. With other forms of price control, such as rate of return regulation as practiced by the states in the U.S., high or low earnings relative to the cost of capital trigger price reviews, which are called rate cases. The regulator generally relies on the operator or a consumer representative to raise the issue of whether earnings are out of line with the cost of capital. If that happens, then the regulator conducts a rate case.

Concluding Observations

As we indicate above, most regulators use a hybrid scheme to regulate overall prices. The appropriate combination of rate of return tools, price or revenue caps, benchmarking, and length of time between price reviews depends on a country's goals, institutional strength, level of competition, and economic stability to name a few. In fact, in some instances the regulator gives the operator a menu of options from which the operator can choose its hybrid scheme. These options generally include tradeoffs between price decreases and profits such that if the operator chooses an option that has aggressive price decreases, the operator is allowed to keep all or a significant portion of whatever earnings it receives from the marketplace. Conversely, if the operator chooses an option that has conservative price decreases, then the operator has to give back all or a significant portion of its earnings if they exceed the operator's cost of capital.

Of the general approaches to regulating overall price levels, rate of return regulation generally provides flexibility in addressing changes in costs and earnings. Price and revenue cap regulation provide the greatest pricing flexibility for the operator. Furthermore, rate of return regulation provides the greatest predictability of earnings, if the regulatory environment is considered to be predictable. Price and revenue regulation provide the greatest predictability for overall price levels.

Regardless of the form of regulation, the regulator is better off knowing more about the industry than less. The next chapter on examines issues in obtaining and managing information.

Case Studies

Artana, Daniel, Fernando Navajos, and Santiago Urbiztondo. "Governance and Regulation: A Tale of Two Concessions in Argentina" in Spilled Water: Institutional Commitment in the Provision of Water Services, edited by William Savedoff and Pablo Spiller. Washington, D.C.: Inter-American Development Bank, 1999, pp.197-248.

Gómez-Ibáñez, José, Regulating Infrastructure: Monopoly, Contracts, and Discretion. Cambridge, MA: Harvard University Press, 2003, Chapter 9.

Guasch, J. Luis, and Pablo Spiller, Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story, Washington, D.C.: The World Bank Group, 1999, Chapter 7.

Meyrick and Associates, "Regulation of Electricity Lines Businesses, Analysis of Lines Business Performance – 1996–2003: Report prepared for Commerce Commission, Wellington, New Zealand," 19 December 2003.

Office of Water Regulation, Perth, Australia, "Statistical Profile and Performance Benchmarking of Water Supply Services in 32 Major Western Australia Towns 1999/2000," June 2001.

Ofgem, "Electricity Distribution Price Control Review: Initial consultation," July 2003.

OFWAT Final Determinations. Future Water and Sewerage Charges 2000-05: Periodic Review 1999. November 1999.

OFWAT, International comparison of water and sewerage service, 2000-01 report, December 2002.

OFWAT Setting water and sewerage price limits for 2005-10: Framework and Approach. Periodic Review 2004. March 2003.

OFWAT, "OFWAT Forward Programme: 2004-05 to 2006-07," 31 March 2004.

Chapter IV Cases by Topic Area

Table 4. Chapter IV Cases by Topic Area

	Cases									
	Artana, Navajos, and Urbiztondo, 1999.	Gómez-Ibáñez, 2003, Chapter 9.	Guasch, and Spiller, 1999, Chapter 7.	Meyrick and Associates, 19 December 2003.	Office of Water Regulation, Perth, Australia, June 2001	Ofgem, July 2003.	OFWAT. November 1999.	OFWAT, March 2004.	OFWAT, March 2003.	OFWAT, 31 March 2004.
Chapter IV. Regulating Overall Price Level										
A. Principles	X	X	X			X	X		X	X
B. Price Regulation				X						
C. Revenue Caps										
D. Principles for using Efficiency Measures for Benchmarking					X					
E. Earnings and Revenue Sharing Techniques										

References

A. Principles

1. Alternative forms of regulation: cost of service, price cap, revenue cap, benchmarking, hybrid approaches

Core References

Baldwin, Robert, and Martin Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapters 15, 17, and 18.

Discusses need for revenue to cover total cost. Describes rate of return regulation, price cap regulation using RPI-X, issues of excess returns, profit sharing approaches, error corrections, benchmarking, and yardstick regulation.

Farrier Swier Consulting, "Comparison of Building Block and Index-based Approaches," paper prepared for the Utility Regulators Forum, Australian Competition and Consumer Commission, 2002.

Examines price cap and revenue cap regulation in Australia, focusing on efficiency incentives, risk, robustness, transparency, simplicity, administration, and cost and availability of information required. Considers whether regulators should incorporate utility-specific factors, benchmarking, and appropriateness to statutory objectives.

Guasch, J. Luis, and Pablo Spiller, Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story, Washington, D.C.: The World Bank Group, 1999, Chapter 5.

Summarizes rate of return regulation, earnings sharing, price caps, revenue caps, and yardsticks. Discusses U.K. case for electricity and telecommunications.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapter 2.

Describes traditional rate of return regulation for the U.S.

King, S., "Principles of Price Cap Regulation," in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 46-54.

> Explains that a price cap simply sets a maximum allowed inter-temporal path for the price of a specific product. The rules for the path are set in advance and only depend on factors that are beyond the control of the regulated firm. Finds that in practice, however, price caps tend to be more complex because firms produce multiple products and these products may be bundled together in the price cap, the price cap may automatically adjust for exogenous changes in specific prices that have strong implications for the profitability of the regulated firm, and price regulation may have associated regulation covering service quality. Explains that a variety of forms of price cap are used when a regulated firm produces multiple products, such as fixed weight price cap, average revenue regulation (current quantities), average revenue regulation (lagged quantities), and tariff basket regulation.

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Estache, Antonio, Martín Rodríguez Pardina, José María Rodríguez, and Germán Sember, "An Introduction to Financial and Economic Modeling for Utility Regulators," World Bank Policy Research Working Paper 3001, March 2003.

> Summarizes rate of return regulation, price cap regulation, and hybrid schemes. Describes how to choose incentive regulation scheme based on regulatory objectives.

Green, Richard, and Martin Rodriguez Pardina, Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapter 2.

> Describes two major kinds of price control, namely price baskets and revenue yield controls. Describes how price baskets (price caps) allow a firm to charge more efficient prices by increasing some prices by more than the allowed average provided that others are increased by a lesser amount. Explains use of weights and two-part tariffs. Describes revenue control, which does not require the regulator to specify a list of prices, which may not be possible if the set of prices is complex. States that pass-

through terms may be included in a price control if the firm faces significant costs that are both uncertain and outside its control, and if consumers can better bear the risk than can the firm. Mathematical formulae for both price basket and revenue yield controls are specified.

TELECOMMUNICATIONS

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 4.

Describes different approaches for regulating telecommunications prices, including discretionary price setting, rate of return regulation, rate of return-incentive regulation (banded rate of return, rate case moratoria and earnings sharing), and price cap regulation.

Sappington, David E.M., and Dennis L. Weisman, Designing Incentive Regulation for the Telecommunications Industry. Cambridge, MA: MIT Press, 1996, Chapters 1 and 3.

Describes advantages and disadvantages of price cap regulation and rate of return regulation.

WATER

OFWAT Setting water and sewerage price limits for 2005-10: Framework and Approach. Periodic Review 2004. March 2003.

Describes incentives for efficiency in Ofwat's price cap system and how the benefits are passed on to customers.

Key Words

Incentive regulation, Efficiency, Rate of return, Cost of service, Price, Price cap regulation, Benchmarking, Revenue caps, Price basket controls, RPI-X, Yardstick regulation, Service quality, Rate base

2. Differences between alternative forms of price regulation: allocation of risks and incentive properties, ability of company to adjust individual prices within overall price control, incentives, and regulatory procedures

Core References

Alexander, Ian and Chris Shugart, "Risk, Volatility and Smoothing: Regulatory Options for Controlling Prices," 1999.

Examines price caps, revenue caps, and hybrids. Considers advantages and disadvantages, with particular attention to price volatility. Discusses options for addressing price volatility.

Berg, S., "Introduction to the Fundamentals of Incentive Regulation," in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 37-45.

Explains that incentive regulation is about creating incentives for the utility to adopt efficient pricing and patterns of investment, that the need for incentive regulation comes about from the inherent informational asymmetries that exist between utility and regulator, and that successful regulation will depend largely upon the degree of incorporation of relevant fundamental economic principles in the design of an incentive mechanism for each particular case.

Farrier Swier Consulting, "Comparison of Building Block and Index-based Approaches," paper prepared for the Utility Regulators Forum, Australian Competition and Consumer Commission, 2002.

Examines price cap and revenue cap regulation in Australia, focusing on efficiency incentives, risk, robustness, transparency, simplicity, administration, and cost and availability of information required. Considers whether regulators should incorporate utility-specific factors, benchmarking, and appropriateness to statutory objectives.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapter 2, vol. II, Chapter 2.

Describes rate of return regulation for the U.S. Describes of regulation distorts incentives for efficiency.

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Bakovic, T., B. Tenenbaum, and R. Woolf, "Regulation by Contract: A New Way to Privatize Electricity Distribution?" Energy and Mining Sector Board Discussion Paper, Series Paper no. 7, March 2003.

Explains that risk should be borne by the party that can mitigate or manage the risk at the lowest cost. Detailed analysis of four risks is provided. Explains that two benchmarks in many developing countries are the technical and commercial loss-reduction targets and the price paid for discretionary power purchases. Examines how to design a benchmark for power purchases.

Green, Richard, and Martin Rodriguez Pardina, Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapter 2.

States that price baskets (price caps) are only feasible when the set of prices is relatively small and unchanging, and some limits on price rebalancing may be appropriate. Describes disadvantages of revenue-yield control. Says that "revenue drivers" must be included in the formula to tie total revenue to factors such as the number of customers and sales to each customer group; specific examples are given and discussed.

TELECOMMUNICATIONS

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 4.

Describes weakness of rate of return regulation, incentives of earnings sharing mechanisms and rate case moratoria. Explains that price cap regulation is meant to provide incentives that are similar to competitive market forces. Advantages of price cap regulation are detailed.

Laffont, Jean-Jacques, and Jean Tirole, Competition in Telecommunications, Cambridge, MA: MIT Press, Chapter 2.

Describes economics of price cap regulation for telecommunications. Provides narrative and technical explanations.

Sappington, David E.M., and Dennis L. Weisman, Designing Incentive Regulation for the Telecommunications Industry. Cambridge, MA: MIT Press, 1996, Chapters 1 and 3.

Compares price cap regulation and rate of return regulation for telecommunications.

Sappington, David E. M., "The Effects of Incentive Regulation on Retail Telephone Service Quality in the United States," Review of Network Economics 2(4): 356-375, December 2003.

Describes how price cap regulation affects service quality in telecommunications.

Other References

Alexander, Ian, and Timothy Irwin, "Price Caps, Rate-of-Return Regulation, and the Cost of Capital," Note no. 87 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, September 1996.

Demonstrates that price cap regulation results in a higher cost of capital for regulated firms than does rate of return regulation, indicating that price cap regulation shifts risk from customers to shareholders.

Vickers, John, and George Yarrow, Privatization: An Economic Analysis. Cambridge, MA: MIT Press, 1988, Chapter 4.

Explains Averch-Johnson effect, regulatory lag, information asymmetries, RPI-X regulation and Ramsey pricing, and implications of competition.

Key Words

Incentive regulation, Efficiency, Information, Rate of return, Cost of service, Price, Price cap regulation, Benchmarking, Revenue caps, RPI-X, Yardstick regulation, Service quality, Rate base

3. Use of extraordinary price adjustments and other techniques for handling major changes in financial/economic equilibrium

Core References

Bernstein, Jeffrey I., and David E. M. Sappington. "How to Determine the X in RPI - X Regulation: A User's Guide," *Telecommunications Policy* 24(1): February 2000, pp. 63-68.

Explains that the proper choice of an *X*-factor is critical for price cap regulation. Too small an *X*-factor could lead to excessive profits and thereby jeopardize the legitimacy of the regulator. Too large an *X*-factor could hurt the financial integrity of the operator. The *X*-factor should reflect the extent to which the regulated industry has historically achieved higher productivity growth and faced lower input price inflation than other industries in the economy. Details, conditions, and exceptions are examined.

Booker, A. "Incentive Regulation in Water – Case Study," in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 68-74.

> Explains that to ensure real productivity gains in U.K. water regulation, Ofwat introduced quality service monitoring. The initial caps were allowing substantial profits, which were retrieved using a glide path. The second periodic review will take even more notice of service quality and place more importance on environmental concerns.

Green, Richard, and Martin Rodriguez Pardina, Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapter 4.

> Describes how regulators choose the form of price control in a price review process. Describes pass-through terms for price caps and revenue caps.

King, S., "Principles of Price Cap Regulation," in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 46-54.

> Explains that in price caps, the regulator decides how input prices are to be passed through to consumers, as any allowed cost pass through will reduce incentives to minimize costs. Another key design issue is the price review. Further explains that any 'allowed profit' aspect to price cap reviews – including using past performance to set future price caps – will tend to reduce the incentives of an operator to reduce costs. Raising an X- or a catch-up factor if the firm exceeds expected productivity performance also decreases incentives to improve performance.

Key Words

Incentive regulation, Efficiency, Information, Rate of return, Cost of service, Price, Price cap regulation, Benchmarking, Revenue caps, Price basket controls, RPI-X, Price review, Yardstick regulation, Service quality, Rate base

4. Treatment of different categories of costs (controllable vs. non-controllable) in price controls

Core References

Booker, A. "Incentive Regulation in Water – Case Study," in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 68-74.

Explains that water regulation in the U.K. is in the form of setting medium-term (5 years) price caps, and a benefit-sharing and cost-cutting incentive mechanism providing a stable investment environment. To ensure productivity gains were real, quality service monitoring was introduced. Describes how the first periodic review expressly incorporated a quality term in the price capping formula, due to concerns that arose over the first price cap period. Also describes incentive problems of the claw back system, which encourages companies to delay investment and operating costs at the initial stage of a price cap in order to enjoy out-performance for long periods.

Green, Richard, and Martin Rodriguez Pardina, Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapter 4.

Explain that the past and future projected operating costs of the regulated firm should be collected from the firm and broken down by customer group, activity (such as customer service), and category (such as labor). Further explains that the regulator should divide these costs into three groups: ongoing controllable costs, ongoing uncontrollable costs, and one-off costs. Holds that the best available forecast of uncontrollable costs should be included in the projected cost, while some type of benchmarking or yardstick competition should be used to set a target for controllable costs that an efficient firm could meet.

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Alexander, Ian and Clive Harris, "Incentive Regulation and Multi-year Price Controls: An Application to the Regulation of Power Distribution in India," International Journal of Regulation and Governance 1(1): 25–46, 2001.

Considers regulator's ability to commit to multi-year tariffs. Finding that such commitments are not credible, evaluates whether this is a

barrier to incentive regulation. Considers a hybrid incentive methodology that rewards for improvements in efficiency for items under the operator's control.

Arizu, Beatriz, Luiz Maurer, and Bernard Tenenbaum, "Pass Through of Power Purchase Costs: Regulatory Challenges and International Practices," Washington, D.C.: The World Bank, February 2004.

Explains the importance of rules on pass through of power purchase costs. Identifies, compares and contrasts pass through methodologies used in both developed and developing countries. Presents lessons learned and best practices. Recommends pass through methods that rely on market prices and competitive procurements. Considers cases where data restrictions necessitate an evolutionary path for pass-through regulation.

Bakovic, T., B. Tenenbaum, and R. Woolf, "Regulation by Contract: A New Way to Privatize Electricity Distribution?" Energy and Mining Sector Board Discussion Paper, Series Paper no. 7, March 2003.

Explains that most regulatory contracts specify a multi-year system that includes a formula that distinguishes between controllable and non-controllable costs. Changes in non-controllable costs are automatically passed through. Changes in controllable costs are benchmarked. States that pass-through of non-controllable costs should be done frequently and automatically. Holds that a common mistake made in designing a multi-year system is the failure to distinguish between degrees of effective control. The nature of control over a particular cost item may be quite different between developed and developing countries.

TELECOMMUNICATIONS

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 4.

States that price cap regulation is meant to provide incentives that are similar to competitive market forces. The formula is designed to permit an operator to recover its unavoidable cost increases through price increases, but also requires the operator to lower its prices regularly to reflect productivity increases that an efficient operator would be expected to experience.

Key Words

Incentive regulation, Efficiency, Information, Rate of return, Cost of service, Price, Peak-load pricing, Price cap regulation, Benchmarking, Revenue caps, Price basket controls, RPI-X, Price review, Yardstick regulation, Service quality, Rate base, Controllable costs, Non-controllable costs

5. Trade-offs between flexibility and predictability of regulatory arrangements

Core References

Baldwin, Robert, and Martin Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapters 6, 17, and 21.

> Examines practices for ensuring quality regulation, considering the role of legislation, due process, and agency expertise. Discusses tradeoffs between predictability and flexibility in price cap regulation. Also examines accountability of the regulatory agency, with attention to oversight of regulatory agency by legislative bodies, government, appeals bodies including courts, super-agencies, and consumers.

Frontier Economics, "Developing Network Monopoly Price Controls: Workstream A: Regulatory mechanisms for dealing with uncertainty," A final report prepared for Ofgem, March 2003.

> Develops a framework for examining the best regulatory response to uncertainty. Considers the "tension between offering the firm incentives to reveal its efficient cost level, and offering it insurance against unforeseen events," including how the regulatory response affects operator incentives and vulnerability.

Green, Richard, and Martin Rodriguez Pardina, Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapter 6.

> Explains that one disadvantage of revenue-yield control is that while prices are set initially, revenue cannot be checked until after the fact, which means that a correction factor should be included in the revenue cap formula. Pass-through terms may be included in a price control if the firm faces significant costs that are both uncertain and outside its control, and if consumers can better bear the risk than can the firm.

Newbery, David M., Privatization, Restructuring, and Regulation of Network Industries. Cambridge, MA: MIT Press, 1999, Chapter 2.

Examines problems of regulatory commitment and how it impacts credibility and various regulatory instruments.

Sectoral References

ELECTRICITY

Bakovic, T., B. Tenenbaum, and R. Woolf, "Regulation by Contract: A New Way to Privatize Electricity Distribution?" Energy and Mining Sector Board Discussion Paper, Series Paper no. 7, March 2003.

> States that the tariff-setting system should include a mechanism for the pass-through of costs associated with unanticipated external events such as natural disasters or major changes in law, regulations and some taxes. Whenever possible, the regulatory contract should include specific "trigger" mechanisms to adjust tariffs for extraordinary events. In developing countries, the civil law concept of restoring the enterprise's "financial-economic equilibrium" is not a workable approach for dealing with extraordinary events.

TELECOMMUNICATIONS

Sappington, David E.M., and Dennis L. Weisman, Designing Incentive Regulation for the Telecommunications Industry. Cambridge, MA: MIT Press, 1996, Chapters 3, 4, and 7.

> Examines the features and economic effects of various forms of regulation, including rate of return regulation, earnings-sharing plans, revenue-sharing plans, and price cap regulation. Discusses regulatory goals, priorities, and resources. Also examines the importance of regulatory commitment, including causes of lack of commitment, the effects of lack of commitment, and the implications of low commitment powers for designing incentive regulation.

6. Main steps in conducting a price review

Core References

Baldwin, Robert, and Martin Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapter 17.

> Describes how to review prices under price cap regulation.

Booker, A. "Incentive Regulation in Water – Case Study," in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 68-74.

Describes the steps Ofwat took in its early price reviews.

Note: Green (1997) and the Green and Pardina (1999) are substitutable for each other.

Green, R., "Utility Regulation – A Critical Path for Revising Price Controls." Note no. 133 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, Nov. 1997.

States that the regulatory process needs to begin two years before the new control is due to come into effect. Explains that the review process includes: (1) Gathering and analyzing information on costs, investment plans, and demand forecasts; (2) Forecasting revenue requirements; (3) Choosing whether to use price caps or revenue caps; (4) Projecting revenue and cash flows using different price control parameters (such as the service baskets and the anticipated efficiency gains) to find a set of parameters that result in the appropriate cash flows; and (5) Making the announcement. Holds that the regulator should release information at several stages of the review process so that interested parties are kept informed. Suggests the following time table: (1) Request information (2 years ahead); (2) assess and amend information (18 months ahead); (3) determine form of control and rate of return (15 months ahead); (4) calculate revenue needs (1 year ahead); (5) select candidate price control and predict revenues, iterating until match revenue needs (1 year to 9 months ahead); (6) Propose price control (9 months ahead); (7) complete appeal process (3-9 months ahead); (8) implement price control (1 month ahead).

Green, Richard, and Martin Rodriguez Pardina, Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999.

Identifies four stages a regulator should follow in resetting a price control, namely information gathering, analysis and decision-making, announcement (and possible appeal), and implementation. In this framework, the regulator would: (1) collect information from the firm,

focusing on the future; (2) gather information and views from other interested parties; and (3) communicate with the firm and all interested parties throughout the process to increase the likelihood of acceptance of the final outcome of the review. Describes processes for analyzing financial information: (1) Firm projections about the future are compared against independent evidence when possible, and the reported costs and investment plan should be evaluated to see if they are reasonable; (2) The amount of revenue necessary to cover costs is calculated and transformed into a price control given demand forecasts; (3) announce the new price control as soon as possible to allow the firm time to react and possibly appeal. Possible outcomes may be discussed during the review process, to hear reactions and allow the parties to become used to the proposals before they are finalized. The new price control may be integrated into the company's concession contract and enforced by the regulator. Examples of each of these stages are described for Argentina and the U.K.

Sectoral References

WATER

OFWAT, Ofwat Annual Report 2003-2004, 2004.

Outlines how Ofwat regulates prices and sets out plans for upcoming price review.

Key Words

Incentive regulation, Information, Regulation, Price, Price cap regulation, Benchmarking, Revenue caps, Price basket controls, RPI-X, Price review, Yardstick regulation, Service quality, Rate base

7. Establishing the duration of the price control

Core References

Green, Richard, and Martin Rodriguez Pardina, Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapter 4.

Explains that in setting the duration of the price controls, a regulator must trade off the productive efficiency that increases with duration against allocative efficiency, which decreases with duration if prices become significantly higher than costs over time. That is to say, the regulator must weigh the increased incentives of long intervals against the risks that prices will get out of line with costs. Holds that during privatization, longer intervals may be beneficial since there may be considerable scope for efficiency gains. Suggests that including a provision in the price control that specifies when an early price review could take place might also be beneficial.

Sappington, David E.M., and Dennis L. Weisman, Designing Incentive Regulation for the Telecommunications Industry. Cambridge, MA: MIT Press, 1996, Chapter 3.

Examines the features and economic effects of various forms of regulation, including rate of return regulation, earnings-sharing plans, revenue-sharing plans, and price cap regulation. Considers how to establish the length of time for a price cap plan.

Key Words

Incentive regulation, Information, Price cap regulation, Benchmarking, Revenue caps, Price basket controls, RPI-X, Price review, Yardstick regulation, Service quality, Rate base

B. Price Regulation – main building blocks and process

1. Choice of price escalation indices

Core References

Bernstein, Jeffrey I. and David E. M. Sappington, "How to Determine the X in RPI - X Regulation: A User's Guide," *Telecommunications Policy* 24(1): February 2000, pp. 63-68.

Explains that price cap regulation is intended to replicate the discipline of competitive market forces. Competitive forces compel firms to realize productivity gains and to pass these gains on to their customers in the form of lower prices, after accounting for unavoidable increases in input prices. Therefore, if all industries in an economy were competitive,

output prices in the economy would grow at a rate equal to the difference between the growth rate of input prices and the rate of productivity growth.

Green, Richard, and Martin Rodriguez Pardina, Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapter 4.

Explains that a regulator may choose to use a general consumer price index for familiarity purposes, although a producer price index may be a better proxy for prices faced by the firm. Further explains that the choice of a price index affects how one sets the *X*-factor. Using price inflation from the previous time period (preferably short in duration) in the RPI – X formula has the advantage of not forcing the company to forecast inflation and thus reduces correction terms.

Sectoral References

TELECOMMUNICATIONS

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 4.

State that frequently used criteria for choosing an inflation index include: a) reflectiveness of changes in the operator's costs; b) availability from a credible, published, independent source; c) availability on a timely basis; d) understandability; e) stability; and f) consistency with total factor productivity of the economy. Further state that potentially useful inflation measures include Gross Domestic Product (GDP) indices and Consumer Price Index (CPI) or the Retail Price Index (RPI) indices.

Key Words

Inflation, Price cap regulation, Incentives, Productivity, RPI-X regulation, Price index

2. Basics of financial modeling for price regulation

Core References

Armstrong, Mark, Simon Cowan, and John Vickers, Regulatory Reform: Economic Analysis and British Experience, Cambridge, MA: The MIT Press, 1999, Chapter 6.

Describes financial modeling for RPI-X regulation.

Estache, Antonio, Martín Rodríguez Pardina, José María Rodríguez, and Germán Sember, "An Introduction to Financial and Economic Modeling for Utility Regulators," World Bank Policy Research Working Paper 3001, March 2003.

Describes basics of financial modeling for a price review. Considers regulatory objectives, regulatory instruments, cost of capital, inflation, and exchange rates. Describes how to perform net present value analysis.

Farrier Swier Consulting, "Comparison of Building Block and Index-based Approaches," paper prepared for the Utility Regulators Forum, Australian Competition and Consumer Commission, 2002.

Examines price cap and revenue cap regulation in Australia, focusing on efficiency incentives, risk, robustness, transparency, simplicity, administration, and cost and availability of information required. Describes financial modeling in Australia and makes recommendations.

Green, Richard, and Martin Rodriguez Pardina, Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapters 5, 8, and 9.

Describe the present value calculations used in U.K.-style price cap regulation to determine the amount of revenue required for cover the operator's required cash flow and return on investment. States that present values can be estimated using a cost-based approach or an economic approach. Operating costs are forecasted for each year, as are revenues.

3. Principles for determining the *X*-factor, including total factor productivity approach and earnings forecasting approach

(a) Demand and revenue forecasting

(b) Estimation and forecasting of costs

(c) Present value calculations: cost based versus value based

Core References

Bernstein, Jeffrey I. and David E. M. Sappington, "How to Determine the X in RPI - X Regulation: A User's Guide," *Telecommunications Policy* 24(1): February 2000, pp. 63-68.

Explains that if the regulated firm were just like the typical firm in a competitive economy, competition would limit the rate of growth of the firm's prices to the economy-wide rate of price inflation. As a result, the *X*-factor should reflect the extent to which: (1) the regulated firm is capable of increasing its productivity more rapidly than are other firms in the economy; and (2) the prices of inputs employed by the regulated firm grow less rapidly than do the input prices faced by other firms in the economy.

Coelli, T. A. Estache, S. Perelman, and L. Trujillo, A Primer on Efficiency Measurement for Utilities and Transport Regulators. Washington, D.C.: World Bank Group, 2003.

Describes the tools used for measuring efficiency. Considers total factor productivity measures, frontier analysis, and data concerns. Describes how these measures are incorporated into *X*-factors.

Green, Richard, and Martin Rodriguez Pardina, Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapters 5-8.

Holds that the regulator should construct a model to predict the company's revenues given a price control, using price elasticities of demand to predict how price changes will affect quantity demanded. Describes how the regulator can then transform a revenue requirement into a price control. Considers sales predictions, past and future projected operating costs, ongoing controllable costs, ongoing uncontrollable costs, one-off costs, role of benchmarking or yardstick competition, cost- and value-based approaches to present value calculations, cash-flow-based formula for present value calculations, and the timing of payments and receipts.

OFWAT, "Assessing Capital Values at the Periodic Review. A consultation paper on the framework for reflecting reasonable returns on capital in price limits." November 1992.

Describes how asset values affect price cap parameters.

Key Words

Price cap regulation, RPI-X regulation, Forecasting, Price review, Revenue, Pricing, Costs, Benchmarking

C. Revenue Caps

Core References

Alexander, Ian and Chris Shugart, "Risk, Volatility and Smoothing: Regulatory Options for Controlling Prices," 1999.

Examines price caps, revenue caps, and hybrids. Considers advantages and disadvantages, with particular attention to price volatility. Discusses options for addressing price volatility.

Green, Richard, "Has Price Cap Regulation of U.K. Utilities Been a Success?" Note no. 132 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, Nov. 1997.

Compares regulatory schemes for British Telecom, British Gas, U.K. water operators, and U.S. utilities. Examines regulatory discretion and adjustments.

Green, Richard, and Martin Rodriguez Pardina, Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapter 4.

Discusses how regulators review price control methods in the context of a price review. Describes features and practices in revenue cap regulation.

Sectoral References

ELECTRICITY

Australian Competition and Consumer Commission, Decision: Statement of principles for the regulation of transmission revenues: Information requirements guidelines, 5 June 2002.

Details information filing requirements for electricity transmission operators. Describes information needs for revenue caps. Describes policies for information disclosure and future information policy issues.

Key Words

Revenue cap regulation, Inflation, Revenue, Costs

D. Principles of using efficiency measures for yardstick regulation

1. **Performance measures for benchmarking, including efficiency, theft, and loss**
2. **Techniques for measuring efficiency and their properties, including frontier analysis, regression analysis, and virtual company approach**
3. **Issues in estimating benchmarks, including controlling for exchange rates and data quality and needs**
4. **Incorporation of efficiency parameters into price control formulas**
5. **Publication of benchmarking information**

Core References

Baldwin, Robert, and Martin Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapter 18.

Outlines how to assess operator efficiency using benchmarking and yardsticking. Provides examples from the U.K.

CEPA, "Background to Work on Assessing Efficiency for the 2005 Distribution Price Control Review: Scoping Study Final Report for Ofgem," Cambridge Economic Policy Associates, September 2003.

Examines approaches for analyzing benchmarking data. Considers regression analysis, data envelope analysis, and corrected ordinary least squares, stochastic frontier analysis. Examines scale variables, cost drivers, the benchmark variable, and quality.

Coelli, Tim, Antonio Estache, Sergio Perelman, and Lourdes Trujillo, "A Primer on Efficiency Measurement for Utilities and Transport Regulators," Washington, D.C.: The World Bank, 2003.

Describes the tools used for measuring efficiency. Considers total factor productivity measures, frontier analysis, and data concerns. Describes how these measures are incorporated into *X*-factors.

Farrier Swier Consulting, "Comparison of Building Block and Index-based Approaches," paper prepared for the Utility Regulators Forum, Australian Competition and Consumer Commission, 2002.

Examines price cap and revenue cap regulation in Australia, focusing on efficiency incentives, risk, robustness, transparency, simplicity, administration, and cost and availability of information required. Considers various methods for benchmarking utilities, including total factor productivity and data envelopment analysis.

Kingdom, Bill, Vijay Jagannathan, "Utility Benchmarking," Note no. 229 in Viewpoint. Washington, D.C.: World Bank Group, March 2001.

Describes how some regulators routinely publish indicators of utility service performance in the local media and how this provides incentives for poorly performing operators to provide better services. Holds that this also shields regulators from political interference. Reviews requirements for effective benchmarking in the choice of indicators.

Lawrence, D., "Benchmarking Infrastructure Enterprises," in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 55-67.

Explains that the development of performance measures offers a way of indirectly introducing competitive pressures to infrastructure industries, by

comparing actual performance to international benchmarks. Says that the various types of performance measures can be divided into three broad categories: accounting, non-financial and economic indicators. Explains each. Also describes importance of management incentives.

Sectoral References

ELECTRICITY

Domah, Preetum, "Technical Efficiency in Electricity Generation – The Impact of Smallness and Isolation of Island Economies," Working Paper 0232 (CM14), Department of Applied Economics, University of Cambridge, U.K.

Conducts a comparative technical efficiency analysis of electricity generators in small island economies. Does not find significant differences between islands and non-islands electric utilities. Suggests that "benchmarking of small islands, using non-island generating utilities as comparators, is both feasible and desirable given the lack of historical generation data for most small islands."

Estache, Antonio, Martin A. Rossi, and Christian A. Ruzzier, "The Case for International Coordination of Electricity Regulation: Evidence from the Measurement of Efficiency in South America." World Bank Policy Research Working Paper 2907, Washington, D.C., October 2002.

States that monitoring performance of public and private monopolies in South America is difficult because operators control most of the needed information and do not provide it to regulators. Argues that Latin America's electricity regulators should use benchmarking based on performance rankings using comparative efficiency measures. This approach has modest data requirements. Demonstrates how this could be done.

Guasch, J. Luis, and Pablo Spiller, Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story, Washington, D.C.: The World Bank Group, 1999, Chapter 7.

Discusses benchmark regulation in Chile. Outlines main characteristics.

Meyrick Consulting, "Regulation of Electricity Lines Businesses: Analysis of Lines Business Performance – 1996–2003," Report prepared for Commerce Commission, Wellington, New Zealand, 19 December 2003.

Examines use of benchmarking in establishing *X*-factor for electricity distribution company.

TELECOMMUNICATIONS

Sappington, David E.M., and Dennis L. Weisman, Designing Incentive Regulation for the Telecommunications Industry. Cambridge, MA: MIT Press, 1996, Chapter 5.

Examines how to structure and establish performance goals and incentives. Considers broad versus targeted benchmarks, determining the appropriate performance level, and four basic principles for performance incentives.

WATER

Gómez-Ibáñez, José, Regulating Infrastructure: Monopoly, Contracts, and Discretion. Cambridge, MA: Harvard University Press, 2003, Chapter 9.

Discusses price cap regulation for British water sector. Considers historical context, the design of the price capping system, privatization, the 1994 and 1999 price reviews, effects of weather, and appeals. Assesses strengths and weaknesses of the system.

Shirley, Mary M., and Claude Ménard. "Cities Awash: A Synthesis of the Country Cases," in Thirsting for Efficiency, edited by Mary M. Shirley. Washington, D.C.: The World Bank, 2002, pp.1-41.

Discusses yardstick competition, monitoring, performance targets, assignment of risks and rewards, incentives in tariff policies, and the roles of regulatory, judicial, and political institutions.

Van den Berg, C., "Water Privatization and Regulation in England and Wales." Note no. 115 in Public Policy for the Private Sector Washington, D.C.: World Bank Group, May 1997.

Examines England and Wales water sector privatizations. Discusses cost structures and how regulator uses yardstick regulation.

Other References

Estache, Antonio, and Eugene Kouassi, "Sector Organization, Governance, and the Inefficiency of African Water Utilities." World Bank Policy Research Working Paper 2890, Washington, D.C., September 2002.

Using a benchmarking approach, analyzes the determinants of the efficiency levels of African water utilities.

Jamasb, Tooraj. Paul Nillesen, and Michael Pollitt, "Strategic Behaviour under Regulation Benchmarking." Working Paper WP 0312, 2003, Department of Applied Economics, University of Cambridge, U.K.

Examines how electricity distribution companies regulated by benchmarking can engage in strategic behavior to increase profits without improving efficiency.

Key Words

Price cap regulation, Incentive regulation, Productivity, RPI-X regulation, Benchmarking, Costs, Competition, Comparative competition, Yardstick

E. Earnings and revenue sharing techniques

Core References

Green, Richard, and Martin Rodriguez Pardina, Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapters 2 and 4.

Summarizes profit sharing regulation. Further discusses how regulators choose forms of incentive regulation in the context of a price review and provides an overview of the options.

Mayer, Colin and John Vickers, "Profit Sharing Regulation: An Economic Appraisal," Fiscal Studies, 17(2): 83-101, 1996.

Examines profit sharing regulation. Considers regulatory instability, regulatory lag, incentive power, measurement problems, and using cash- flow or cost rather than profit measures of performance.

Sappington, David E.M., and Dennis L. Weisman, Designing Incentive Regulation for the Telecommunications Industry. Cambridge, MA: MIT Press, 1996, Chapters 1 and 3.

Defines and explains the basics of incentive regulation. Examines the features and economic effects of various forms of regulation, including rate of return regulation, earnings-sharing plans, revenue-sharing plans, and price cap regulation.

Other References

Sappington, David E.M., "Price Regulation," in Handbook of Telecommunications Economics, vol. 1, edited by Martin E. Cave, Sumit K. Majumdar, and Ingo Vogelsang. Amsterdam: North-Holland, 2002, pp. 227-293.

Describes and gives examples of banded rate of return regulation, earnings sharing regulation, and revenue sharing regulation. Charts illustrate the sharing options and the incentive properties.

Key Words

Incentive regulation, Information, Earnings, Revenue, Sharing

Chapter V. Tariff Design

Introduction

Tariff design or rate design refers to the relationships among the individual prices the operator charges.[120] Tariff design is different from most other regulatory issues in that it is one topic area where the interests of the operator and the interests of the government often coincide. In this chapter, we discuss situations where this is likely to hold so that the government can do no better than to allow the operator to choose its own tariff design. We also describe situations where regulation of tariff design might be desirable. We then describe various tariff design options and their properties. We further discuss pricing for the poor,[121] pricing in competitive situations,[122] and demand forecasting.[123] Following this chapter's narrative is a list of references, organized by topic.

Economics of Tariff Design

1. Government and Operator Objectives

Before identifying situations in which tariff design should be left to the operator, we first examine the objectives of the operator and the objectives of the government. We assume that the operator wants to maximize profit[124] and that the government's interest in tariff design is to maximize welfare and provide affordable service to the poor. Welfare is the difference between the value that customers place on the service and what it costs to provide the service.[125] The operator and the government also have an interest in maintaining a stable political environment, but they may disagree on the role of regulation in that environment. As a result, the operator and government may disagree on issues such as service to the poor, which are generally viewed more

[120] Chapter IV examines how to set the overall price level.
[121] Chapter VI Section C also covers issues of service to the poor.
[122] Chapter II Section B examines other issues related to competition in the market.
[123] Chapter III Section B also examines issues related to demand forecasting.
[124] Chapter III Sections B and E discuss how to measure profits.
[125] Welfare includes both the net benefits to customers and the net benefit to the operator that come from the service being provided and used. The net benefit to customers is called net consumer surplus and is the difference between the value that customers place on the service – more specifically, the area under the customer demand curve – and what customers pay for the service. The net benefit to the operator is called profit and is the difference between the revenue the operator receives and the costs the operator incurs. Sometimes the government may value net consumer surplus more or less than it values profits, in which case welfare is a weighted sum of net consumer surplus and profit. Welfare is generally maximized when prices equal their respective marginal costs. Marginal cost includes the all of the extra costs that the operator incurs when it increases output by one unit. If the system is capacity constrained, meaning that capacity cannot be increased, marginal cost would also include the marginal congestion cost.

as social policies than as economic policies. The operator and the government may also disagree on price discrimination, the situation where different customers pay different prices even though the costs of serving these customers are the same. The operator may find that some forms of price discrimination increase profit. However, customers generally do not like price discrimination on grounds of fairness, so the government may want to limit what is generally called undue price discrimination.

To maximize profit, the operator seeks prices that equate marginal revenue and marginal cost, which, properly estimated, consider the need for a politically sustainable business and regulatory environment.[126] Marginal revenue is the extra revenue the operator receives when it increases output by one unit. Once marginal revenue and marginal cost are equal, any change in output decreases profit, so the operator is making as much profit as it can on the service in question.

When markets are perfectly competitive, marginal revenue is equal to the market price. As a result, the profit-maximizing operator in a competitive environment will charge prices that are equal to marginal cost. Marginal cost pricing also maximizes welfare, so the interests of the operator and the interests of the government coincide when markets are highly competitive.

2. Deviations from Marginal Cost Pricing: Ramsey Pricing[127]

When the operator has market power,[128] its profit-maximizing prices will exceed their marginal costs in most situations.[129] This causes a loss in welfare relative to the perfectly competitive situation, so the government has an interest in lowering prices to their respective marginal costs. However, as we explain in Chapter II on Market Structure and Competition, marginal-cost pricing may not be financially feasible for the operator because of scale economies, fixed costs, or joint and common costs.[130] When this is the case, the profit maximizing price structure for the monopoly operator is one that causes the quantities that customers want to purchase to deviate as little as possible from what customers would purchase with marginal-cost pricing. This system of pricing, called Ramsey Pricing or the inverse elasticity rule, raises individual prices above marginal cost in according to each service's price elasticity of demand.[131]

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[126] Sections A and B provide information on economics of pricing.
[127] See Sections A and B.
[128] Chapter II Section A provides information on market power.
[129] Exceptions might include situations where the sales of one product stimulate the sales of another product. For example, shortly after the development of telephone service in the U.S., AT&T chose to price residential service below marginal cost in order to stimulate sales of business service, which could be priced above marginal cost.
[130] Joint costs are costs that, once incurred, produce two or more services in fixed proportions. Joint costs are efficiently recovered by using Ramsey pricing. Common costs are costs that are incurred to produce one service and that do not have to be incurred again to produce one or more additional services. Most regulators use some form of cost distribution to deal with common costs. Ramsey prices are also efficient for recovering common costs. Section D provides further information on this topic.
[131] See Sections A and B.

Mark-ups above marginal cost are lower for services with more elastic demand, and conversely mark-ups are greater for services with more inelastic demand.[132]

Ramsey pricing is sometimes consistent with the government's objectives because Ramsey pricing is economically efficient in the sense that can maximize welfare under certain circumstances. There are, however, problems with Ramsey pricing. A profit-maximizing operator will choose Ramsey prices only if all markets are equally monopolistic or equally competitive. If markets are not equally monopolistic or competitive, then the regulator has an interest in taking steps to ensure that the extent to which the operator can use Ramsey pricing is limited to groups of services that are subject to similar degrees of competition. Regulators typically do this by forming baskets of services that are subject to similar degrees of competition and allowing the operator price flexibility within each service basket. Chapter IV on Regulating the Overall Price Level describes how service baskets are used in incentive regulation.

Even though Ramsey pricing can be economically efficient, it may not be consistent with the government's goal of providing affordable service to the poor and the rate by which prices change to achieve Ramsey-efficient prices may not be consistent with political sustainability. As a result of these two concerns, the regulator sometimes limits the operator's ability to pursue Ramsey pricing within a service basket. In the case of services to the poor, the regulator may place upper limits on the prices. In the case of services where traditional prices were different from Ramsey prices, there are equity issues in changing from the traditional pricing structure to a new structure, even if the new structure would be more efficient in an aggregate sense. In such situations, the regulator may impose pricing restrictions that prevent Ramsey pricing or that impose a slower transition to Ramsey pricing than the operator would choose left to its own devices.[133]

Lastly, regulators often note that Ramsey pricing is a form of price discrimination -- although not necessarily a bad form of price discrimination – and customers sometimes object to it on that basis. The public sometimes believes that it is unfair to cause one type of customer to pay a higher mark-up above marginal cost than another type of customer. In such situations regulators may further limit an operator's ability to adopt Ramsey prices.

3. Deviations from Marginal Cost Pricing: Multipart Prices[134]

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[132] The greater the elasticity of demand, expressed as a positive number, the more customers change the quantities they purchase in response to a change in price. If customers change the quantities they purchase by more than 1 percent in response to a 1 percent change in price, then demand is elastic and the elasticity of demand is greater than 1 when expressed as a positive number. Demand is inelastic if customers change their purchases by less than 1 percent in response to a 1 percent change in price and the elasticity of demand is less than 1 when expressed as a positive number. An elasticity of demand equal to 1 is called *unitary elasticity of demand*.

[133] Chapter IV Section B provides further information on price constraints within service baskets.

[134] See Sections A and B.

In addition to Ramsey pricing, the operator also generally finds that multi-part tariffs are more profitable than linear tariffs. A multi-part tariff is one in which the operator charges separate prices for different elements of the service. A linear tariff is one in which the operator charges a single price for the service. A common multi-part tariff is the two-part tariff in electricity, under which the customer pays a monthly fee for access and a usage fee for consumption of electricity. With this two-part tariff, the operator is able to charge a price equal to marginal cost for electricity, which is profit maximizing, and deviate from marginal cost pricing in the fee for access. A common linear tariff is flat-rate telephone service, under which the customer pays a single monthly price that includes both access and usage.

4. Price Discrimination[135]

Ramsey pricing is an example of price discrimination. In many situations, price discrimination is efficient in that the differences in prices allow customers to buy more of the service. It does, however, appear unfair to some customers, which can make price discrimination difficult politically. This is a situation where the interests of the government and the operator may be different. As a result, it is often the regulator's job to understand when some amount of efficiency must be traded for political stability or other considerations. There is a danger, though, that the government may go too far in this tradeoff. In telecommunications, for example, many governments put off the political pain of price rebalancing so long that sector development was delayed and difficult transitions had to be made quickly. Price rebalancing is the process of aligning prices closer to their underlying costs. This topic is discussed in more detail in Section D.

5. Optional Tariffs[136]

The optional tariff is closely related to the multi-part tariff. Under optional tariffs, the operator offers the customer a menu of pricing plans.[137] The customer chooses the pricing plan that best fits the customer's consumption preferences and pays according to that plan. If properly designed, the optional tariff scheme is profit maximizing for the operator and makes customers better off. Most optional tariffs include multi-part pricing.

Fortunately, multipart tariffs and optional tariffs are situations where the operator's interests and the government's interest often coincide. Multipart tariffs provide greater welfare than linear tariffs when the linear price does not equal marginal cost. Optional tariffs make customers better off than single tariffs because customers can choose the tariff that best meets their needs.

6. Non-linear Prices[138]

Another approach to economic pricing is non-linear pricing. Non-linear prices are prices that vary depending on the amount of consumption by the customer. An example might be a water tariff, which has higher per gallon or per liter prices for higher levels of consumption than for lower levels of consumption. Non-linear prices are like multipart prices in that they allow the operator to charge prices at the margin that reflect marginal cost, while using the inframarginal

[135] See Sections A, B and E.
[136] See Sections A and B.
[137] The economics of offering a customer a menu of tariffs is related to the economics of offering an operator a menu of incentive regulation plans. Readers interested in the underlying economics could read more technical economics texts on these issues, such as Laffont, Jean-Jacques, and Jean Tirole, A Theory of Incentives in Procurement and Regulation, Cambridge, Massachusetts: The MIT Press, 1993.
[138] See Sections A and B.

prices to manage earnings. Inframarginal prices are the prices charged for units that are not at the margin. For example, if a consumer purchases 1000 liters of water, the price paid for the 1000th unit is the marginal price and the prices charged for the other 999 liters are the inframarginal prices. Non-linear prices may be used in conjunction with multipart tariffs. Non-linear prices represent another situation where the interest of the operator and the interest of the government coincide.

7. Peak-load Pricing[139]

Peak-load pricing is another pricing variation where the operator and government interests coincide. Peak-load pricing is useful when marginal costs vary depending on when the service is used. For example, the telecommunications operator builds his network with the capacity to serve the peak demand, which generally occurs during business hours. As a result, network costs are caused by peak demand and not demand during off-peak hours. To facilitate marginal cost pricing, the operator would maximize profit by charging higher prices during peak hours and lower prices during off-peak hours. The prices at the peak reflect the marginal costs of capacity and the lower-off peak prices reflect only the marginal costs of off-peak usage, which are generally close to zero in telecommunications.

Peak-load pricing requires sophisticated measurement of customer usage. This is rarely a problem in telecommunications, but requires advanced metering technologies in energy and water. As a result, the cost of implementing these advanced measurement technologies must be weighed against the welfare gains of metering. This is a situation where the operator and government may disagree. The operator benefits from advanced metering only to the extent that the metering increases profits. The government is also interested in how the metering benefits customers, so the government may have a stronger desire for advanced metering than does the operator.

8. Summary

In summary, we have identified several situations where the operator's preferences and the government's preferences coincide with respect to tariff design. These include pricing in a competitive environment, Ramsey pricing for services that are subject to similar competitive pressures, multipart prices, optional tariffs, and non-linear tariffs. With respect to these if the interests of the government and the operator are in alignment, the government can do no better than to let the operator use its superior knowledge of its abilities and of the market to choose efficient pricing arrangements. We have also identified situations where it may be beneficial for the government to intervene in pricing. These situations include pricing for the poor, controlling undue price discrimination, tariff design for services that are subject to different levels of competitive pressure, and the speed of transition to efficient pricing. A situation we have not

[139] See Sections A and B.

discussed in this chapter is access prices charged to rivals. Chapter II on Market Structure and Competition covers access prices.

Finally, we need to also discuss the cost basis for pricing. Most of the price issues discussed above relate prices to marginal cost and demand. Marginal cost is an economic concept, so to the extent that regulators need cost information for efficiency purposes, the regulator needs information on economic costs.[140] Another approach to measuring costs – called fully distributed costs – is also used in regulation, but primarily in situations where the regulator wants to limit the earnings of the operator for a specific set of services. This is called accounting separations and is discussed in Chapter III Section D.

Pricing for the Poor[141]

Special pricing and service arrangements for the poor are frequently developed in countries where the poor cannot afford the services purchased by the general public. The keys to these arrangements appear to be to balance quality, price levels, and payment schemes so that the needs of the poor can be met. This section examines pricing and payment scheme issues. Quality issues for the poor are addressed in Chapter VI on Quality, Social, and Environment Issues.

Both price level and payment scheme are important for making services affordable for the poor. Sometimes customers can afford cost-based usage fees by managing their usage, but not cost-based initial connection fees. In these situations, it may be optimal for the operator to provide customers with the option of paying their connection fee over time, perhaps through usage fees. Customers may also prefer prepaid service, which allows customers to use only what they can afford and allows service for customers who cannot establish credit and who may be difficult to bill. Prepaid mobile service is an example of a situation where an innovative payment scheme made service affordable for the poor. The poor in many countries could not afford monthly fees for mobile service, could not establish credit for post-paid pricing schemes, and did not have mailing addresses where they could receive their bills. Operators developed prepaid cards, which have higher usage fees than post-paid service, but that have nevertheless made service affordable for many poor customers. The ease of collecting from poor customers using prepaid cards actually lowered the cost of serving the poor, which made serving the poor profitable for operators.[142] In certain situations, it may also be possible to give customers a menu of options that provide various combinations of price and quality.

[140] Regulators use current cost asset valuation when estimating economic costs. Chapter III Sections B and E discuss asset valuation.
[141] See Section E.
[142] We would like to thank Vice Chairman/Chief Executive Officer of Teledom, Dr Emmanuel Ekuwem, of the Nigerian Communications Commission for this insight.

There are situations, however, where price level is a hurdle because overall costs of providing any level of service are high relative to what customers can afford. Consider for example the case of electricity distribution. The fixed costs that are currently inherent in the provision of the electricity grid are sufficiently high to make extension of the grid into poor, rural areas commercially infeasible. As a result, extensions of the grid to these people must be subsidized if the grid is to be commercially viable. In these situations, it may be necessary to provide subsidies to ensure affordable prices for the poor.

There is growing consensus, however, that subsidies should be avoided if possible. Research has shown that the poor rarely benefit from broadly based subsidy schemes. For example, subsidies directed at public water companies have often benefited the middle class rather than the poor, who often receive their water from sources other than the formal water utility. Some regulators have attempted to solve this problem by developing targeted, direct subsidies to customers, which have the advantages of being transparent and explicit, and minimize distortions in the behavior of water utilities ant their customers. The main drawbacks are high administrative costs and the difficulty of designing suitable eligibility criteria.

Development of subsidies for service to the poor involves determining the amount of subsidy and funding the subsidy. Recently countries have had success with auctions to determine the amount of subsidy. One of the first successful examples of the use of auctions was with Chile, which auctioned subsidies for telecommunications projects in rural areas. Funding of below-cost prices can be done through concession bidding and external subsidies. Concession and licensing fees can provide funding for subsidies, or a requirement for internal funding of subsidized service can be built into the concession contract. In such situations, the operator either funds the subsidy by embedding cross subsidies in his price structure or he funds the subsidy by lowering what he is willing to pay for the concession contract. Sometimes regulators collect subsidy funds through percentage fees against operator turnover or revenue.

Experience has shown that subsidy schemes designed to benefit the poor can continue beyond their usefulness, perhaps because policy makers neglect to re-evaluate the schemes, the needs of the poor change, or non-poor stakeholders benefit from the subsidy process and so advocate its continuation. These possibilities point to the need to evaluate subsidy schemes on a regular basis. Evaluation criteria include how well the poor are reached, the share of the subsidy that goes to the poor, the predictability of the benefit for the poor, the extent and significance of unintended side effects, and administrative cost and difficulty.

Pricing in Competitive or Partially Competitive Environments[143]

[143] See Section E. Chapter II discusses competition.

In most countries, utility service prices prior to market reforms were based on political considerations and not on underlying costs. Examples include subsidized electricity prices and high international telecommunications prices used to subsidize other services, fund the country's treasury, or provide hard currency to the government. Politically-based prices are unsustainable when competition is allowed because entrants target the subsidy-providing customers and subsidized markets are ignored. As a result, there is often a need to rebalance prices when markets are open to competition. Rebalancing means that prices are aligned closer to their marginal costs. Rebalancing prices can adversely affect some customers, so regulators need to consider whether these effects make certain aspects of rebalancing unsustainable politically and whether certain aspects of the rebalancing conflict with regulatory objectives.

Price flexibility or deregulation is also important when there is competition. If market forces are to work, operators need the ability to respond to market changes, expect extra profits when they make good decisions in the marketplace, and experiment with ideas. If regulators are reluctant to deregulate prices in competitive markets but nonetheless want to allow the operator to respond to competitive pressure, they will sometimes use forms of price regulation for those markets to allow price flexibility. Examples of approaches include establishing a service basket[144] for nearly competitive services, establishing price floors based on incremental cost or imputation, and banded prices. Imputation is used in instances where the operator provides an essential facility[145] that its rivals need in order to compete in the nearly competitive market. Imputation is a process that in effect requires the operator to reflect in its competitive prices the price it charges its rivals for using the essential facility. Banded prices are simply upper and lower bounds, between which the operator can change prices as it wishes. The lower band is typically based on incremental cost.

The regulator might also be concerned about protecting customers of non-competitive services from providing cross-subsidies to the operator's competitive operations. The regulator might address this problem with ring fencing, the price floors discussed above, or with pure price cap regulation for the non-competitive services.[146]

Demand Forecasting[147]

Demand forecasts are used for setting price controls for energy and water and could be used in telecommunications. Several methods of demand forecasting are available. Trend analysis expresses demand largely as a function of time. There is general consensus that trend analysis is too simplistic for most countries. End-use method develops demand projects by examining the number of devices in households and businesses that use the utility service. For

[144] Chapter IV Section B discusses service baskets.
[145] See Chapter II Section B for a discussion of essential facilities.
[146] Chapter IV Sections A and B describe pure price cap regulation.
[147] See Section F.

example, an energy demand forecast would consider the number of household appliances that use energy and the amount of energy that each appliance is expected to use. The econometric approach uses statistical analyses to forecast demand based on household income levels, use-intensive industries, and prices, to name a few of the possible variables. Time-series methods are similar to the econometric approach, but incorporate the effects that one time period has on subsequent time periods. Hybrid approaches are also used.

Concluding Observations

As we explain above, tariff design is an area where the interests of the government and the interests of the operator may coincide. As a result, the government can effectively deregulate tariff design in many instances. This is also true, but to a lesser extent, for service quality and social issues. These topics are covered in Chapter VI.

Case Studies

Foster, V., A. Gómez-Lobo, and J. Halpern, "Designing Direct Subsidies for the Poor – A Water and Sanitation Case Study," Note No. 211 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, June 2000.

Garg, A., M. Kabra, and R. Kacker, Regulatory Reforms in India: Effectiveness, Efficiency, and Impacts, The Energy and Resources Institute, New Delhi, India, 2003.

GeoEconomics Associates Inc., Economic Principles and Concepts as Applied to Municipal Water Utilities, Final Report to the Ontario Superbuild Corporation (project number SSB-018197), 2002.

Hall, D., ed., Marginal Cost Rate Design and Wholesale Water Markets: Advances in the Economics of Environmental Resources, vol. 1. Greenwich, CT: JAI Press, 1996.

Maryland Power Plant Research Program, "Maryland Power Plants and the Environment: A review of the impacts of power plants and transmission lines on Maryland's natural resources," December 2003, Appendix C: State-Wide Forecast of Electricity Consumption and Peak Demands in Maryland.

NERA, "Electricity Tariff Structure Review: Alternative Tariff Structures: A Consultation Paper," CER/04/239, July 1, 2004.

NERA, "Marginal Cost of Electricity Service Study," CER/04/240, July 1, 2004.

OFWAT Final Determinations. Future Water and Sewerage Charges 2000-05: Periodic Review 1999. November 1999.

OFWAT Setting water and sewerage price limits for 2005-10: Framework and Approach. Periodic Review 2004. March 2003.

Rohlfs, Jeffrey H. and Arturo Briceño, "Rate Rebalancing and Competition in Peruvian Telecommunications," Prepared for presentation at the International Telecommunications Society meetings held in Stockholm, Sweden, June 1998.

Romanian National Regulatory Authority for Communications, Decision for Approving the Regulation for the Realization of the Top-down Long Run Incremental Costing Model by Mobifon S.A., 18 December 2003.

Ros, A., and A. Banerjee, "Telecommunications Privatization and Tariff Rebalancing: Evidence from Latin America," *Telecommunications Policy* 24(3): 2000, pp. 233-52.

World Energy Council, "Pricing Energy in Developing Countries," June 2001.

Chapter V Cases by Topic Area

Table 5. Chapter V Cases by Topic Area

	Cases												
	Foster, Gómez-Lobo, and Halpern, June 2000.	Garg, Kabra, and Kacker, 2003.	GeoEconomics Associates Inc., 2002.	Hall, 1996.	Maryland Power Plant Research Program, December 2003.	National Economic Research Associates, July 1, 2004(a).	National Economic Research Associates, July 1, 2004(b).	OFWAT, November 1999.	OFWAT, March 2003.	Rohlfs and Briceño, June 1998.	Romanian National Regulatory Authority for Communications, 18 December 2003	Ros and Banerjee, 2000.	World Energy Council, June 2001.
Chapter V. Tariff Design													
A. Principles, Options, and Considerations in Rate Design		X	X			X	X	X	X		X		X
B. Economics of Alternative Price Structures			X	X		X	X	X	X	X			
C. Pricing for the Poor	X	X											X
D. Effects of Joint and Common Costs on Pricing			X	X		X	X	X	X		X		X
E. Effects of Comptition		X								X		X	
F. Demand Forecasting			X		X								

References

A. Principles, options and considerations in rate design, including conditions for deciding when tariff design is a regulatory concern

Core References

Baldwin, Robert, and Martin Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapter 15.

Provides an overview of pricing issues for regulating monopolies. Considers multipart tariffs, Ramsey pricing, and problems of cost recovery.

Berg, S., "Basics of Rate Design – Pricing Principles and Self-Selecting Two-Part Tariffs," in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 74-90.

Explains that two-part pricing and Ramsey pricing represent innovative ways to recover joint costs. Defines each and explains how Ramsey pricing improves efficiency.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapters 2-7.

Describes pricing issues in utility regulation, giving practical examples and explaining the underlying economics. Considers asset valuation, marginal cost pricing, peak load pricing, short-run and long-run marginal costs, effects of scale economies, externalities, Ramsey pricing, fully distributed costs, and effects of competition.

Sectoral References

ELECTRICITY

Borenstein, S., "Understanding Competitive Pricing and Market Power in Wholesale Electricity Markets," POWER Working Papers, PWP-067, University of California-Berkeley, 1999.

Proposes a definition of competitive prices in electricity markets, and then discusses the definition of market power in such markets. Shows that frequent

confusions between market power and competitive peak-load pricing arise in wholesale electricity markets and argues that these confusions have to be clarified in order to guarantee adequate regulatory intervention in those markets.

Green, R., "Electricity Transmission Pricing: An International Comparison," *Utilities Policy* 6: 1999, pp. 177-184.

Argues that in the case of electricity transmission, prices that closely reflect costs are constrained by the complexity of costs and hurdles to political implementation. Outlines six principles for transmission pricing to be short- and long-term efficient, and politically feasible. These criteria are reviewed using examples from eight studies of transmission pricing systems.

GAS

Okogu, B., "Issues in Global Natural Gas: A Primer and Analysis," International Monetary Fund Working Paper no. 02/40, 2002.

Gives an outlook of the natural gas industry and its evolution in the recent decades. Describes the structure of the industry and points to factors that may constrain its further development. Deals with the contracting process and its implications on the structure of the gas price. Both gas pricing and demand drivers are analyzed using evidence from the literature. Proposes a set of solutions to improve the efficiency of the pricing mechanisms in the natural gas industry.

TELECOMMUNICATIONS

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Modules 1, 4, and 6, Appendix B.

Provides a practical overview of telecommunications pricing issues and regulatory approaches.

Mitomo, H., "The Political Economy of Pricing: Comparing the Efficiency Impacts of Flat Rate vs. Two-Part Tariffs," *Communications and Strategies* 44: 2001, pp. 55-70.

Following the popularity of flat rates, in particular, in Internet, this paper compares its efficiency to that of another pricing scheme, namely, two-part tariffs. Shows by means of simulations that a change from two-part tariffs to flat rates has

negative implications for supplier's efficiency or profitability. Raises some questions about the economic principles lying behind the choice of flat rates.

WATER

Dinar, A., ed. The Political Economy of Water Pricing Reforms. Oxford, U.K.: Oxford University Press for the World Bank, 2000.

Collects eighteen papers that seek to incorporate political economy concepts in the analysis of reforms in water-pricing schemes. The papers cover such important issues as the impact of market structure and property rights on pricing regimes, the difficulties in regulating the water industry through pricing, and the importance of involving the public in rate design. The collection also includes papers that give a wide empirical overview of price reforms in this sector.

GeoEconomics Associates Inc., Economic Principles and Concepts as Applied to Municipal Water Utilities, Final Report to the Ontario Superbuild Corporation (project number SSB-018197), 2002.

Presents some economic principles and concepts that are applicable to municipal water servicing. Sketches the essential aspects of markets for water services. Then outlines the theory of water pricing and suggests alternative organizational, ownership and management arrangements for municipal water utilities. Applies the above principles and concepts to the Ontario's water servicing market.

OFWAT Final Determinations. Future Water and Sewerage Charges 2000-05: Periodic Review 1999. November 1999.

Describes customer priorities in U.K., profiles customer bills, describes prices' affects on bills and profitability, and profiles charges.

Other References

Berg, S., and J. Tschirhart, Natural Monopoly Regulation: Principles and Practice. Cambridge Surveys of Economic Literature Series, Cambridge University Press, 1988.

Provides a technical economic description of pricing issues.

Faruqui, A., and K. Eakin, eds. Pricing in Competitive Electricity Markets. Boston: Kluwer, 2000.

Provides technical analyses of various pricing issues in electricity, including consumer responses, effects of market design, risk management, and energy derivatives.

Laffont, J.J., and J. Tirole, A Theory of Incentives in Procurement and Regulation. Cambridge, MA: MIT Press, 1993.

Provides a technical economic description of pricing issues.

Key Words

Efficiency, Price structure, Rate structure, Marginal cost pricing, Marginal cost, Multi-part tariffs, Ramsey pricing, Two-part tariffs, Externalities, Class cost of service, Objectives

B. Economics of alternative price structures (linear and non-linear rates, peak-load pricing, multi-part tariff, price discrimination, etc.)

Core References

Berg, S., "Basics of Rate Design – Pricing Principles and Self-Selecting Two-Part Tariffs," in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 74-90.

> Explains that multipart pricing enables the supplier to create win-win options — bringing the marginal price down to incremental cost, while recovering current capacity costs via fixed monthly fees. Further explains that incremental cost pricing promotes the efficient use of society's resources, and price options enable the supplier to extract more consumer surplus than under uniform pricing. Further explains Ramsey pricing and its efficiency aspects.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapters 3-7, vol. II, Chapter 5.

> Describes pricing issues in utility regulation, giving practical examples and explaining the underlying economics. Explains economic efficiency in the context of pricing. Considers marginal cost pricing, peak load pricing, short-run and long-run marginal costs, effects of scale economies, externalities, Ramsey pricing, fully distributed costs, effects of competition, cream-skimming, and price discrimination.

Sectoral References

ELECTRICITY

Borenstein, S., M. Jaske, and A. Rosenfeld, "Dynamic Pricing, Advanced Metering, and Demand Response in Electricity Markets," CSEM Working Papers, CSEMWP-105, University of California at Berkeley, 2002.

Discusses the possibility of enhancing the participation of the demand side in electricity markets through dynamic pricing, which could help balance supply and demand. Provides an overview of the theory and practice of the different approaches used to achieve such an objective and concludes by suggesting a wider use of dynamic retail pricing. Argues that this measure would allow end-user prices to reflect changes in wholesale prices and the gap between supply and demand.

Schweppe, F., M. Caramanis, R. Tabors, and R. Bohn, Spot Pricing of Electricity. Boston: Kluwer, 1988.

Presents in both a descriptive and theoretical way the concept of spot pricing in the electricity industry. Provides a rigorous approach to power system operation and control and discusses applications of spot pricing for transactions by industrial customers and utilities. Extends the analysis to the case in which publicly owned utilities are subject to competition.

Viscusi, W. Kip, John M. Vernon, and Joseph E. Harrington, Jr., Economics of Regulation and Antitrust. Cambridge, MA: MIT Press, 2000, Chapter 12.

Discusses the economics of price structures, including fully distributed cost, price discrimination, and peak-load pricing.

World Energy Council, "Pricing Energy in Developing Countries," June 2001.

Examines historical cost recovery, marginal costs, opportunity costs, market-based pricing, subsidies, pricing for industrial customers, and special problems in a developing country context.

GAS

OECD/IEA, Natural Gas Pricing in Competitive Markets. Washington, D.C.: Organization for Economic Cooperation and Development, 1998.

Describes the process of introducing competition in the natural gas industry. Analyzes the main economic principles that apply to contracting and pricing mechanisms in a competitive framework. Surveys the reform experiences in the U.S., Canada, and the U.K., and discusses their applicability to other countries, particularly in continental Europe.

TELECOMMUNICATIONS

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 4.

Provides a practical overview of telecommunications pricing issues and regulatory approaches.

Romanian National Regulatory Authority for Communications, Decision for Approving the Regulation for the Realization of the Top-down Long Run Incremental Costing Model by Mobifon S.A., 18 December 2003.

Describes the economics of estimating incremental costs in telecommunications in compliance with European Union directives.

Romanian National Regulatory Authority for Communications, Decision for Approving the Regulation for the Realization of the Top-down Long Run Incremental Costing Model by Romtelecom S.A., 18 December 2003.

Describes the economics of estimating incremental costs in telecommunications in compliance with European Union directives.

WATER

Hall, D., ed., Marginal Cost Rate Design and Wholesale Water Markets: Advances in the Economics of Environmental Resources, vol. 1. Greenwich, CT: JAI Press, 1996.

Collects eleven papers analyzing the political economy of water and evaluating the success of emerging wholesale water markets and retail marginal cost pricing. Provides a methodology for the calculation of marginal cost for water rates, and applies it to the design of urban water rates. Surveys various case studies in which such policies have been implemented and discusses the importance of water markets as a mechanism to address water scarcity.

Komives, Kristin, and Penelope J. Brook Cowen, "Expanding Water and Sanitation Services to Low-Income Households." Note no. 178 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1998.

Explains that if service expansion is to be sustainable, a concessionaire must be able to recover its costs. Three potential disconnects between the tariff

structure and the regulatory objectives include water usage being below costs for low-consumption customers, a household with a water connection but no sewer connection, and the maximum connection fees not reflecting the true cost of connection.

Key Words

Price structure, Peak-load pricing, Efficiency, Marginal cost pricing, Marginal cost, Multi-part tariffs, Ramsey pricing, Two-part tariffs, Fairness, Social policy, Distributional justice, Externalities, Contract regulation, Franchising, Service continuity, Service availability, Performance standards, Objectives

C. Pricing for the poor

[NOTE: Readers should cross-reference this section with Chapter VI Section C.]

Core References

Chisari, Omar O., Antonio Estache, and Catherine Waddams Price, "Access by the Poor in Latin America's Utility Reform Subsidies and Service Obligations," Discussion Paper No. 2001/75, World Institute for Development Economics Research, United Nations University, Helsinki, September 2001.

> Identifies problems of increasing access by the poor and ensuring consumption affordability. Asserts that policy makers and academics focus mainly on cutting costs to increase coverage. Experience in Latin America indicates that the poor are often the last to benefit from increased access due to reform.

Ehrhardt, David, "Impact of Market Structure on Service Options for the Poor," Presented at Infrastructure for Development: Private Solutions and the Poor, 31 May - 2 June 2000 l London, UK.

> Discusses market structure options for utility reforms, with special attention to impacts on the poor. Considers entrants versus formal providers, price and quality options, payment mechanisms, subsidies, and regulatory process.

Foster, V., A. Gómez-Lobo, and J. Halpern, "Designing Direct Subsidies for the Poor – A Water and Sanitation Case Study," Note No. 211 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, June 2000.

Describes direct subsidies for making infrastructure services more affordable to the poor. Considers how governments pay part of the water bill of poor households that meet certain eligibility criteria. Describes case of Chile and illustrates how simulation techniques can be used to improve the effectiveness of such programs.

The World Bank, New Designs for Water and Sanitation Transactions Making Private Sector Participation Work for the Poor, Washington, D.C.: The World Bank (undated).

Discusses the importance of considering the poor in water reforms. Examines various elements of water reforms, including tariff reform, governance, and management changes. Discusses legal issues for helping the poor, including the regulatory framework, using competition, private sector involvement, and methods for addressing legal issues.

D. Effect of joint and common costs associated with network industries on pricing rules

Core References

Ergas, H., "Valuation and Costing Issues in Access Pricing with Specific Applications to Telecommunications, in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 91-112.

> Explains that common costs are likely to account for a substantial part of the total resources deployed in a telecommunications network. Argues that efficient recovery of these costs will require a mark-up over the attributable long-run costs of each service, including access and that the contribution sought for these costs from access services should reflect regulatory price distortions, notably so as to avoid inefficient entry. Further holds that to minimize the resulting economic costs, access prices should be structured in such a way as to secure the greatest contribution from infra-marginal traffic.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapters 3-5, 7.

> Describes pricing issues in utility regulation, giving practical examples and explaining the underlying economics. Explains economic efficiency in the context of pricing. Considers marginal cost pricing, peak load pricing, short-run and long-run marginal costs, effects of scale economies, externalities, Ramsey pricing, fully distributed costs, and price discrimination.

Sectoral References

TELECOMMUNICATIONS

Gasmi, F., Kennet, D., Laffont, J.J., and W. Sharkey, Cost Proxy Models and Telecommunications Policy: A New Empirical Approach to Regulation, Cambridge, MA: MIT Press, 2002, Chapter 9.

> Uses the cost function of a representative local exchange regulated telecommunications firm obtained from an engineering cost proxy model to assess the typical size of joint and common costs. Evaluates the extent of accounting and strategic cross-subsidizes that can be associated with vertical integration and their impact on pricing of the firm in the competitive segment.

Romanian National Regulatory Authority for Communications, Decision for Approving the Regulation for the Realization of the Top-down Long Run Incremental Costing Model by Mobifon S.A., 18 December 2003.

Describes the economics of estimating incremental costs in telecommunications and its use in pricing in a competitive environment.

Romanian National Regulatory Authority for Communications, Decision for Approving the Regulation for the Realization of the Top-down Long Run Incremental Costing Model by Romtelecom S.A., 18 December 2003.

Describes the economics of estimating incremental costs in telecommunications and its use in pricing in a competitive environment.

Key Words

Efficiency, Price structure, Marginal cost pricing, Marginal cost, Multi-part tariffs, Ramsey pricing, Two-part tariffs, Joint costs, Common costs

E. Effect of competition on decisions regarding tariff rebalancing, cross-subsidization, and funding of social obligations

[NOTE: Readers should cross-reference this section with Chapter VI Section C.]

Core References

Armstrong, Mark, "Regulation and Inefficient Entry," Nuffield College, Oxford, February 2000.

Explores regulation can promote inefficient entry. Considers protection of entrants, universal service obligations, asymmetric regulation, deregulation, access to essential facilities, price averaging, and regulation of price structures.

Cremer, H., F. Gasmi, A. Grimaud, and J.J. Laffont, "Universal Service: An Economic Perspective," *Annals of Public and Cooperative Economics* 72(1): 2001, pp. 5-43.

Gives a detailed account of the issues related to the definition, the economic justification, the cost, and the financing of universal service. Provides a systematic analysis of the tradeoffs raised by the implementation of universal

service in both a regulated and a deregulated market. Surveys some universal service experiences in the telecommunications and postal services.

Irwin, Timothy, "Price Structures, Cross-Subsidies, and Competition in Infrastructure." Note no. 107 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

States that price discrimination designed to favor one group over another generally does not withstand competition, but rebalancing the price structure has costs for some groups that may exceed the benefits they receive from increased competition. Options are discussed. Finds that most schemes in which one firm supplies services at low prices and is compensated by its competitors are in telecommunications. Also finds that the reform of the Chilean water supply industry replaced cross-subsidies with a price subsidy targeted at low-income households. Describes how New Zealand eliminated subsidies and relied on existing social safety nets.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapter 6.

Examines issues of pricing in the presence of competition. Discusses issues of cross subsidy and price flexibility.

Sectoral References

ELECTRICITY

Berg, S., "Basics of Rate Design – Pricing Principles and Self-Selecting Two-Part Tariffs," in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 74-90.

Explains that cost allocation manuals are becoming increasingly irrelevant as the electricity industry becomes more competitive. Argues that: (1) Evidence from other industries suggests that competition will force marginal price towards incremental cost; (2) Electric utilities are going to have to generate value for customers by devising new rate designs, which create win-win opportunities; and (3) Incremental cost pricing promotes the efficient use of society's resources, and price options enable the supplier to extract more consumer surplus than under uniform pricing — which enhances the financial viability of a firm under competitive pressure.

Hunt, Sally, Making Competition Work in Electricity. New York: Wiley & Sons, 2002, Chapters 16-18.

Examines transmission pricing and the functions of the Independent System Operator and the transmission operators. Discusses issues of market power and the roles regulators can play to control or disperse market power. Also discusses retail pricing with stranded costs.

GAS

Gomez-Lobo, A., "The Welfare Consequences of Tariff Rebalancing in the Domestic Gas Market," *Fiscal Studies* 17(4): 1996, pp. 49-65.

Asserts that competitive reforms in U.K. energy markets will make tariffs more cost-reflective, threatening cross-subsidies between consumer groups. Focuses on the welfare impact of competition on the traditional cross-subsidy, namely, the fact that the "standing charge," a charge that is independent of the amount consumed, is set smaller than the fixed cost while the unit price exceeds the marginal cost.

TELECOMMUNICATIONS

Gasmi, F., D. Kennet, J.J. Laffont, and W. Sharkey, Cost Proxy Models and Telecommunications Policy: A New Empirical Approach to Regulation, Cambridge, MA: MIT Press, 2002, Chapter 8.

Addresses the issue of the funding of universal service in an increasingly competitive telecommunications industry. Using a cost function estimated from an engineering cost proxy model and a "new regulatory economics" theoretical framework, explores the extent to which the traditional cross-subsidization mechanism used to finance universal service is still viable.

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 4.

Explains that the term "rebalancing" refers to moving the prices for different telecommunications services more closely in line with the costs of providing each service. Further states that: (1) Prices of telephone connections, monthly subscriptions, and local calls have traditionally been set below costs in many countries; (2) Unbalanced price structures are not sustainable in a competitive environment; and (3) Traditional unbalanced price structures are also inefficient in that higher-than-cost prices encourage uneconomic entry by high-

cost operators, and lower-than-cost prices discourage economic entry, even by low-cost operators.

Ros, A., and A. Banerjee, "Telecommunications Privatization and Tariff Rebalancing: Evidence from Latin America," *Telecommunications Policy* 24(3): 2000, pp. 233-52.

Addresses the relationship between network expansion and tariff rebalancing under privatization of telecommunication services. Using cross-sectional information on privatization programs in Latin American countries, shows how privatization is a policy that gives incentives for network expansion. Finds that tariff rebalancing, understood as an increase in residential service prices to reflect costs, also leads to network expansion and efficiency improvement.

Key Words

Efficiency, Price structure, Marginal cost pricing, Multi-part tariffs, Ramsey pricing, Two-part tariffs, Competition, Cross-subsidy, Universal service

F. Demand forecasting

[NOTE: Readers should cross-reference this section with Chapter IV Section B]

Core References

Green, R., "Utility Regulation – A Critical Path for Revising Price Controls." Note no. 133 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, Nov. 1997.

Describes sequence of tasks U.K. regulators use in price reviews.

Green, Richard, and Martin Rodriguez Pardina, Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapters 5-8.

Describes forecasting of costs, investment, and revenue in a price review setting. Further describes how these forecasts are incorporated into present value calculations.

Whittington, Dale, "The Challenge of Demand Forecasting in Pro-poor Infrastructure Projects" Departments of Environmental Science and Engineering, University of North Carolina Chapel Hill, 2002.

Examines approaches to demand forecasting, with particular attention to projects targeted for the poor.

Sectoral References

ELECTRICITY

Maryland Power Plant Research Program, "Maryland Power Plants and the Environment: A review of the impacts of power plants and transmission lines on Maryland's natural resources," December 2003, Appendix B: Determinants of Electricity Demand Growth in Maryland and Appendix C: State-Wide Forecast of Electricity Consumption and Peak Demands in Maryland.

> Describes determinants of electricity growth, the principles of econometric forecasting of electricity demand, the effects of demographic features. Provides case study of a demand forecast for Maryland.

Mehra M and A. Bharadwaj, "Demand Forecasting for Electricity," New Delhi, India: Tata Energy Research Institute, 2000.

> Considers the need for good forecasting and summarizes existing methods, including trend analysis, end-use method, the econometric approach, and time series methods. Discusses hybrid approaches. Also considers load curves, effects of new technologies, and data needs.

WATER

OFWAT Setting water and sewerage price limits for 2005-10: Framework and Approach. Periodic Review 2004. March 2003.

> Describes the process that Ofwat planned for its 2004 price review.

Key Words

Demand, Price, Price review, Forecast

Chapter VI. Quality, Social, and Environmental Issues

Introduction

Regulators often focus on issues of price, incentives, and market structure.[148] However, issues of service quality, achieving social objectives, and the environment – sometimes collectively called non-price issues – also receive considerable attention. As in the case of tariff design, there are instances in service quality, social, and environmental issues in which the interests of the operator and the interests of the government may coincide. An example is the case of prepaid cards for mobile service in telecommunications discussed in Chapter V. Telecommunications operators developed these cards without government direction and many poor are now able to have phone service as a result of these cards.

There exist, however, situations where the interests of the government differ from the interests of the operator.[149] For example, if the customer at the margin – i.e., the customer who is most indifferent about whether or not to purchase the service – is not very responsive relative to other customers to changes in service quality, then the operator has an incentive to under invest in quality. Furthermore, if the environmental impact of the utility service is an externality, then a profit-maximizing operator would under invest in environmental protection. An externality is an effect that is visited on someone who is not a party to the transaction.[150] For example, if producing electricity causes air pollution, people who are not purchasing the electricity may suffer from the air pollution. Absent government intervention or some other extra-market effort, this pollution effect does not affect the operator's profits, so the operator does not make production decisions that are beneficial from a welfare perspective. When the interests of the operator and the interests of the government do not coincide, the government may find it optimal to establish incentives for the operator to pursue the government's goals with respect to service quality, social issues, and the environment.

We consider these issues in this chapter. We discuss service quality issues and then environmental issues. We complete this narrative by considering social issues. Following this chapter's narrative is a list of references, organized by topic.

Quality of Service[151]

[148] Pricing, incentive regulation, and market structure are covered in Chapters V, IV, and II respectively.
[149] See Chapter I for a discussion of the importance of asymmetries between the operator and the government.
[150] Some references in Chapter V discuss pricing with externalities.
[151] See Section A.

In certain instances, regulatory schemes that incent the operator to decrease costs also incent the operator to lower service quality. This may be especially true for access sold to rivals because the operator not only saves costs of quality, but the lower quality access also decreases competitive pressure. The regulator may respond to these incentives by regulating service quality. Such regulations may take the form of minimum standards, rewards for improving quality, and penalties for substandard quality. Regulating service quality involves the steps of identifying the preferred level of service quality, designing a system for providing the operator with the incentive to offer this service quality, and developing a system for monitoring service quality and enforcing the standards.

The preferred level of service quality should reflect the value customers place on quality and the operator's cost of providing service quality. The appropriate level of quality equates marginal benefit and marginal cost.[152] In principle, the marginal benefit should be the marginal benefit to the average customer. This is difficult to determine in practice, but regulators nevertheless attempt to learn customer quality preferences through survey instruments, the complaint process, benchmarking studies, and choice of quality options. It is generally preferred that preferences be aggregated into a few indices that reflect the tradeoffs that customers make between various dimensions of service quality. This allows the operator to make economic tradeoffs when trying to achieve the preferred level of customer satisfaction in the least costly way. A customer tradeoff in service quality might be that the customer places more value on the purity of water than on consistent water pressure. The relative importance of these two dimensions of service quality would be reflected in their relative weights in the aggregate index. With respect to cost, the operator may find that achieving an incremental improvement in water purity is very costly, but that an incremental improvement in water pressure is inexpensive. The operator can offer customers and optimal balance of cost and quality if the operator has the flexibility to make production choices.

In some situations, it may be optimal for operators to offer grades of service, so that each customer can choose the service quality that best serves her need. This approach overcomes the need to identify the marginal benefit for the average customer because individual customers reveal their preferences in the purchasing choices that they make. The levels of quality offered and the prices charged should reflect both the marginal costs of quality and differences in customers' quality preferences. Price differences will generally be greater than the differences in marginal cost. If the operator failed to deliver the promised quality, customers would receive a refund based on the price paid and the price that would have been paid for the lower quality level, if the customer had chosen it.

Regulators can economize on costs of regulating service quality by monitoring a small number of quality indicators on a regular basis. These indicators may be sufficient for

[152] Chapter V describes marginal cost and how regulators estimate marginal cost.

determining whether there is a quality problem. Once a problem is indicated, a more thorough analysis, including collection of additional data, can be done.

The enforcement of service quality standards commonly occur annually or at price reviews, but other options are available. If quality is a problem, frequent monitoring may be in order because waiting to address the problem until the next price review might allow the problem to persist too long.

Penalties for low service quality should reflect the customers' loss of value. Conversely, rewards for exceeding service quality standards should reflect customers' gain in value. (Where feasible, offering customers a menu of options eliminates the need to quantify penalties and rewards.) Publishing statistics of operator performance can provide a powerful incentive to meet quality standards, especially if there is competition. This can be particularly useful in telecommunications because telephony services are what economists call experience goods, which means that customers cannot determine service quality unless they actually purchase and use the service. Publishing service quality monitoring results lets prospective customers learn what existing customers experience.

In some situations poor customers cannot afford cost-based prices for service that is equal in quality to that purchased by the general population. Regulators sometimes respond to this situation by allowing the operator to offer lower quality services to poor customers. Operators choosing this approach may find it profitable to serve poor customers, which would make both the poor and the operator better off. Section C in this chapter contains information on pro-poor policies. Chapter V Section C provides information on pricing for the poor.

Environmental and Safety Issues[153]

The three main trends in environmental regulation in recent years have been: (a) a shift from command and control regulation towards economic instruments that provide incentives for operators to choose optimal investments in environmental protection; (b) an increasing availability of information on the monetary value of environmental costs and benefits; and (c) an increasing tendency for environmental objectives to be determined in international fora. In addition, interactions between environmental regulation and utility regulation have grown in importance. There are a number of important interactions between the economic and environmental regulation of these sectors:[154] (a) environmental regulations may be a critical determinant of investment programs; (b) the rate setting process may affect a regulated company's incentives to respond to economic instruments; and (c) the economic regulator may be particularly well-placed to deal with certain sector specific environmental problems.

[153] See Section B.
[154] See Chapter I Section C and Chapter VII Sections A and D for information on roles for utility regulators and relationships with other government agencies.

Despite the trend towards the use of economic incentives, there remains a predominance of command and control in environmental regulation in which the government establishes standards and a penalty system for enforcing the standards. But even command and control systems can operate as incentive systems because operators sometimes weigh the costs of compliance against the costs non-compliance in making their production decisions. As a result, governments often carefully weigh the costs and benefits of environmental regulations to ensure that customers and citizens receive a net benefit from the regulations. The regulator may be involved in this cost-benefit analysis because of the regulator's expertise in understanding operator costs.

The interactions between economic and environmental regulation raise several issues. For example, they raise the question as to whether the economic and environmental regulation of the water and energy sectors should be institutionally integrated.[155] Also, regulatory policies for rate setting affect the operator's incentives in complying with environmental regulations.[156] One option for dealing with externalities in rate setting is to allow full pass through of externality charges. However, this reduces the operator's incentives to reduce its creation of externalities. Another option is for the regulator to forecast the cost of controlling the externality and to adjust the price-cap accordingly.[157] A third approach would be to allow partial pass through of the externality cost.[158] In some cases, the regulator may be able to shift the externality charge on to the users, rather than to the operator. This might be appropriate if customer demand is the primary driver of the externality and the operator cannot affect the amount of the externality nor its cost.

Social Aspects[159]

Social issues generally focus on access to and affordability of a service.[160] Some countries address these issues by including access or connection targets in concession contracts. This avoids trying to set up subsidy mechanisms later because the operator can consider the cost of the obligation at the time of bidding on the contract. However, once the contract is given the operator has an incentive to try to renegotiate or renege on the obligation, so monitoring and enforcement procedures, as well as evaluation criteria for the scheme itself, should be set out at

[155] See Chapter I Section C and Chapter VII Section A for information on roles of regulators and the scope of regulatory institutions.
[156] See Chapter IV for information on regulating the overall price level and Chapter V for information on price design.
[157] See Chapter IV Section B for details on price cap regulation.
[158] See Chapter IV Section A for information on other cost pass-through issues.
[159] See Section C.
[160] See Chapter V Sections C and E for information on pricing for the poor and funding subsidies for the poor.

the time of bidding.[161] The service obligation is generally based on what customers need and would be willing to pay, but for their poverty.

Sometimes service can be made affordable by changing price structures, as Chapter V on Tariff Structure discusses. For example, poor customers can sometimes afford cost-based usage fees, but not cost-based initial connection fees. In these situations, it may be optimal for the operator to provide customers with the option of paying their connection fee over time, perhaps through usage fees.[162] Customers may also prefer prepaid service, which allows customers to use only what they can afford. This has proven successful with mobile telephone service.

In other instances, the social policy for the poor uses an explicit subsidy. Not disconnecting households for non-payment is a form of subsidy. When the subsidy is included in a concession contract, the operator commits to a certain number of connections and a retail tariff in exchange for a subsidy. The concession, which may not be exclusive, is awarded to the operator asking for the lowest subsidy. Chile and other countries have applied this for establishing telecommunications in remote areas. Another strategy is for the country to provide consumption subsidies directly to customers.

Some regulators have found that, ceteris paribus, it is better to subsidize access than consumption. These regulators have found that access subsidies are superior to usage subsidies for encouraging poor customers to obtain access. It also encourages efficient usage because consumers base their consumption decisions on prices that reflect marginal costs. If consumption is subsidized, regulators generally limit the subsidy to a specified level of usage considered adequate to address essential requirements.[163]

If subsidies are to be used, the regulator or policy maker should establish methods for determining the amount of the subsidy, how funding for the subsidy will be collected, and how the subsidy will be distributed. It is generally accepted that the amount of subsidy should be the difference between the incremental cost of providing the service and the customer's ability to pay. In other words, the amount of subsidy should be just enough to ensure that the service provider does not receive a negative profit from serving the targeted customer, including any cross-elastic effects.[164] Funds should be collected and distributed in the least distortive manner. If markets are competitive, this means that the fund collection and distribution should be done in a competitively neutral manner. In monopoly markets, operators can efficiently internalize the

[161] See Chapter II Section C for information on renegotiation of concessions and franchises. See Chapter VIII Section D for information on negotiation processes.
[162] See Chapter V Sections A and B for information on optional tariffs.
[163] We would like to thank Winston Hay for this insight.
[164] A cross-elastic effect occurs when a change in the output of one service changes the demand or cost of another service. For example, an increase in the output of telecommunications sometimes causes an increase in the demand for electricity.

subsidy, but the competition for the market should be competitively neutral. A transparent subsidy system may be more necessary than in monopoly markets.

Concluding Observations

Experience is demonstrating that competition is an important instrument for service quality and social issues. Competition may not result in operators offering the optimal quality, but it is difficult for regulators to improve on competitive market results without significant information on customers' willingness to pay for quality. Competition provides operators with incentives to develop services, service qualities, and pricing arrangements that make services to the poor commercially viable. In situations where commercially viable services to the poor are technically infeasible, then subsidies may be needed. Competitive markets may also contribute to resolving some environmental issues if regulators and policy makers can create markets that allow operators to internalize the environmental externalities.

Regulators need information on operators and markets to optimally solving both price and non-price issues. Chapter VII describes ways that regulators collect and manage information.

Case Studies

Covarrubias, Alvaro J. and Kilian Reiche, "A case study on exclusive concessions for rural off-grid service in Argentina," in Energy Services for the World's Poor, Washington, D.C.: The World Bank, 2000, pp. 84-90.

Econ One Research, Inc. and ESG International, "Uganda Telecommunications: A Case Study in the Private Provision of Rural Infrastructure," July 30, 2002.

Economic Consulting Associates and Mercados de Energia S.A., "Emerging Lessons in Private Provision of Rural Infrastructure Services: Final Report – Guatemala," the World Bank, August 2002.

Foster, Vivien and Caridad Araujo, "Does Infrastructure Reform Work for the Poor? A Case Study from Guatemala," The World Bank, December 2001.

Hankins, Mark, "A case study on private provision of photovoltaic systems in Kenya," in Energy Services for the World's Poor, Washington, D.C.: The World Bank, 2000, pp. 92-99.

Jadresic, Alejandro, "A case study on subsidizing rural electrification in Chile," in Energy Services for the World's Poor, Washington, D.C.: The World Bank, 2000, pp. 76-82.

Ofgem, "Development of Multiple Interruption and Other Standards for Electricity Distribution: Consultation on Draft Determination of Overall Standard and Implementation Arrangements for Guaranteed Standard," March 2004.

OFWAT Final Determinations. Future Water and Sewerage Charges 2000-05: Periodic Review 1999. November 1999.

OFWAT Setting water and sewerage price limits for 2005-10: Framework and Approach. Periodic Review 2004. March 2003.

OFWAT, Ofwat Annual Report 2003-2004, 2004.

Pennsylvania Public Utilities Commission, 2002 Customer Service Performance Report: Pennsylvania Electric Distribution Companies & Natural Gas Distribution Companies, 2003.

Pennsylvania Public Utilities Commission, Report on 2002 Universal Service Programs & Collections Performance of the Pennsylvania Electric Distribution Companies & Natural Gas Distribution Companies, 2003.

Tremolet, Sophie and Joanna Neale, "Emerging Lessons in Private Provision of Infrastructure Services in Rural Areas: Water and Electricity Services in Gabon," The World Bank, Reference No. 8524, September 2002.

Chapter VI Cases by Topic Area

Table 6. Chapter VI Cases by Topic Area

	Cases												
	Covarrubias and Reiche, 2000.	Econ One Research, Inc. and ESG International, 2002.	Economic Consulting Associates and Mercados de Energia S.A., August 2002.	Foster and Araujo, 2001.	Hankins, 2000.	Jadresic, 2000.	Ofgem, 2004.	OFWAT, 1999.	OFWAT, 2003.	OFWAT, 2004.	Pennsylvania Public Utilities Commission, 2003a.	Pennsylvania Public Utilities Commission, 2003b.	Tremolet and Neale, 2002.
Chapter VI. Quality, Social, and Environmental Issues													
A. Quality of Service							X	X	X		X		
B. Environmental and Safety Issues										X			
C. Social Aspects	X	X	X	X	X	X						X	X

References

A. Quality of service

1. Rationale for regulation of quality of service

Core References

Baldwin, Robert, and Martin Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapter 19.

Describes regulation of service quality. Considers quality parameters, performance targets, economics of quality, and ways to value quality.

Forsyth, P., "Environmental Externalities, Congestion and Quality under Regulation," in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 185-196.

Argues that price cap regulation creates an incentive for the firm to supply a less than optimal level of quality, especially when access prices are regulated. Explains that congestion is essentially another aspect of quality, one that depends on the relationship of demand to capacity. Holds that because the firm cannot convert reductions in congestion into higher revenue because its price is capped, the firm has an incentive to provide too little capacity and allow congestion to be inefficiently high.

Green, Richard, and Martin Rodriguez Pardina. Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapter 8.

States that price controls provide an incentive to the firm to reduce quality, so performance standards may be necessary. Explains methods of control.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapter 2.

Explains why regulators should pay attention to the regulation of quality.

Sectoral References

ELECTRICITY

Meyrick and Associates, Electricity Service Quality Incentives Scoping Paper, Prepared for: Queensland Competition Authority, 4 July 2002.

Argues that price cap regulation provides incentives for the firm to decrease quality.

Ofgem, "Development of Multiple Interruption and Other Standards for Electricity Distribution: Consultation on Draft Determination of Overall Standard and Implementation Arrangements for Guaranteed Standard," March 2004.

Summarizes responses on proposed Multiple Interruption performance standards in electricity distribution.

WATER

Savedoff, William, and Pablo Spiller. "Government Opportunism and the Provision of Water," in Spilled Water: Institutional Commitment in the Provision of Water Services, edited by William Savedoff and Pablo Spiller. Washington, D.C.: Inter-American Development Bank, 1999, pp.1-34.

Discusses the causes of leakage, linking the problem with issues of commitment, opportunism, and finances. Describes the political context of water services and determinants of becoming stuck in an equilibrium that provides poor service. Discusses how to overcome these problems and ways of sustaining success.

Shirley, Mary M., and Claude Ménard. "Cities Awash: A Synthesis of the Country Cases," in Thirsting for Efficiency, edited by Mary M. Shirley. Washington, D.C.: The World Bank, 2002, pp.1-41.

Discusses quality issues in the context of yardstick competition, monitoring, performance targets, assignment of risks and rewards, incentives in tariff policies, and the roles of regulatory, judicial, and political institutions.

Key Words

Access pricing, Service quality, Customer value, Incentives

2. Developing a framework for quality of service regulation

Core References

Arblaster, Margaret, "Quality of Service Monitoring: Utility Regulators Forum," Discussion Paper prepared for the Australian Competition and Consumer Commission, Victoria, Australia, 1999.

> Outlines several features of an effective monitoring program. Discusses periodic reporting, explanations and justifications by service providers, roles of complaints-handling bodies and relevant regulators, and benchmarking studies and audits.

Forsyth, P., "Environmental Externalities, Congestion and Quality under Regulation," in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 185-196.

> States that regulation of quality is the most difficult problem regulators face because regulation breaks the nexus between price and quality. Further states that typically there is an attempt to identify what physical aspects of quality are important. Discusses relevant quality indicators and trade-offs.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapter 2, vol. II, Chapter 5.

> Explains why regulators should pay attention to the regulation of quality. Explains the relationship between quality and the concept of destructive competition.

Sectoral References

ELECTRICITY

Bakovic, T., B. Tenenbaum, and R. Woolf, "Regulation by Contract: A New Way to Privatize Electricity Distribution?" Energy and Mining Sector Board Discussion Paper Series Paper no. 7, March 2003.

> Describes quality and performance targets for electricity distribution. Provides country examples.

Council of European Energy Regulators, Quality of Electricity Supply: Initial Benchmarking on Actual Levels, Standards and Regulatory Strategies, 2001.

State that quality of service regulation should relate to transactions between companies and customers (for example, accuracy of estimated bills and actual meter readings), continuity of supply (for example, planned or unplanned service, their duration, and low voltage levels), and voltage quality.

Meyrick and Associates, Electricity Service Quality Incentives Scoping Paper, Prepared for: Queensland Competition Authority, 4 July 2002.

Details recommendations for focusing on performance standards most valued by customers.

TELECOMMUNICATIONS

Berg, Sanford, and John Lynch, "The Measurement and Encouragement of Telephone Service Quality," *Telecommunications Policy* 16(3): 1992, pp. 210-24.

Details an overall assessment index that combines multiple dimensions of quality, assigns weights to them (based on importance to customers), and aggregates the weights into a single score. Explains that this approach simplifies review of the company's performance and the company can be afforded flexibility to respond to technological advances and invest in those services that enhance its own self-interests and those of its customers.

WATER

OFWAT Updating the Overall Performance Assessment (OPA) – A Consultation. December 2003.

Examines alternative performance measures for water utilities. Considers weighting of measures, performance ranges, funding of enhanced service levels, water supply measures, drinking water quality, sewerage service measures, customer service measures, and environmental performance measures.

OFWAT, Linking service levels to prices, February 2002.

Examines policies for linking service levels to prices. Considers incentives that regulation creates for service (formal linkages and regulatory lag), weighting measures, differentiating between operators, and parameters for water supply, sewage, customer service, and environmental.

Key Words

Access pricing, Service quality, Customer value, Incentives, Benchmarking, Incentive regulation, RPI – X regulation

3. Developing and introducing performance standards

Core References

Arblaster, Margaret, "Quality of Service Monitoring: Utility Regulators Forum," Discussion Paper prepared for the Australian Competition and Consumer Commission, Victoria, Australia, 1999.

Describes a general framework in which performance indicators serve as "triggers" to amassing additional information. Explains that information must be reliable, verifiable, and subject to periodic review. Also explains that publishing findings of the company's performance requires regulators to determine how that information should be imparted, the breadth of the disclosure, the intended audience, mitigating circumstances that might affect the data, which agency(s) has responsibility for ultimate oversight, and the timing of report releases.

Baldwin, Robert, and Martin Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapter 19.

Describes regulation of service quality. Considers quality parameters, performance targets, economics of quality, and ways to value quality.

Green, Richard, and Martin Rodriguez Pardina. Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapter 8.

Explain that one possible approach to regulating service quality is to collect and publish data on the company's overall performance against a range of indicators, which may be most effective if there are several companies or if tougher price controls are threatened for the future unless standards improve. Describe a second method, which is to compensate consumers who are the victims of bad service. A third method is to include a direct link between the company's allowable revenue and its quality of service in the price control formula, which may be particularly beneficial in areas unsuited to individual compensation payments, such as fluctuations in voltage.

Sectoral References

ELECTRICITY

Bakovic, T., B. Tenenbaum, and R. Woolf, "Regulation by Contract: A New Way to Privatize Electricity Distribution?" Energy and Mining Sector Board Discussion Paper Series Paper no. 7, March 2003.

Explains that quality-of-service standards and associated penalties and rewards may be phased-in over time; however with regulation by contract, standards may not be changed during a multi-year tariff period unless the changes were pre-specified at the beginning of the tariff period or are agreed to by the licensee. Considers how standards may be based on the licensee's own past performance or the performance of other comparable licensees in the country and elsewhere in the world. Describes characteristics of a monitoring system and the system's purpose. Explains that the licensees should be allowed to recover costs of quality and compliance in their tariffs.

Davis, Ron, "Acting on Performance-Based Regulation," *Electricity Journal* 13(4): 2000, pp. 13-23.

Holds that performance standards should be set with respect to reliability, customer call centers, employee safety, and billing and customer complaints. Recommends that measures and targets to improve service quality be consistent with the company's business plan and long-term interests. States that in developing performance standards, an electric utility should: 1) understand its historic performance in order to develop an appropriate baseline for yardstick comparisons; 2) determine those areas where cost savings may be realized and quality may be approved; and 3)

begin collecting information on service quality and develop measures to be used for benchmarking performance.

Meyrick and Associates, Electricity Service Quality Incentives Scoping Paper, Prepared for: Queensland Competition Authority, 4 July 2002.

Describes sequential process for designing incentive schemes. Victoria, Australia, set minimum reliability standards for its distributors differentiating between short and long feeders, and in 2001 they plan to introduce quality incentives directly into the CPI – X price cap regulation as well as forcing payments to affected consumers. In South Australia, utilities receive points for quality achievements relative to specified targets.

Williamson, Brian, "Incentives for Service Quality: Getting the Framework Right," *Electricity Journal* 14(5): 2001, pp. 62-70.

Explains that to provide proper incentives, regulators should focus on all dimensions of quality that customers value directly and that can be expressed as objective, observable, and verifiable performance measures, not use comparative performance, establish a baseline, base the reward on the current level of quality, use a symmetric approach, consider capping rewards and penalties, and ensure that if an overall service quality index is used.

TELECOMMUNICATIONS

Berg, Sanford, and John Lynch, "The Measurement and Encouragement of Telephone Service Quality," *Telecommunications Policy* 16(3): 1992, pp. 210-24.

Provides a critique of the pass/fail minimum standards where regulators generally impose penalties for the performance of telephone companies below a targeted level but do not reward superior performance. In effect, they establish an asymmetric incentive system, giving companies little reason to surpass the minimum established benchmarks and respond effectively to technological changes in the industry.

Oodan, A.P., K.E. Ward, and A.W. Mullee, Quality of Service in Telecommunications, London: Institute of Electrical Engineers, 1997.

States that key steps for establishing a framework for regulation of service quality include developing a matrix to derive relevant quality of service criteria, identifying methods of determining customers' quality requirements and perceptions, identifying problems encountered in service-level agreements, outlining the process used by monitoring systems, identifying ways of protecting interconnected networks and testing interoperability, identifying cost drivers that contribute to network failures and heavy traffic congestion, and summarizing efforts of various organizations and countries to standardize measures for benchmarking purposes. Holds that regulators should publish quality information.

WATER

OFWAT Final Determinations. Future Water and Sewerage Charges 2000-05: Periodic Review 1999. November 1999.

Identifies performance standards and their rationale in U.K. water.

OFWAT Setting water and sewerage price limits for 2005-10: Framework and Approach. Periodic Review 2004. March 2003.

Describes quality standards and how they are incorporated into the 2004 price review.

Other References

Kingdom, Bill, and Vijay Jagannathan, "Utility Benchmarking," Viewpoint, Note No. 229. Washington, D.C.: World Bank Group, March 2001.

Says benchmarking can include quality, efficiency, affordability, or other aspects of performance that are conducive to comparative analysis.

Key Words

Service quality

4. Strategies to provide consumers' choice on QOS standards/price options

Core References

Baker, Bill, and Sophie Tremolet, "Regulating Quality." Note no. 221 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, October 2000.

State that quality is often a matter of consumer choice, so offering different levels of quality in such instances is equivalent to changing the economic value of the service, so the regulator should expect a different willingness to pay from each customer or group of customers. Recommends that regulators allow for the delivery of various price and quality bundles.

Meyrick and Associates, Electricity Service Quality Incentives Scoping Paper, Prepared for: Queensland Competition Authority, 4 July 2002.

Explains that higher reliability can be achieved for customers who choose such an option for a higher price by providing them with a primary selective service where they have access to multiple feeders so they are less susceptible to one feeder failing. Further explains that reliability guarantees are another variant on the price/service-offering concept. Information asymmetries and the resulting free-rider problem create problems.

Sectoral References

WATER

OFWAT, Linking service levels to prices, February 2002.

Examines policies for linking service levels to prices. Considers incentives that regulation creates for service (formal linkages and regulatory lag), weighting measures, differentiating between operators, and parameters for water supply, sewage, customer service, and environmental.

OFWAT Updating the Overall Performance Assessment (OPA) – A Consultation. December 2003.

Examines alternative performance measures for water utilities. Considers weighting of measures, performance ranges, funding of enhanced service levels, water supply measures, drinking water quality, sewerage service measures, customer service measures, and environmental performance measures.

Key Words

Benchmarking, Incentive regulation, RPI – X regulation, Service quality

5. Penalties and incentives for compliance with QOS standards

Core References

Arblaster, Margaret, "Quality of Service Monitoring: Utility Regulators Forum," Discussion Paper prepared for the Australian Competition and Consumer Commission, Victoria, Australia, 1999.

Provides a framework that regulators can use to monitor quality of service. Methods discussed for securing compliance with regulatory requirements include: comparative performing (benchmarking), enforcement of service standards through statutory penalties, price controls that include price adjustment mechanisms if performance falls below or exceeds benchmarks (depending upon whether a symmetric or asymmetric reward system is adopted), guaranteed payment requirements if performance fails to meet minimum standards, and prospective sanctions from courts or complaint handling bodies if the company's performance results in loss or damages.

OFWAT, Linking service levels to prices, February 2002.

Examines policies for linking service levels to prices. Considers incentives that regulation creates for service (formal linkages and regulatory lag), weighting measures, differentiating between operators, and parameters for water supply, sewage, customer service, and environmental.

Sectoral References

ELECTRICITY

Bakovic, T., B. Tenenbaum, and R. Woolf, "Regulation by Contract: A New Way to Privatize Electricity Distribution?" Energy and Mining Sector Board Discussion Paper Series Paper no. 7, March 2003.

Explains that, after a phase-in period, sanctions or penalties may be imposed for failure to meet pre-specified quality-of-service standards. Penalties should be related to estimates of the disutility experienced by the customer (based, where feasible, on estimates of the cost to the customer of not being served) and the costs likely to be incurred by the licensee in meeting the standards. Rewards may be granted. Penalties may be paid to individual consumers or to a general fund, administered by the Commission, which can be used to provide subsidies to economically disadvantaged customers.

Meyrick and Associates, Electricity Service Quality Incentives Scoping Paper, Prepared for: Queensland Competition Authority, 4 July 2002.

Explains that utilities in the U.K. have faced fines and forced compensation to consumers for failure to meet quality targets. At the time of publication, regulators in the U.K. planned to introduce a reward system based on performance relative to an estimated cost-quality frontier, though that plan was criticized for not taking account of consumer willingness to pay. The regulator of San Diego Gas & Electric used 'performance-based ratemaking', which uses financial incentives and disincentives to influence utility behavior in the desired direction.

WATER

OFWAT, Linking service levels to prices, February 2002.

Examines policies for linking service levels to prices. Considers incentives that regulation creates for service (formal linkages and regulatory lag), weighting measures, differentiating between operators, and parameters for water supply, sewage, customer service, and environmental.

OFWAT Updating the Overall Performance Assessment (OPA) – A Consultation. December 2003.

Examines alternative performance measures for water utilities. Considers weighting of measures, performance ranges, funding of enhanced service levels, water supply measures, drinking water quality, sewerage service measures, customer service measures, and environmental performance measures.

6. Incorporation of QOS issues into price reviews

Core References

Baldwin, Robert, and Martin Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapter 19.

Explains the conceptual attractiveness of linking changes in service quality levels to the price cap formula, but that such an approach could result in an oversupply or undersupply in quality levels if the marginal costs or benefits are estimated incorrectly and lead, in turn, to selection of an inappropriate quality coefficient in price cap formula. Identifies another problem, namely the difficulty of ensuring that all attributes of quality (since quality is multidimensional) are adequately captured in the price cap formula. Omission of any attribute might lead to quality deterioration.

Sectoral References

ELECTRICITY

Meyrick and Associates, Electricity Service Quality Incentives Scoping Paper, Prepared for: Queensland Competition Authority, 4 July 2002.

State that rewards and penalties should reflect the marginal willingness to pay for quality while exceeding the marginal cost of

supplying it, and in the first scheme penalties and rewards should be capped. These incentives should be included in the revenue cap of the form CPI – X + S, where S is a service quality parameter. Considers design issues.

WATER

OFWAT Final Determinations. Future Water and Sewerage Charges 2000-05: Periodic Review 1999. November 1999.

Describes quality improvement programs and their linkages with the price review.

OFWAT Setting water and sewerage price limits for 2005-10: Framework and Approach. Periodic Review 2004. March 2003.

Describes quality parameters and how they are incorporated in the 2004 price review.

Key Words

Information disclosure, Monitoring, Sanctions, Benchmarking, Incentive regulation, RPI – X regulation, Service quality

7. Effects of Competition on service quality

Core References

Baker, Bill, and Sophie Tremolet, "Utility Reform: Regulating Quality Standards to Improve Access for the Poor." Note no. 219 in Public Policy for the Private Sector. Washington, D.C.: World Group, October 2000.

Explains why quality standards, as part of privatization efforts, are generally set high for utility providers in developing countries. States that: (1) Regulator can authorize alternative providers to supply services at lower prices than the incumbent carrier; (2) Another option is to allow the carrier to offer diversified services assuming such services lend themselves to differentiated tariffs and the targeted group for the lower-price, lower-quality services can be identified; (3) Contracts between the government and provider should explicitly authorize flexible choice arrangements, including flexible payment arrangements, so that providers are not penalized for offering differentiated services.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. II, Chapter 5.

Discusses linkage between service quality and the concept of destructive competition.

Sectoral References

TELECOMMUNICATIONS

Roycroft, Trevor R., and Martha Garcia-Murrilo, "Trouble Reports as an Indicator of Service Quality: The Influence of Competition, Technology, and Regulation," *Telecommunications Policy* 24: 2000, pp. 947-967.

Shows that companies subject to competition invest in quality to differentiate products.

Key Words

Information disclosure, Monitoring, Sanctions

8. QOS standards and the poor

Core References

Baker, Bill, and Sophie Trémolet, "Regulating Quality." Note no. 221 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, October 2000.

Explains that quality is often a matter of consumer choice. Furthermore, offering different levels of quality in such instances is equivalent to changing the economic value of the service, so the regulator should expect a different willingness to pay from each customer or group of customers. Explains that if a private provider wants to serve the poor and remain profitable, it must diversify its pricing or supply arrangements, or both. Also, while data on poor consumers is scant, studies suggest that they are willing to pay a higher percentage of their income for infrastructure services than the rich—a measure of their desire for service.

Baker, Bill and Sophie Trémolet, "Utility Regulation: Regulating Quality Standards to Improve Access for the Poor Utility Reform," in Public Policy for the Private Sector. Note No. 219. Washington, D.C.: World Bank, October 2000.

Explains why quality standards, as part of privatization efforts, are generally set high for utility providers in developing countries and that these higher standards often result in higher costs for services, thus reducing access of low-income households to those services. An example of a government's agreement with alternative providers was an experiment in Buenos Aires in Barrio San Jorge. Residents paid a higher fee for water from the piped network or a lower fee for water drawn from groundwater sources that was too salty for drinking but was acceptable for other purposes.

Chisari, Omar O., Antonio Estache, and Catherine Waddams Price, "Access by the Poor in Latin America's Utility Reform Subsidies and Service Obligations," Discussion Paper No. 2001/75, World Institute for Development Economics Research, United Nations University, Helsinki, September 2001.

Discusses access and affordability for the poor. Cheaper technologies and various financing/lending schemes can lower costs for serving the poor, which increases access and affordability. Examines Latin American experiences.

Sectoral References

ELECTRICITY

Bakovic, T., B. Tenenbaum, and R. Woolf, "Regulation by Contract: A New Way to Privatize Electricity Distribution?" Energy and Mining Sector Board Discussion Paper Series Paper no. 7, March 2003.

Says quality-of-service standards need not be uniform across all customer categories or geographic areas. Instead, standards should be based on customers' preferences and their willingness to pay for the costs of providing the specified level of quality.

Key Words

Social policy, Distributional justice, Universal service, Subsidies, Cross-subsidy, Poor, Information disclosure, Monitoring, Sanctions

B. Environmental and safety issues

1. **Role of economic regulators in developing and overseeing environmental and safety issues, including effects of regulation on incentives for using renewable energy sources**
2. **Developing standards related to health, safety, and environmental factors**
3. **Models of interaction with agencies charged with concurrent oversight of health, safety, and environmental issues**

Core References

Forsyth, P., "Environmental Externalities, Congestion and Quality under Regulation," in Infrastructure Regulation and Market Reform: Principles and Practice, edited by Margaret Arblaster and Mark Jamison. Canberra, Australia: ACCC and PURC, 1998, pp. 185-196.

Explains that one option for dealing with externalities is to allow full pass through of externality charges; however, the operator would have no incentive to reduce its creation of externalities. Another option is for the regulator to forecast the cost of controlling the externality and to adjust the price-cap accordingly. A third approach would be to allow partial pass through of the externality cost. In some cases, the regulator may be able to shift the externality charge on to the users, rather than to the operator, which would be appropriate if customer demand is the primary driver of the externality, i.e., the operator cannot affect the amount of the externality nor its cost.

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapter 7.

Explains that externalities are generated to some degree in every economic transaction, and those transactions involving regulated firms are no different. Therefore, regulated firms and unregulated firms to behave in the same manner and whether the firm is regulated or unregulated the same review process should apply.

Kojima, Masami, "Leapfrogging Technology: Cost-Effective Solution for Pollution in Developing Countries?" Note no. 254 in Public Policy for the Private Sector, Washington, D.C.: World Bank Group, February 2003.

Explains that governments in developing countries should be cautious with technology-based environmental regulations – industrial-country practices may be costly because these countries have already "picked the low-hanging fruit," that is, they have already taken low-cost-high-impact measures, such as providing water connections and controlling disease. Recommends that developing countries try to leapfrog to existing industrial-country practices may miss taking low-cost-high-impact steps. Also, developing countries may not have sufficient industrial infrastructure to maintain the more expensive technologies. Lastly, the combination of country risk and technology risk may make it too costly to invest in some newer technologies.

OFWAT, Ofwat Annual Report 2003-2004, 2004.

Describes collaborations with environmental regulators, use of environmental considerations in pricing, getting consumer input on environmental issues, environmental policy recommendations, effects of incentives on decisions that affect the environment, and monitoring environmental impacts.

Smith, Warrick, "Utility Regulators: Roles and Responsibilities." Note no. 128 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

Explains that utility regulators' main focus is economic regulation to control market power. However, utilities are also subject to other regulation, including safety and environmental. Suggests that putting these different regulations under one agency concentrates expertise and avoids coordination costs, duplication of effort, and greater complexity. However, keeping economic regulation separate from safety and environmental regulation may be required to avoid conflicts and problems of having sector-specific regulations and general regulations under a single agency.

Sectoral References

ELECTRICITY

Hunt, Sally, Making Competition Work in Electricity. New York: Wiley & Sons, 2002, Chapter 5.

Explains that under traditional regulation, the costs of complying with environmental regulations were passed along to consumers; however, in restructured competitive markets, there is no explicit mechanism like this and operators view these as any other costs. Explains that spot prices will normally include the marginal environmental costs of the marginal generator. Also, the three methods of environmental control include best available control technology, output limitation, and cap-and-trade. Suggests that the cap-and-trade mechanism is the preferred method since it prices clean air and the cost of the permits goes directly into the market price of electricity, rather than indirectly through temporary or permanent closures of generating plants. As for green power, suggests that the aim should be to make it easy for them to enter competitive markets whenever they are economic and, if they are to be subsidized, to subsidize in a way that does not impact the mechanisms that make the market competitive.

OFGEM, Transmission investment and renewable generation: Consultation document, October 2003.

Examines how transmission investment affects renewable generation. Considers wind power, generation in remote areas, cost recovery, the effects of price controls, business risk, and policy options.

WATER

OFWAT Updating the Overall Performance Assessment (OPA) – A Consultation. December 2003.

Examines alternative performance measures for water utilities, including environmental performance measures.

OFWAT, Linking service levels to prices, February 2002.

Examines policies for linking service levels to prices, including environmental issues.

Key Words

Externalities, Tradable permits, Incentives, Penalties, Rewards, Monitoring, Environment

C. Social aspects

[NOTE: Readers should cross-reference this section with Section A and with Chapter V Section C.]

1. Regulatory strategies for promoting increased access and consumption affordability

Core References

Baker, Bill and Sophie Trémolet, "Regulation of the Quality of Infrastructure Services in Developing Countries," in Infrastructure for Poor People: Public Policy for Private Provision, Penelope J. Brooke and Timothy C. Irwin, eds., Washington, D.C.: The World Bank, 2003, pp. 233-275.

Describes how regulation of service quality can sometimes preclude operators from using low-cost technologies that could make service affordable for the poor. Examines how to use differentiated quality and alternate suppliers for the poor.

Ehrnhardt, David, "Impact of Market Structure on Service Options for the Poor," in Infrastructure for Poor People: Public Policy for Private Provision, Penelope J.

Brooke and Timothy C. Irwin, eds., Washington, D.C.: The World Bank, 2003, pp. 179-208.

Describes how mechanisms to ensure competitive markets improve service provision for the poor.

Estache, Antonio, Vivien Foster, and Quentin Wodon, Accounting for Poverty in Infrastructure Reform: Learning from Latin America's Experience, Washington, D.C.: The World Bank, 2002.

Examines strategies for serving the poor. Explains macroeconomic and microeconomic linkages between infrastructure reform and the poor and discusses setting priorities. Describes reforms' impacts on access and affordability for the poor. Describes approaches for improving access for the poor, including operator obligations, connection targets, low-cost technologies, subsidies and cross-subsidies, and open entry. Also describes approaches for improving affordability, including lifeline subsidies, means-tested subsidies, vouchers, balancing connection and usage charges, billing options, and prepaid service.

Lovei, Laszlo, Eugene Gurenko, Michael Haney, Philip O'Keefe, and Maria Shkaratan, "Scorecard for Subsidies: How Utility Subsidies Perform in Transition Economies," Note no. 218 in Public Policy for the Private Sector. Washington, D.C., October 2000.

Describes criteria for evaluating various subsidy schemes, including how well the poor are reached, the share of the subsidy that goes to the poor, the predictability of the benefit for the poor, the extent and significance of unintended side effects, and administrative cost and difficulty. States that the main types of utility subsidies in Central and Eastern Europe and the former Soviet Union are analyzed using a scoring system developed by the authors. Instructions on how to apply the scoring system are provided.

Sectoral References

ELECTRICITY AND GAS

Jadresic, Alejandro, "Auctioning Subsidies for Rural Electrification in Chile." Note no. 214 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 2000.

Explains that in Chile, the central government allocates funds to regional governments on the basis of need and their past performance in meeting needs, while regional governments in turn allocate funds in a form of a one-time direct subsidy to private companies to help cover investment costs. Describes the allocation of these funds.

Powell, S., and M. Starks, "Does Reform of Energy Sector Networks Improve Access for the Poor?" Note no. 209 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997, May 2000.

States that the fundamental cost characteristics of grid provision do not favor the provision of access to rural and poor populations, so grid-based electricity provision will not revolutionize access by the poor, but reductions in the fixed costs of transmission and distribution equipment, and innovations to reduce the costs of supplying remote areas, improve the prospects that grids will be extended to rural areas. However, the fixed costs of transmission and distribution equipment have not fallen enough to make it profitable to extend the grid to some rural populations. Concludes that extensions of the grid to these people must be subsidized.

Price, Catherine Waddams, "Better energy services, better energy sectors—and links with the poor," in Energy Services for the World's Poor, Washington, D.C.: The World Bank, 2000, pp. 26-32.

Examines direct and indirect effects of energy reforms on the poor. Considers effects of prices, quality improvements, access improvement, and environmental policies.

TELECOMMUNICATIONS

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 6.

Describes universal service and access mechanisms.

Wellenius, Bjorn, "Extending Telecommunications beyond the Market." Note no. 206 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, March 2000, pp. 1-12.

Explains that universal service support programs mainly seek to extend service to uneconomic areas and customers. Cost-effective measures to achieve widespread access focus on removing obstacles that prevent the market from working well, offering alternatives to standard service, and using market mechanisms to allocate responsibility for extending service beyond the market and to quantify and allocate any necessary funding.

WATER

Foster, V., A. Gómez-Lobo, and J. Halpern, "Designing Direct Subsidies for the Poor – A Water and Sanitation Case Study." Note no. 211 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, June 2000.

> Explains that subsidies directed at public water companies have often benefited the middle class rather than the poor. States that the main advantages of direct subsidies to customers are that they are transparent and explicit, and minimize distortions in the behavior of water utilities ant their customers. The main drawbacks are higher administrative costs and the difficulty of designing suitable eligibility criteria.

Komives, Kristin, and Penelope J. Brook Cowen, "Expanding Water and Sanitation Services to Low-Income Households." Note no. 178 in Public Policy for the Private Sector, 1998.

> Describes concession in La Paz and El Alto. Bidders identified the number of water connections they would make in exchange for a pre-specified tariff. Several service quality attributes were specified in the contract regarding water quality, continuity of service, water pressure and flow, and customer service. The contract also mandated that all new water and sewer connections must be in-house connections.

Rosenthal, Shane, "The Design of Manila Concessions and Implications for the Poor," Washington, D.C.: The World Bank, 2002.

> Examines the experience of Metro Manila's water and sanitation network. Concludes that the poor can benefit if the concessionaire has flexibility and alternative providers are allowed to serve markets where they have an advantage in doing so.

The World Bank, New Designs for Water and Sanitation Transactions Making Private Sector Participation Work for the Poor, Washington, D.C.: The World Bank (undated).

> Considers policies that affect the poor, including tariff reform, governance, sector regulation, legal frameworks, competition, and private sector participation.

Key Words

Costs, Social policy, Distributional justice, Subsidies, Universal service, Contracting out, Franchising

2. Development and funding of universal service obligations

[NOTE: Readers should cross-reference this subsection with Chapter V Section E.]

Core References

Chisari, Omar O., Antonio Estache, and Catherine Waddams Price, "Access by the Poor in Latin America's Utility Reform Subsidies and Service Obligations," Discussion Paper No. 2001/75, World Institute for Development Economics Research, United Nations University, Helsinki, September 2001.

> Discusses access and affordability for the poor. Cheaper technologies and various financing/lending schemes can lower costs for serving the poor, which increases access and affordability. Examines Latin American experiences.

Irwin, Timothy, "Price Structures, Cross-Subsidies, and Competition in Infrastructure." Note no. 107 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

> Explains that the government can fund price subsidies from general tax revenue or simply rely on existing social safety nets rather than price subsidies. Criteria for evaluating this option include whether the costs are clear and measurable, whether administrative costs are as low as possible, whether the necessary revenue is raised at least possible cost, and how well the program is targeted toward those the government most wants to help.

Sectoral References

ELECTRICITY AND GAS

Jadresic, Alejandro, "Auctioning Subsidies for Rural Electrification in Chile." Note no. 214 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 2000.

> Describes the Chilean system.

TELECOMMUNICATIONS

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 6.

Describes approaches for funding universal service/access subsidies.

Wellenius, Bjorn, "Extending Telecommunications beyond the Market." Note no. 206 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, March 2000, pp. 1-12.

Evaluates approaches for funding universal service.

Key Words

Costs, Subsidies, Universal service, Universal access, Competition

3. Connection and disconnection policies, alternative payment methods

Core References

Lovei, Laszlo, Eugene Gurenko, Michael Haney, Philip O'Keefe, and Maria Shkaratan, "Scorecard for Subsidies: How Utility Subsidies Perform in Transition Economies," Note no. 218 in Public Policy for the Private Sector. Washington, D.C., October 2000.

Explains that not disconnecting households who do not pay is one form of a utility service subsidy. States that this may seem to have no impact on a government's budget, but in the long run it is costly for utilities, which strains the government's budget by lowering corporate tax revenues and perhaps forcing the government to assume utility debt to prevent the utility from collapsing.

Sectoral References

WATER

Komives, Kristin, and Penelope J. Brook Cowen, "Expanding Water and Sanitation Services to Low-Income Households." Note no. 178 in Public Policy for the Private Sector, 1998.

Describes features of La Paz and El Alto concession.

OFWAT, Dealing with Customers in Debt – Guidelines, October 2002.

Explains and describes policies for dealing with customer debt. Encourages operators to be proactive in seeking solutions, provide flexible payment policies, be non-threatening in customer interactions, consider customers' ability to pay, and not discriminate against customers who have debt problems.

OFWAT. Paying for Water Customer Research. Accent Research for WaterVoice and Ofwat September 2003.

Examines customers' attitudes towards paying their bills. Considers attitudes relative to paying for other services, customer priorities, reasons for water and sewerage debt, importance of water debt, size of debt, and motivations for resolving debt. Also examines what encourages customers to pay bills, including awareness of payment facilities, installment arrangements, billing frequency, prepayment schemes, payment of water charges with rent, trust funds, restart schemes, and customers' use of consumer assistance services. Also examines operator techniques for managing debt, including water companies' processes when customers fall behind in their payments, customer communication strategies, debt recovery strategies, and penalties. Lastly considers the water and sewage bill, including awareness of the supplier, the size of the bill, how bills are calculated, and cross subsidies.

Key Words

Poor, Subsidies, Universal service, Universal access, Disconnection, Connection, Prices

4. Options for pro-poor regulatory strategies, including impacts of competition and techniques for subsidizing the poor

[NOTE: Readers should cross-reference this subsection with Chapter V Section E.]

Core References

Barja1, Gover and Miguel Urquiola, "Capitalization, Regulation and the Poor: Access to Basic Services in Bolivia," Discussion Paper No. 2001/34, World Institute for Development Economics Research, United Nations University, Helsinki, July 2001.

Analyzes privatization in Bolivia. Considers how the capitalization mechanism attracted foreign investment for the poor in urban areas, but not appreciably in rural areas.

Chisari, Omar O., Antonio Estache, and Catherine Waddams Price, "Access by the Poor in Latin America's Utility Reform Subsidies and Service Obligations," Discussion Paper No. 2001/75, World Institute for Development Economics Research, United Nations University, Helsinki, September 2001.

Discusses access and affordability for the poor. Cheaper technologies and various financing/lending schemes can lower costs for serving the poor, which increases access and affordability. Examines Latin American experiences.

Estache, Antonio, Vivien Foster, and Quentin Wodon, Accounting for Poverty in Infrastructure Reform: Learning from Latin America's Experience, Washington, D.C.: The World Bank, 2002.

Examines strategies for serving the poor. Describes approaches for improving access for the poor, including operator obligations, connection targets, low-cost technologies, subsidies and cross-subsidies, and open entry. Also describes approaches for improving affordability, including lifeline subsidies, means-tested subsidies, vouchers, balancing connection and usage charges, billing options, and prepaid service.

Klein, Michael, "Ways Out of Poverty: Diffusing Best Practices and Creating Capabilities – Perspectives on Policies for Poverty Reduction." Policy Research Working Paper No. WPS2990. Washington, D.C.: World Bank Group, March 2003.

Explains that the key to poverty reduction is the creation of productive jobs and growth processes in poor areas. Examines importance of rules that respect property rights. Holds that firms are the vehicles that spread best practices and productive jobs to areas where poor people live.

Explains importance of competition to ensure that new firms can enter the market, good firms face few barriers to growth, and substandard firms are allowed to fail. Further explains that in spreading best practices and more productive jobs, however, the lives of some people will be disrupted even while in the end raising living standards broadly. Identifies keys to dealing with politically popular programs that protect some groups and may undermine the workings of sound markets and the development of world-class capability in firms.

Sectoral References

ELECTRICITY AND GAS

Barnes, Douglas F. and Jonathan Halpern, "The role of energy subsidies," in Energy Services for the World's Poor, Washington, D.C.: The World Bank, 2000, pp. 60-66.

Examines the role of subsidies in serving the poor. Considers motivation for subsidies, access subsidies, targeting, non-payment of bill, excessive subsidies and technology choices. Reviews policies for deciding who and what to subsidize, where, when, and by how much. Also reviews institutional processes for subsidies.

Foster, Vivien, "Measuring the Impact of Energy Reform – Practical Options." Note no. 210 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, May 2000.

Explains that to improve the accuracy in reaching the target population, policymakers should examine the poverty profile of water utility customers and collect evidence on willingness to pay in relation to the true costs of service provision. Argues that full-scale subsidies should be avoided, since they eliminate incentives for the efficient use of water. Furthermore, the subsidy should be capped at some pre-determined subsistence consumption level, to not encourage excessive use of the service. Eligibility for subsidies should not be reassessed too frequently.

Powell, Stephen and Mary Starks, "Key drivers of improved access—service through networks," in Energy Services for the World's Poor, Washington, D.C.: The World Bank, 2000, pp. 44-50.

States that the fundamental cost characteristics of grid provision do not favor the provision of access to rural and poor populations, so grid-based electricity provision will not revolutionize access by the poor, but reductions in the fixed costs of transmission and distribution equipment, and innovations to reduce the costs of supplying remote areas, improve the prospects that grids will be extended to rural areas. However, the fixed costs of transmission and distribution equipment have not fallen enough to make it profitable to extend the grid to some rural populations. Concludes that extensions of the grid to these people must be subsidized.

Villagran, Eduardo, "Key drivers of improved access—off-grid service," in Energy Services for the World's Poor, Washington, D.C.: The World Bank, 2000, pp. 52-59.

Examines off-grid solutions for service to the poor. Considers fuel reliability, cost of doing business, customer information, financing, technological and commercial innovations, and the role of government.

TELECOMMUNICATIONS

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 6.

Describes universal service/access options and how regulators implement them.

WATER

Foster, V., A. Gómez-Lobo, and J. Halpern, "Designing Direct Subsidies for the Poor – A Water and Sanitation Case Study," Note No. 211 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, June 2000.

Considers direct subsidies for the poor. Examines the Chilean experience where the government paid a portion of the customer bill.

Galiani, Sebastian, Paul Gertler, Ernesto Schargrodsky, "Water for Life: The Impact of the Privatization of Water Services." Center for Research on Economic Development and Policy Reform Working Paper 154, Stanford University, CA, August 2002.

Considers impact of privatization on water services for the poor in Argentina. Finds that impacts have been positive. Further found that poor benefited the most from in terms of reductions in child mortality.

Komives, Kristin, and Penelope J. Brook Cowen, "Expanding Water and Sanitation Services to Low-Income Households." Note no. 178 in Public Policy for the Private Sector, Washington, D.C.: World Bank Group, 1998.

Describes features of La Paz and El Alto concession.

The World Bank, New Designs for Water and Sanitation Transactions Making Private Sector Participation Work for the Poor, Washington, D.C.: The World Bank (undated).

Discusses the importance of considering the poor in water reforms. Examines various elements of water reforms, including tariff reform, governance, and management changes. Discusses legal issues for helping the poor, including the regulatory framework, using competition, private sector involvement, and methods for addressing legal issues.

Other References

Clarke, George R. G., and Scott J. Wallsten, "Universal Service: Empirical Evidence on the Provision of Infrastructure Services to Rural and Poor Urban Customers," in Infrastructure for Poor People: Public Policy for Private Provision, Penelope J. Brooke and Timothy C. Irwin, eds., Washington, D.C.: The World Bank, 2003, pp. 21-75.

Examines subsides in infrastructure services. Finds little evidence that these subsidies benefit the poor.

Key Words

Market reform, Poor, Social policy, Distributional justice, Subsidies, Universal service, Universal access

5. Models of operator obligations for serving the poor

Core References

Chisari, Omar O., Antonio Estache, and Catherine Waddams Price, "Access by the Poor in Latin America's Utility Reform Subsidies and Service Obligations," Discussion Paper No. 2001/75, World Institute for Development Economics Research, United Nations University, Helsinki, September 2001.

Discusses access and affordability for the poor. Cheaper technologies and various financing/lending schemes can lower costs for serving the poor, which increases access and affordability. Examines Latin American experiences.

Econ One Research, Inc. and EMCON Consulting Group, "Northern Electricity Distribution Service in Northern Namibia: A Case Study in the Private Provision of Rural Infrastructure," July 31, 2002.

Examines rural electricity in Namibia. Draws lessons concerning policy preparation, government coordination, timeliness, private sector participation, customer relations, government interference with private operators, and political interference in the process.

Econ One Research, Inc. and ESG International, "Uganda Telecommunications: A Case Study in the Private Provision of Rural Infrastructure," July 30, 2002.

Examines rural telecommunications development in Uganda. Draws lessons concerning privatization, competition, application of both commercial interests, subsidies, differences between rural and urban customers, regulation of prices, and regulatory skills.

Key Words

Market reform, Poor, Social policy, Distributional justice, Subsidies, Universal service, Universal access

Chapter VII. Information Issues

Introduction

As we indicate above, regulators have three basic options for addressing asymmetries between the government and the operator with respect to objectives and information, namely, (1) facilitate competition, (2) gather information, and (3) apply incentive regulation. Chapter II addresses competition. Chapter IV addresses incentive regulation. Chapter II examines both information and incentive regulation issues. This chapter completes our discussion of how regulators can obtain, manage, and use information to address information asymmetries. It examines informational requirements, obtaining and managing information, data quality, reporting information, and public access to information. Following this chapter's narrative is a list of references, organized by topic.

Information in the Regulatory Process

The first step in decreasing the information asymmetry between the government and the operator is to identify the kinds of information that the regulator needs.[165] The regulator's responsibilities and instruments used for regulation determine the regulator's information needs, although they do not necessarily indicate what the regulator can realistically expect to gather and use.[166] Sufficient and accurate information is important because, without it, the information asymmetry between the regulator and the operator could lead to profit for the operator above its cost of equity; to the regulator making poorly-informed decisions on issues of market structure, service quality, and service availability; or to financial distress for the operator. In general, regulators gather operator accounting and operating statistics on a regular basis.[167] This information can be used to assess the operator's ability to operate efficiently,[168] the financial condition of the operator,[169] and market demand.[170] Additional information is needed for price reviews, perhaps including detailed explanations of past management decisions, adjustments that the operator has made to its historical records, and projections.[171]

There are at least two situations where the regulator may want to gather information from other jurisdictions, such as other counties. Agencies that regulate operators that serve multiple

[165] See Section A.
[166] Chapter I Section G provides an overview of regulatory instruments. The remaining chapters provide details on regulatory instruments.
[167] See Chapter III Sections B and C.
[168] See Chapter IV Section B.
[169] See Chapter III Section E.
[170] See Chapter V Section F for a discussion of forecasting demand.
[171] See Chapter IV for further information on conducting a price review.

jurisdictions may find it beneficial to develop uniform reporting requirements and to share data.[172] Also, information from other jurisdictions may be useful for benchmarking analyses.[173] The European Union, for example, used cross-country analyses to assist National Regulatory Authorities in establishing interconnection prices in telecommunications. UK regulators regularly benchmark their utilities against utilities in other counties. Regulators generally find such international comparisons useful, but care must be taken to ensure that the operating conditions in the comparator jurisdictions are sufficiently similar to those in the regulator's own jurisdiction to make the comparisons valid. Agencies that regulate operators that serve multiple jurisdictions may find it beneficial to develop uniform reporting requirements and to share data.[174] Data may be crosschecked across jurisdictions and regulators can share resources for audits.[175] Regulators can also use error-checking routines in spreadsheets, especially if operators submit data electronically. Regulators should require that data be submitted in a sufficiently disaggregated form to allow analysis.

Once the information needs have been defined, the regulator then needs to establish how the information with be gathered and managed.[176] Most regulators require operators to submit accounting and operating statistics annually, although some collect certain data, such as fuel costs, on a quarterly basis if there is a need to adjust prices, analyze seasonality of the data, or closely monitor patterns.

In developing their systems for managing information, regulatory agencies often seek to provide citizens and operators with greater access to information about the agency and the operators, promote transparency in the regulatory process, provide public interaction with the agency, protect information on customers and operators that should be kept private, ensure relevant information can be retained and retrieved accurately and efficiently, and provide cost effective means for operators to provide the agency with information.[177] Best practices are emerging on using the web and email for accomplishing these goals. Key issues are how to protect information on customers and operators that should be kept private and how to provide information in a way that is cost effective for both the agency and the stakeholders.

Concluding Observations

Information on the operator, the market, and other operators and markets are important for the regulator if she is seeking to decrease information asymmetries with the operator. There is another important information asymmetry – one in which the regulator knows more about its

[172] See Chapter III Section C for information on accounting requirements.
[173] See Chapter IV Section D for further information.
[174] See Section C.
[175] See Chapter VIII for other information on working with stakeholders and other government agencies.
[176] See Section B. See Chapter VIII Section A for information on other agency management issues.
[177] See Section D. See Chapter VIII for information on communicating with the public and other stakeholders.

processes and decisions than the operator, the public, and other stakeholders. This information asymmetry also affects the regulator's effectiveness, and is discussed in the next chapter.

Case Studies

Australian Competition and Consumer Commission, "Decision: Statement of principles for the regulation of transmission revenues: Information requirements guidelines," 5 June 2002.

IPART, "Draft Energy and Water License Compliance Policy," Independent Pricing and Regulatory Tribunal of New South Wales, September 2003.

Meyrick and Associates, Scoping Study into Data Collection Issues for Incentive Regulation, Report prepared for Australian Competition and Consumer Commission, 19 November 2003.

South African Telecommunications Regulatory Authority, Chart of Accounts and Cost Allocation Manual: Detailed Requirements for Fixed-Line Telephone Operators, September 19, 1999.

Chapter VII Cases by Topic Area

Table 7. Chapter VII Cases by Topic Area

	Cases			
	Australian Competition and Consumer Commission, 2002.	Independent Pricing and Regulatory Tribunal of New South Wales, September 2001	Meyrick and Associates, 2003.	South African Telecommunications Regulatory Authority, 1999.
Chapter VII. Information Issues				
A. Identifying Information Requirements	X	X	X	X
B. Systems for Obtaining and Managing Information		X		
C. Measures to Improve Data Quality				
D. Systems for Reporting Information and Public Access to Information				

References

A. Identifying informational requirements

Core References

Burns, P., and A. Estache, "Infrastructure Concessions, Information Flows, and Regulatory Risk." Note no. 203 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, December 1999.

Explains that because the asymmetry of information places the regulator at a disadvantage, the regulator must define its information requirements and data processes early in the design of the concession contract and transaction. It should take advantage of the government's leverage during bidding to extract information from concessionaires and commitments from them to provide continued flows of information to aid price review. Information provision is a two-way street. Details types of information to gather.

Green, Richard, and Martin Rodriguez Pardina. Resetting Price Controls for Privatized Utilities: A Manual for Regulators. Washington, D.C.: World Bank, 1999, Chapter 3.

Holds that the regulator should gather general accounting information, including past information, on an ongoing basis. For a price review, the operator should provide a business plan and projections of demand, operating costs, and investments.

Utility Regulators Forum, "National Regulatory Reporting for Electricity Distribution and Retailing Businesses," Australian Competition and Consumer Commission, Sidney, 2002.

Explains that if operators serving multiple jurisdictions are generally subject to multiple reporting requirements, these operators incur higher reporting costs than if there was a single, uniform reporting requirement. Discusses other problems. Establishes uniform reporting requirements for electricity distribution providers in Australia.

Sectoral References

ELECTRICITY

Australian Competition and Consumer Commission, Decision: Statement of principles for the regulation of transmission revenues: Information requirements guidelines, 5 June 2002.

Details information filing requirements for electricity transmission operators. Describes information needs for revenue caps. Describes policies for information disclosure and future information policy issues.

Foster, Vivien, "Measuring the Impact of Energy Reform – Practical Options." Note no. 210 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, May 2000.

Identifies indicators needed for assessing the impact of energy reform on the poor.

Meyrick and Associates, Scoping Study into Data Collection Issues for Incentive Regulation, Report prepared for Australian Competition and Consumer Commission, 19 November 2003.

Identifies data needs for incentive regulation.

Other References

Kahn, Alfred. The Economics of Regulation: Principles and Institutions. Cambridge, MA: MIT Press, 1988, Reissue Edition, vol. I, Chapter 7.

Summarizes some types of cost and demand information that regulators may need.

Key Words

Information, Assets, Costs, Investment

B. Systems for obtaining and managing information

Core References

The E-government Handbook for Developing Countries, Washington, D.C.: World Bank, 2002.

States that developing countries can use e-government practices to provide greater access to government information, promote civic engagement, make government more accountable, and provide development opportunities. The three phases of e-government are publish, interact and transact.

Energy E-Comm.com, "Energy Regulatory Commission Web Sites Don't Click," (2000) Energy E-Comm.com.

Describes best practices for web use by regulatory agencies, including providing up to date information on a wide range of topics, links to and information on operators, contact information, maps to offices, commissioners pictures and biographies, agenda schedules, how to file a complaint, and a directory of personnel.

Other References

Flaherty, David, "Privacy Impact Assessment Guidelines: An Essential Tool for Data Protection." Victoria, BC, Canada: David H. Flaherty, Inc., 2001. (Download at http://aspe.os.dhhs.gov/datacncl/flaherty.htm.)

An online guide to assessing privacy needs and impacts of government information on privacy.

Key Words

Information, Transparency, Privacy, e-Government

C. Measures to improve data quality

Core References

Foster, Vivien, "Measuring the Impact of Energy Reform—Practical Options." Note no. 210 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 2000.

Describes how to gather and process information on the effects of energy reforms on the poor.

NARUC Staff Subcommittee on Accounting and Finance, "Rate Case and Audit Manual," Washington, D.C.: National Association of Regulatory Utility Commissioners, 2003.

Describes auditing purposes and procedures. Includes studying the operator's accounting system, analyzing historical data, focusing the audit, reviewing past decisions of the regulatory agency, reviewing working papers, using external and internal audit reports, contacting other jurisdictions, managing the audit process, confidentiality procedures, and identifying records to be reviewed.

Utility Regulators Forum, "National Regulatory Reporting for Electricity Distribution and Retailing Businesses," Australian Competition and Consumer Commission, Sidney, 2002.

Establishes uniform reporting requirements for electricity distribution providers in Australia.

Key Words

Information, Assets, Costs, Investment, Social policy

D. Systems for reporting information and public access to information

Core References

The E-government Handbook for Developing Countries. Washington, D.C.: World Bank, 2002, pp. 1-20.

States that developing countries can use e-government practices to provide greater access to government information, promote civic engagement, make government more accountable, and provide development opportunities.

Energy E-Comm.com, "Energy Regulatory Commission Web Sites Don't Click," (2000) Energy E-Comm.com.

Describes best practices for web use by regulatory agencies.

Other References

Coglianese, Cary, "The Internet and Public Participation in Rulemaking." Kennedy School of Government, Harvard University, 2003 (see http://ksgnotes1.harvard.edu/research/wpaper.nsf/rwp/RWP03-022/$File/rwp03_022_coglianese.pdf).

Describes how governments can evaluate use of the Internet to increase public participation.

Flaherty, David, "Privacy Impact Assessment Guidelines: An Essential Tool for Data Protection." Victoria, BC, Canada: David H. Flaherty, Inc., 2001. (Download at http://aspe.os.dhhs.gov/datacncl/flaherty.htm.)

An online guide to assessing privacy needs and impacts of government information on privacy.

Key Words

Information, Transparency, Privacy, e-Government

Chapter VIII. Regulatory Process

Introduction

Recall that a basic problem of regulation is to overcome to the extent possible the asymmetries between the government and the operator.[178] But even if regulatory instruments overcome this asymmetry, it is still important to ensure that the actions of the government and the regulator match the long-term interests of the country's citizens. It may be tempting, for example, for politicians to pressure the regulator to pursue short-term political interests that hurt the longer-term interests of customers of the utility services.[179] To overcome such problems to the extent possible, countries adopt rules for regulation and government institutions that encourage regulation under the law,[180] as well as independence, transparency, predictability, legitimacy, and credibility of the regulatory system, to help ensure that regulation serves the long-term interests of the country.

This chapter addresses these issues. It first examines institutional design issues, such as the role of the regulator. Then review of regulatory decisions, ethics and stakeholder relations are discussed. Following this chapter's narrative is a list of references, organized by topic.

Institutional Design[181]

Proper institutional design is important for providing confidence to investors and customers that the regulatory process is credible, legitimate, and predictable. Regulation is credible if stakeholders can trust that commitments will be kept. Legitimacy means that the regulator is not captured by the operator or other special interests. Regulation is predictable if regulatory decisions are consistent over time so that stakeholders are able to anticipate how the regulator will resolve issues. Three main elements of institutional design are (1) the regulatory mechanism, (2) the existence of an independent, economically autonomous, well-funded and technically qualified regulatory agency, and (3) accountability mechanisms[182] to prevent favoritisms.

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[178] See Chapter I.
[179] This highlights what are in essence two principal-agent problems, one between the government (acting as the principal) and the regulator (acting as the agent) and another between the public (acting as the principal) and the government (acting as the agent).
[180] See Chapter I Section I for a discussion of the economic foundations of law.
[181] See Section A.
[182] See Chapter VII for discussion of regulators sharing information with the public, which helps with accountability.

In general the regulatory institution is considered independent if it operates under the law and has arms-length relationships with private interests, arms-length relationships with political branches of government, and organizational autonomy, including economic autonomy. Regulatory agencies are held accountable by having transparency in agency processes and through appeal processes. Commissioners or directors serve in effectively non-political positions.

The two main issues in defining a transparent regulatory process are the institutions to which the regulator is accountable and the set of mechanisms through which accountability takes place. Relevant institutions are the executive and legislative branches of government, a supra regulatory agency, the judges, and qualified consumers associations. Mechanisms for ensuring accountability include allowing stakeholders to appeal agency decisions to the courts, a detailed specification of the tasks to be performed by the regulator, clear rules and deadlines, transparency of the regulatory decisions (publication and reasonable explanation of decisions, existence of consultative bodies), an open regulatory process, existence of feedback procedures, the supervision of regulator actions by auditors and watchdogs, mechanisms of removal when moral incapacity or misconduct is proved, scrutiny of budget, and commissioners or directors serving fixed terms, being subject to restrictions on corruption and conflicts of interest, and being appointed by the government. Transparency promotes intellectual rigor, well-reasoned decision making, and coherent policy, and satisfies parties' right to know the reasoning process.

The three main issues in defining a utility regulator's role are the sector(s) covered, the regulator's role in relation to policy makers,[183] and the regulator's role in relation to other regulatory entities such as the competition agency.[184] Regulatory agencies can be industry-specific, sector wide or multi-sector depending on the size of the industries, scarcity of human resources, political risks, imperfection of decision making process, coordination capacities and the relevance of industry boundary problems. Regional regulatory agencies exist in some countries where legal traditions or a desire to be close to local conditions makes regional bodies desirable. Regulatory agencies are administrative regulatory bodies that act on behalf of the government to prevent market failure. Typical regulatory duties include standard setting, regulating prices and service quality, supervising and enforcing operator commitments, handling complaints, providing policy advice, monitoring competition, and settling disputes. Regulators may also monitor the financial performance of the sector, conduct auctions and grant concessions, have some normative functions directly related to issues like safety standards and regulatory procedures, and have competences with regards to environmental protection. A clear determination of responsibilities and procedures is relevant to successfully perform these tasks. Monitoring of access and competition is a key responsibility of regulatory agencies. This work is often performed in coordination with the country's competition authority.[185]

[183] This includes the regulator's authority to enforce her decisions.
[184] Chapter I Section C also covers the role of the regulator.
[185] Chapter II Section B discusses the utility regulator's relationship with the competition regulator.

Some agencies are structured with a board of directors appointed by the executive branch of government, while others are managed by an executive director. Usually the legislative branch participates by confirming the proposed directors or even appointing them. For an optimal institutional design directors should be highly qualified and independent of regulated firms, consumers, other stakeholders, and the political powers. Specific expertise is required to deal with diverse and highly specialized issues, so staffing should be based on a strict recruitment process and include an optimal mix of skills, appropriate training programs aimed at strengthening regulatory capabilities. Wide access to quality outsourcing, a sustainable salary structure, and independent financial sources are also important. To balance economic autonomy a close scrutiny by auditors and legislators is required.

Reviews and Appeals of Regulatory Decisions[186]

The specific mechanisms and procedures for developing, reviewing and appealing regulatory rules and decisions vary from system to system because they depend on historical and institutional peculiarities, which are often specific for each country. However, general principles apply, including inclusiveness, transparency, and simple methods for citizen participation. In this context, distinctions can be made between the executive, legislative and judicial interventions in the regulatory process as they represent different approaches to pursuing the country's interests. Checks and balances among these branches of government are in order to provide legitimacy and stability to the regulatory system.

An important step in the regulatory process is the choice of instruments, including administrative procedures, specific legislation, contracts and presidential decrees.[187] The choice of instrument affects processes for stakeholder input and appeal. For example, legislation may be used to define the powers of the regulator, agency procedures, and operator obligations and rights, including rights of appeal. Contracts might have different appeal procedures, including to international dispute resolution bodies, and different operators can be treated differently.

Countries often adopt two levels of appeals. The first level is to the regulatory agency itself, where stakeholders can ask the regulator to reconsider a decision. The second level is to an administrative tribunal or the court system, which are sometimes restricted to considering whether the regulator followed the law in making her decision. In some countries courts can also consider whether the regulator was substantively correct in her decision. This involves second-guessing the regulator, so courts sometimes defer to the regulatory agency because the regulator has more specialized knowledge than do the courts. Countries that regulate by license sometimes have another layer of appeal, namely the licensing authority. An appeal to the licensing authority may be triggered if the regulatory decision requires a change to the operating license. Another level of appeal may be to the legislative body or president. These appeals change the laws under

[186] See Section B.
[187] See Chapter I Section G for other information on regulatory instruments.

which the regulator operates and so are often reserved for problems in the structure of regulation itself.

Some regulatory controversies may be best resolved through alternative dispute resolution processes, such as arbitration, when traditional means of resolution are costly, time consuming, and unpredictable. With arbitration the parties voluntarily place in the hands of a third party the solution to their dispute, committing themselves to abide by its decision. The arbiter is often a collegiate body of persons, with expertise in the matter being disputed.

Ethics[188]

The regulator often emphasizes ethics to ensure that decisions are impersonal and impartial, and guided by values and reasoning without conflict of interest. Ethical challenges for regulators include the "revolving door," which is said to occur when the regulator's decisions are influenced by future employment concerns or past employment relationships. The financial interests of the regulator herself or of her family raise another ethical challenge, if these interests are related to the financial performance of the operator.

To address ethical issues, some countries adopt codes of conduct for regulators, which may restrict the regulator's future employment, prohibit the receiving of gifts, limit the regulator's personal investments, and restrict the regulator from being involved in decisions where the regulator cannot maintain fairness or the appearance of fairness.

Stakeholder Relations[189]

To ensure that the independent agency regulates under the law to serve the collective interests of the stakeholders rather than the interest of one or a small group of stakeholders, independent agencies should have arm's-length relationships with regulated firms, consumers, other stakeholders, and politicians. Examples of mechanisms for ensuring arms-length relationships include appeal processes, transparency, restrictions on corruption and conflicts of interest, and publication of an explanation for every decision. Some countries provide oversight committees or advisory bodies for their regulatory agencies, but these should be approached with caution as they can become instruments of influence for politicians and special interests

Two main aspects of regulatory processes are the existence of mechanisms to receive stakeholders´ inputs and to solve stakeholders' complaints in an intermediate, administrative body. Regulatory processes should allow stakeholders to present their opinions through open processes like public hearings. Stakeholder confidence can often be enhanced by having well-

[188] See Section C.
[189] See Section D.

established, ordered, and open interactions between the regulator and stakeholders.[190] However, formal hearings can be legalistic, costly, and slow, so regulators with a tradition of formal processes have begun using alternative procedures, such as negotiated settlements and arbitration. Some countries have experimented with informal processes, but issues of transparency lead many to add elements of formality.[191]

Concluding Observations

The regulatory process is the means by which the public regulates the government and the regulator, and by which the government regulates the regulator. By participating in and observing the regulatory process, constraining regulatory discretion through laws and appeals, and insisting on the development of and enforcement of codes of conduct, the public seeks to ensure that when the government addresses asymmetries between itself and the operator, that asymmetries between the public's knowledge and objectives and the government's knowledge and objectives do not frustrate the development of effective and efficient utility services.

Case Studies

Florida Public Service Commission, Inside the Florida PSC 2003, 2003.

Indiana State Ethics Commission, Code of Ethics for the Indiana Utility Regulatory Commission, Executive Order #93-12. See Indiana State Ethics Commission at http://www.state.in.us/ethics/laws/IURC-EO.html (downloaded August 26, 2003).

National Consumer Council, "Consumer Representation in Public Utility – A Review by the National Consumer Council." PD 02/E/96. London: NCC, 1996.

New Jersey Board of Public Utilities, "Code of Ethics."

Nigerian Communications Commission, Five-Year Strategic Management Plan: 2003 – 2007, 2003.

Office of Utility Regulation, Jamaica, Annual Report & Financial Statements 2002/03, 2003.

Ofgem, "Financial Penalties – The Process," 2003.

OFWAT, Having Your Say: Ofwat's code of practice on consultations, January 2002.

[190] See Chapter VII Section D for additional discussion on sharing information with stakeholders.
[191] One situation where difficult negotiations can occur is in the renegotiation of concessions or licenses. See Chapter II Section C for information on this topic.

OFWAT, Ofwat Complaints Procedure, March 2003.

OFWAT, Ofwat Annual Report 2003-2004, 2004.

Samarajiva, Rohan, "Alternative Regulatory Practices and Alternative Dispute Resolution," in Legal Aspects of Regulation in South Asia, S. K. Sarkar and Vivek Sharma, eds., New Delhi, India: Tara Energy Research Institute, 2002, pp. 36-44.

Sundar, S. and S. K. Sarkar, Framework for Infrastructure Regulation, Tata Energy Research Institute, New Delhi, India, 2000.

Uganda Communications Commission, Business Plan 2000-2002, 2001.

Chapter VIII Cases by Topic Area

Table 8. Chapter VIII Cases by Topic Area

	Cases													
	Florida Public Service Commission, 2003.	Indiana Ethics Commission	National Consumer Council, 1996.	New Jersey Board of Public Utilities	Nigerian Communications Commission, 2003.	Office of Utility Regulation, Jamaica, 2003.	Ofgem, 2003.	OFWAT, 2002.	OFWAT, 2003	OFWAT, 2004.	Pennsylvania Public Utilities Commission, 2002.	Samarajiva, 2002.	Sundar and Sarkar, 2000.	Uganda Communications Commission, 2001.
Chapter VIII. Regulatory Process														
A. Institutional Design Issues	X				X	X					X		X	X
B. Development, Review and Appeal of Regulatory Rules and Decisions					X		X						X	
C. Ethics		X		X										
D. Stakeholder Relations	X		X		X	X		X	X	X		X	X	X

References

A. Institutional design issues

Core References

Estache, A., and D. Martimort, "Politics, Transaction Costs, and the Design of Regulatory Institutions." Washington, D.C.: World Bank, 2002.

Develops a framework to analyze the diversity of transaction costs and agency issues in the design of regulatory institutions.

Guasch, J. Luis, and Pablo Spiller, Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story, Washington, D.C.: The World Bank Group, 1999, Chapter 3.

Describes the basic regulatory instruments and provides examples of where they have been used. Considers legislation, presidential decrees, and contracts.

Levy, Brian, and Pablo T. Spiller. "A Framework for Resolving the Regulatory Problem," in Regulations, Institutions, and Commitment: Comparative Studies in Telecommunications, edited by Brian Levy and Pablo T. Spiller. Cambridge, U.K.: Cambridge University Press, 1996, pp. 1-35.

Describes characteristics of infrastructure monopolies and how they affect optimal institutional design, that is to say, the optimal organizational answer to the nature of transaction costs arising from government opportunism or dynamic inconsistency of investment policies. Examines how developing countries' institutional endowments affect how they should design their regulatory governance. Defines institutional endowment, considering the legislative and executive institutions (mechanisms for appointment and for making and implementing laws and regulations), judicial institutions (mechanisms for appointment and for resolving disputes), customs and accepted norms, contending social interests, and administrative capabilities.

Sectoral References

ELECTRICITY

Bergara, M., W. Henisz, and P. Spiller, "Political Institutions and Electric Utility Investment: A Cross-Nation Analysis," September 1997. Revised version published in *California Management Review* 40(2): 1998, pp. 18-35.

Finds relevant evidence on the relationship between country institutional characteristics and investment in electricity sector. The study is based on a sample of 87 countries.

Other References

Guasch, J., J. Laffont, and Straub. "Renegotiation of Concession Contracts in Latin America." Mimeo, 2002.

Finds evidence on the relationship between institutional characteristics, like bureaucracy quality, and contract renegotiation. The study is based on a data set of 1,000 concessions awarded in Latin-America countries.

Ogus, Anthony, "Comparing Regulatory Systems: Institutions, Processes, and Legal Forms in Industrial Countries." Working Paper No. 35, Centre on Regulation and Competition, University of Manchester, U.K., 2002.

Provides a general comparison of regulatory institutions across countries.

1. Definitions of regulatory independence and institutional mechanisms to promote this (appointments, funding etc.)

Core References

Berg, Sanford, Ali Nawaz Memon, and Rama Skelton, "Designing an Independent Regulatory Commission." Working Paper 00-17, Public Utility Research Center, University of Florida, 2000.

Provides general guidelines and recommendations for introducing for refining an independent regulatory commission.

Estache, Antonio, "Designing Regulatory Institutions for Infrastructure – Lessons from Argentina." Note no. 114 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, May 1997.

Provides an analysis of the mutually related concepts of independence and economic autonomy. Argues that: (1) Regulators should operate independently from political pressures—from ministries and from the regulated enterprises, private or public; (2) Regulators should be appointed on the basis of professional rather than political criteria and should have formal protection from arbitrary removal during their term; (3) The appointment process should involve both the executive and the legislature, to ensure proper checks and balances; and (4) Regulatory agencies must first have their own resources.

Smith, Warrick, "Utility Regulators: The Independence Debate." Note no. 127 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

Analyzes the extent of discretion and the relationship between independence and accountability. Argues that regulatory independence is favored when there is a distinct legal mandate independent of ministerial control, professional criteria prescribed for board appointment, executive and legislative branches involved in appointment process, fixed term appointments and protection from arbitrary removal, staggered terms, autonomous budget and reliable sources of funding.

Tenenbaum, Bernard, "The Real World of Power Sector Regulation." Note no. 50 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, June 1995.

States that the notion of an independent regulatory commission does not mean that the regulatory entity needs to be truly independent, since independence does not mean the absence of accountability. Furthermore, independence does not imply, either, that the regulatory entity should have complete authority over all possible decisions affecting the utility sector. Divisions of responsibilities are typical. Argues that what ultimately matters is not whether the regulatory entity is independent, but whether the government can give a credible commitment to investors and consumers. An alternative to independence is a completely specified regulatory regime that leaves little or no discretion to the regulatory entity, like the approach taken in Chile and Peru.

Sectoral References

ELECTRICITY

Brown, Ashley C., and De Paula, Ericson, "Strengthening of the Institutional and Regulatory Structure of the Brazilian Power Sector." World Bank Report on the PPIAF Project for Brazil Power Sector, Task 4. Washington, D.C., December 2002.

Explains that the funding of regulatory agencies is central to the balance between independence and accountability. Describes balancing accountability, independence, predictability, and dependability. Argues that there must be a legal prohibition against diversion of regulatory fees to other use by the Government.

Johannsen, Katja Sander, **"**Regulatory Independence in Theory and Practice – A Survey of Independent Energy Regulators in Eight European Countries," February 2003.

Provides a comparative assessment of regulatory independence of eight European electricity regulators (Austria, Denmark, Greece, Ireland, Italy, Luxembourg, Northern Ireland and Spain). Finds a significant variation in both the institutional design and the role played by independent regulatory authorities.

Johannsen, Katja, Anders Larsen, Lene H. Pedersen, and Eva M. Sørensen, "Dimensions of Regulatory Independence – A Comparative Study of the Nordic Electricity Regulators." Copenhagen: Institute of Local Government Studies, 2003.

Examines how far the theoretical concerns of regulatory independence are reflected in the institutional design of regulatory authorities. Also compares the independence of electricity regulators in the Nordic countries.

TELECOMMUNICATIONS

Min, Wonki, "Telecommunications Regulations: Institutional Structures and Responsibilities." Working Paper no. 237, Organization for Economic Co-operation and Development (OECD), Washington, D.C., 26 May 2000.

Describes how independence can be strengthened if: (1) The regulator is structurally separate from the Ministry; (2) "The head of the regulatory body is appointed by the head of the Government (i.e. President or Prime Minister) with the approval of the legislative body;" (3) The regulator is not a single person (e.g. a director general), but is a collegiate body (e.g. a commission); (4) The commissioners have fixed, staggered terms; (5) Only the courts can overturn the decisions of the regulatory body; and (6) The regulator has autonomy in making personnel changes. Also discusses the relationship of the regulator to the policy-making body.

Other References

Baudrier, Audrey, "Independent Regulation and Telecommunications Performance in Developing Countries." Working Paper, University of Paris Panthéon-Sorbonne and Autorité de Régulation des Télécommunications, September 2001.

Defines independence and finds that it has a positive impact on the growth rate of telecommunications penetration.

Besley, Timothy, and S. Coated, "Elected versus Appointed Regulators – Theory and Evidence," NBER Working Paper W7579. Cambridge, MA: National Bureau of Economic Research, 2000.

Contrasts direct election with political appointment of regulators, arguing that when regulators are appointed, regulatory policy becomes bundled with other policy issues the appointing politicians are responsible for. Discusses how lack of voter interest affects regulatory policy outcomes.

Stern, Jon, " Effective Utility Regulation and Independent Regulation: What Makes an Independent Regulator Independent?" *Business Strategy Review* 8(2), 1997, pp. 67-74.

Argues that formal regulatory independence and accountability is not always a necessary condition for effective regulation (though where feasible and effective it carries potential economic benefits). Explains how an informal or advisory regulatory system may work better in some situations.

Key Words

Accountability, Independence, Transparency, Dependability, Budgets, Funding

2. Agency responsibilities (sectoral coverage, tier of government, functions, etc.)

Core References

Estache, Antonio, "Designing Regulatory Institutions for Infrastructure – Lessons from Argentina." Note no. 114 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, May 1997.

Provides a description of the design of regulatory institutions for gas and power, water and telecommunication industries in Argentina. Discusses institutional design issues and summarizes the main functions and structural characteristics of the Energy Regulatory Agency.

Florida Public Service Commission, Inside the Florida PSC 2003, 2003.

Describes the Florida Public Service Commission's responsibilities, authority, and practices, including relationship with other governmental bodies and sector coverage.

Kahn, Alfred, The Economics of Regulation: Principles and Institutions, Cambridge, MA: MIT Press, 1988, vol. I, Chapter 2.

The three fundamental roles of regulators are to regulate the quality of service, the rate level, and the rate structure. Explains regulatory techniques and issues in each of these three roles.

Smith, Warrick, "Utility Regulators: Roles and Responsibilities." Note no. 128 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

Examines the utility regulator's sector scope, its role in relation to ministers, and its role in relation to other regulatory entities. Makes a case for multi-sector agencies by arguing that they allow the pooling of scarce expertise, reduce the risk of industry and political capture and of inconsistency in regulatory approaches across sectors, and they help to deal with the blurring of industry boundaries.

Sectoral References

ELECTRICITY

Brown, Ashley C., and Ericson De Paula, "Strengthening of the Institutional and Regulatory Structure of the Brazilian Power Sector." World Bank Report on the PPIAF Project for Brazil Power Sector, Task 4, Washington, D.C., December 2002.

Examines regulatory roles in granting concessions, conducting auctions, and sector planning. Roles in auctions include setting the terms and conditions and ensuring that auctions are conducted fairly and transparently. Describes potential conflicts of interest in having regulators involved in concessions and auctions. Also describes key considerations in deciding whether regulators should have roles in sector planning.

TELECOMMUNICATIONS

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 1.

Describes telecommunications regulators' roles as implementers of policies set by the government.

Other References

Delfino, Jose, and Ariel Casarin, "The Reform of the Utilities Sector in Argentina." Discussion Paper No. 2001/74, World Institute for Development Economics Research, (WIDER), United Nations University, Helsinki, 2001.

> Provides an assessment of the welfare changes and the distributional impact associated with the privatization of telecommunications, electricity, natural gas, and water and sewerage services of the Gran Buenos Aires area.

Laffont, J., "Multiregulation and Development," World Bank Development Report, Mimeo, 2000.

> Develops an agency framework for the analysis of sector specific and multi-sector regulatory agencies in developing countries.

3. Mechanisms for ensuring accountability of regulatory decisions (due process, record keeping, content of written decisions, etc.)

Core References

Brown, Ashley C., and Ericson De Paula, "Strengthening of the Institutional and Regulatory Structure of the Brazilian Power Sector." World Bank Report on the PPIAF Project for Brazil Power Sector, Task 4, Washington, D.C., December 2002.

> Explains the importance of transparency. States that the critical element on the reasoning and integrity implicit in the regulatory process is that no substantive opinion is rendered without full explanation, that directors clearly reveal the thought process by which they arrived at their decision(s) and opinion(s). Disagreements should be over matters of substance and not a matter of how fair or honest the process itself was. Explains that transparency also demands that all of the evidence, be in fact, opinion, or argument, that was presented to the decision makers in an effort to persuade them be publicly exposed. Absent compelling circumstances, no information should be withheld from public view.

Estache, Antonio, "Designing Regulatory Institutions for Infrastructure – Lessons from Argentina." Note no. 114 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, May 1997.

Holds that accountability requires transparency in the regulatory agency's decision-making process, and clear, simple procedural rules. Most important are: a) Rules setting deadlines for decisions; b) Rules requiring detailed justifications and nonpolitical reviews of decisions; c) Processes to ensure that all concerned parties have the opportunity to express their views in public hearings and to appeal decisions; and d) Rules to permit the removal of regulators in cases of proven misconduct. States that another key factor in accountability is the number of regulators.

OECD, Building Public Trust: Ethics Measures in OECD Countries, PUMA Policy Brief No. 7, September 2000.

Describes common ethics criteria in OECD countries. Discusses reasons for ethical conduct. Scores criteria according to frequency of application.

Other References

Paul, Samuel, "New Mechanisms for Public Accountability: The Indian Experience." See http://www.undp.org/governance/docsaccount/new-mechanisms-accountability.pdf.

Provides an assessment of some initiatives to enhance public accountability in India, including the creation of citizen charters in important public services, legislation to facilitate the public's right to information, and experiments in e-governance in sectors and departments serving business and citizens in general.

Key Words

Information, Transparency, Independence, Accountability, Regulation, Process

4. Structuring, staffing, funding requirements

Core References

Academy for Educational Development, "Fiscal Autonomy Review: Comparative Study of Regulatory Fiscal Autonomy Around the World," October 20, 2003.

Compares fiscal autonomy of regulatory institutions around the world. Findings consider funding sources, how agency actions affect funding, funds stability, and funding mechanisms.

Florida Public Service Commission, Inside the Florida PSC 2003, 2003.

Describes the organization and activities of the Florida Public Service Commission and its funding.

Nigerian Communications Commission, Five-Year Strategic Management Plan: 2003 – 2007, 2003.

Describes the organization of the Nigerian Communications Commission and its strategic plans.

Smith, W. "Utility Regulators – Decisionmaking, Structures, Resources, and Start-Up Strategy." Public Sector Note no. 129. Washington, D.C.: World Bank, 1997.

States that governments creating specialized regulatory agencies must make decisions on a wide range of issues. Examines decision-making structures, resources, and startup strategy, emphasizing the situation of developing countries.

Uganda Communications Commission, Business Plan 2000-2002, 2001.

Describes the organization of the Uganda Communications Commission. Identifies agency strengths, weaknesses, opportunities, threats, objectives, projects and project plans, and finances.

Key Words

Agency structure, Training, Accountability, Independence, Ethics

B. Development, review and appeal of regulatory rules and decisions

1. Mechanisms for ensuring effective decision-making

Core References

Baldwin, R., and M. Cave, Understanding Regulation: Theory, Strategy, and Practice, New York: Oxford University Press, 1999, Chapters 7, 9, and 10.

Examines the benefits and costs of regulation, including how countries evaluate regulatory agency costs and benefits. Considers when self-regulation may be effective.

Black, Julia, "Using Rules Effectively" in Regulation and Deregulation, edited by C. McCrudden. Oxford: Oxford University Press, 1990.

States that command and control regulation implies a proper use of rules. Discusses the relevance of using rules effectively and setting standards, in order to achieve legitimacy and avoid counterproductive regulation.

Holburn, G., and P. Spiller, "Interest Group Representation in Administrative Institutions: The Impact of Consumer Advocates and Elected Commissioners on Regulatory Policy in the United States." UCEI Energy Policy and Economics Working Paper No 002, University of California-Berkeley, 2002.

Estimates the effect of consumer advocates on commissions and regulatory policy.

Hossain, Kamal, "Review and Appeal of Regulators' Decisions in the South Asian Context," in Proceedings of the SAFIR Workshop on Regulatory Strategy, S. K. Sarkar, editor, New Dehli, India: Tara Energy Research Institute, 2001, pp. 17-24.

Contrasts the perspectives, expertise, and roles of regulators and judges. Further considers regulatory process and the scope for review.

Smith, W., "Utility Regulators – Decision making, Structures, Resources, and Start-Up Strategy." Public Sector Note no 129, World Bank, Washington, D.C., 1997.

Examines the decision making structure, the strategy for creating regulatory agencies and the role of financial and human capital.

Sectoral References

GAS

Darr, Frank P., "A State Regulatory Strategy for the Transitional Phase of Gas Regulation," *Yale Journal on Regulation* 12 (1): 1995.

> States regulators should adopt a system of advanced planning and incentive rate setting. With planning utilities and regulatory commissions can reduce the level of regulatory risk inherent in the changing environment.

Key words

Cost-benefit analysis, Standards setting

2. Choice of regulatory instrument

[NOTE: Readers should cross reference this subsection with Chapter I Section G.]

Core References

Guasch J., and P. Spiller, "Regulation and Private Sector Development in Latin America." Washington, D.C.: World Bank, 1995.

> Establishes a direct relationship between instruments and regulatory credibility. Regulators legitimacy and regulation itself are achieved through different regulatory instruments, for instance, administrative procedures, contracts and so on.

Guasch, J. Luis, and Pablo Spiller, Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story, Washington, D.C.: The World Bank Group, 1999, Chapter 3.

> Describes the basic regulatory instruments and provides examples of where they have been used. Considers legislation, presidential decrees, and contracts.

McCubbins, M. D., R. G. Noll, and B. R. Weingast, "Administrative Procedures as Instruments of Political Control," *Journal of Law, Economics and Organisation* 3: 1987, pp. 243-277.

> Developing a critique of judicial review literature, recommends the use of administrative procedures as a regulatory instrument that enhances the effectiveness of regulation.

Sectoral References

ELECTRICITY, GAS, AND WATER

Prosser, T., Law and the Regulators, Oxford, U.K.: Clarendon Press, 1997, Chapters 4-6.

> Draws lessons from the liberalization process and examines regulation both without and through competition. Includes chapters dedicated to electricity, water and gas.

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 1.

Describes structures and practices of telecommunications regulatory agencies.

Thatcher, Mark, "Regulatory Reform and Internationalization in Telecommunications, in Industrial Enterprise and European Integration edited by J. Hayward. Oxford, U.K.: Oxford University Press, 1995, pp. 239-269.

Builds upon the idea of convergence in telecommunications reform around the world. Examines the new framework that emerged after privatisation in Europe, focusing on the interaction between the changing strategies of governments and public telecommunication operators at the national level, and regulatory reform in the European Union context.

Other References

Landes, W., and R. Posner, "The Private Enforcement of Law," *Journal of Legal Studies* 4: 1975, pp. 1-46.

Examines the main arguments in the debate on public and private enforcement, and law effectiveness.

Stewart, R., "Regulation and the Crisis of Legalism in the US," in Law as an Instrument of Economic Policy, edited by Terence Daintith. European University Institute, Series A, Law, No. 7, Firenze: Badia Fiesolana, 1988.

Examines the U.S. debate over the use of administrative regulation and alternative instruments to achieve economic objectives, as well as the relationship between regulation and legalization.

Williamson, Oliver, "Franchise Bidding for Natural Monopoly," in The Economic Institutions of Capitalism. London: Collier Macmillan, 1987.

Using the cable television industry as an example, argues that franchise bidding for natural monopolies suffers from severe contractual disabilities in the presence of technological and market uncertainties.

Key words

Contracts, Franchises, Nationalisation, Privatisation, Proceduralisation, Regulatory rules, Public-Private Partnerships

3. Role of government policy arm, investors, consumers, and other stakeholders in regulatory decision-making

Core References

Goetz, A. M., J. Gaventa et al., "Bringing Citizen Voice and Client Focus into Service Delivery." Institute of Development Studies Working Paper no, 138, University of Sussex, U.K., 2001.

> States that there are three different forms of consumer participation in the regulatory process: consultation (dialogue and information sharing), representation (forms of participation in the decision making process), and influence (accountability mechanisms to incorporate people's preferences).

Nigerian Communications Commission, Five-Year Strategic Management Plan: 2003 – 2007, 2003.

> Describes the NCC's values, mission, and responsibilities. For each area of responsibility, describes purpose, targets, and programs. Describes how the NCC engages stakeholders and relates with other governmental bodies.

Prosser, T. *Law and the Regulators*. Oxford: Clarendon Press, 1997.

> Provides an assessment of juridification of regulatory processes in UK and the US. In this context the author discusses the role of the regulator and its relationship with other actors.

Smith, W., "Utility Regulators–Roles and Responsibilities," Public Sector Note no. 128. Washington, D.C.: World Bank, 1997.

> Examines four factors that determine the optimal responsibility allocation between ministers and regulatory agencies: the relevance of technical and political criteria, the existence of conflicts of interest, the strength in specific expertise, and the capabilities of the regulatory agency.

Ugaz C., "Consumer Participation and Pro-Poor Regulation in Latin America," WIDER Discussion Paper No 2002/121, United Nations University, Helsinki, 2002.

Examines the regulatory experience of Latin American countries with different institutional endowments, focusing on the different mechanisms and outcomes of consumer participation in regulatory processes.

Key words

Liberalization, Privatization, Regulatory agency, Sector Policy, Standard setting

4. Appeals of Regulatory Decisions: Legal mechanisms and internal procedures

Core References

Baldwin, R., and M. Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapter 22.

Presents several mechanisms to improve openness, transparency, and accessibility. Discusses the relevance of having a single or a collegiate regulator.

Brown, Ashley C., and Ericson De Paula, "Strengthening of the Institutional and Regulatory Structure of the Brazilian Power Sector." World Bank Report on the PPIAF Project for Brazil Power Sector, Task 4, December 2002.

Explains that having the Government itself hear appeals of regulatory decisions removes any benefit from having an "independent" regulatory agency and in many jurisdictions parties can appeal Government decisions to the courts. Special or pre-existing tribunals hear regulatory appeals in England, India, and Bolivia. Argues that unless the special tribunal is judicial, its decisions could be subject to judicial review. Direct appeals to the courts have the benefit of fulfilling constitutional or other legal rights available to citizens, however, where independent regulation is a new concept the judiciary is often unprepared to deal with such matters.

Green, Richard, "Checks and Balances in Utility Regulation – The U.K. Experience." Note no. 185 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, May 1999.

Describes U.K. appeal process.

Rodriguez-Ibeas, Roberto, "Regulatory Enforcement with Discretionary Fining and Litigation," *Bulletin of Economic Research* 54(2): 2002.

States that enforcement can be performed in different styles and can use a variety of mechanisms. Some of them concern the application of fines in an administrative or, in other cases, in a judicial process. Discusses how litigation and fines involve basic rules and principles that help protecting consumers.

Sundar, S., S. K. Sarkar, and Prerna Kohli, "Regulatory Interface with the Judiciary: The Indian Experience," in Legal Aspects of Regulation in South Asia, S. K. Sarkar and Vivek Sharma, eds., New Delhi, India: Tara Energy Research Institute, 2002, pp. 95-112.

Examines how regulatory agencies differ from government and the judiciary. Further discusses relationships among regulatory agencies, government, and the judiciary, considering judicial intervention and jurisdiction.

Key Words

Administrative bodies, Appeal bodies, Litigation, Accountability

5. Judicial review of regulatory agencies, differences between appeal and review processes, and developing and implementing processes to reduce likelihood of review and appeal

Core References

Baldwin, R., and M. Cave, Understanding Regulation: Theory, Strategy, and Practice, Oxford: Oxford University Press, 1999, Chapter 5.

Examines the issue of who regulates. Discusses roles of legislative bodies, courts, central government departments, and local authorities.

Buscaglia, Edgardo and William Ratliff. Law and economics in developing countries. Stanford, Calif.: Hoover Institution Press, 2000, Chapters 3-4.

Examines the link between legal systems and reform of economic institutions and practices in developing countries. Makes recommendations on judicial review and dispute resolution.

Storms, Scott R., "Indiana Utility Regulatory Commission Rulemaking to Enhance Regulation," October 2003.

Outlines IURC's authority and opportunities for appeal.

Other References

Fordham, Michael, Judicial Review Handbook, 3rd ed. London: Hart Publishing, 2001.

Provides a general overview of judicial review of administrative decisions and discusses the convenience of reviewing legality and opportunity of regulatory procedures.

Hawkins, Keith, The Uses of Discretion. Oxford: Clarendon Press, 1992.

Explores some of the central issues involved of discretion by government organizations. Presents a variety of analyses of by lawyers and social scientists.

Newman, P. (ed.), "Regulatory Agencies and the Courts" in Palgrave Dictionary of Law & Economics, vol 3. London: Macmillan, 1998.

Explains concepts, procedures and problems confronted in the judicial review of administrative decision-making process.

Richardson and Genn, Reviewing Judicial Review: Administrative Law and Government Action. Oxford: Oxford University Press, 1994.

Says that judicial review is examined through the lens of administrative law principles and examines several issues, including discretion, interdiction or arbitrariness and opportunity control.

6. Alternative dispute resolution procedures

Core References

Bourdeaux, C., R. O'Leary, and R. Thornburgh R., "Control, Communication, and Power: A Study of the Use of Alternative Dispute Resolution of Enforcement Actions at the U.S. Environmental Protection Agency," *Negotiation Journal* 17(2): 2001, pp. 175-191.

Focuses on a specific agency, and provides analysis of alternative dispute resolution mechanisms.

Buscaglia, Edgardo. Law and economics in developing countries. Stanford, Calif.: Hoover Institution Press, 2000.

Examines the link between legal systems and reform of economic institutions and practices in developing countries. State that poverty largely results from flaws in legal institutions. Recommend substantive and procedural legal factors for developing countries, including recommendations on judicial review and dispute resolution.

Shapiro, Sidney A, and Randy S. Rabinowitz, "Punishment versus Cooperation in Regulatory Enforcement: A Case Study of OSHA," *Administrative Law Review* 49 (4): 1997.

Focuses on the debate between the compliance and deterrence approaches for enforcing regulation, in terms of punishment and cooperation. Alternative procedures to resolve disputes are discussed, regarding an administrative procedure case.

Key Words

Arbitration, Alternative Dispute Resolution, Conciliation, Mediation

C. Ethics

1. Main principles

Core References

Brown, Ashley C., and Ericson De Paula, "Strengthening of the Institutional and Regulatory Structure of the Brazilian Power Sector," World Bank Report on the PPIAF Project for Brazil Power Sector, Task 4, December 2002.

Explains that since regulatory expertise is in high demand by regulated companies, disparities in compensation between the regulators and the regulated provide incentives for a "revolving door" that can create, at a minimum, the appearance of impropriety, if not constituting an impropriety itself, and can damage the credibility and effectiveness of regulation. There are two elements of the equation, the first being competitive compensation packages and the second being reasonable ethical standards.

Indiana State Ethics Commission, Code of Ethics for the Indiana Utility Regulatory Commission, Executive Order #93-12. See Indiana State Ethics Commission at http://www.state.in.us/ethics/laws/IURC-EO.html (downloaded August 26, 2003).

Establishes a code of conduct for the Indiana Utility Regulatory Commission. Commissioners will maintain the independence of the commission, avoid impropriety and the appearance of impropriety, and be

faithful to the law. A commissioner is disqualified from a decision if the commissioner is biased or has a conflict of interest.

OECD, Building Public Trust: Ethics Measures in OECD Countries, PUMA Policy Brief No. 7, September 2000.

Describes common ethics criteria in OECD countries. Discusses reasons for ethical conduct. Scores criteria according to frequency of application. Describes approaches for developing and implementing ethical practices.

Shell, G. Richard, Bargaining for Advantage. New York: Penguin Books, 1999.

States that while deception is part of negotiation, ethical slips can cause you to lose credibility. The three frameworks for thinking about these contradictory factors and ethical issues in general are the Poker School, the Idealist School, and the Pragmatist School. Techniques for coping with unethical tactics are also discussed.

Sectoral References

TELECOMMUNICATIONS

Wu, Irene, and Cathleen Xue, "Decision-Making Procedures and Ethics Rules: The Practical Enablers of Integrity and Impartiality in Telecommunications Regulation," U.S. Federal Communications Commission, Washington, D.C., August 15, 2002.

Summarizes decision-making and codes of ethics by the Canadian Radio-television and Telecommunications, Hong Kong's Office of the Telecommunications Authority, the U.K.'s Office of Telecommunications, and the U.S. Federal Communications Commission.

Other References

Hirschman, Albert O., "Against Parsimony: Three Easy Ways of Complicating some Categories of Economic Discourse," *American Economic Review* 74: 1984, pp. 89-96.

Provide explanations and definitions of ethical conduct.

Wilson, J., Bureaucracy: What Government Agencies Do and Why They Do It. New York: Basic Books, 1989.

Explains the difference between ethical conduct and bureaucratic conduct.

Key Words

Compensation, Regulatory agencies, Ethics

2. Conflicts of interest

Core References

Brown, Ashley C., and Ericson De Paula, "Strengthening of the Institutional and Regulatory Structure of the Brazilian Power Sector," World Bank Report on the PPIAF Project for Brazil Power Sector, Task 4, December 2002.

> Explains rules that an agency can adopt to limit conflicts of interest, including public disclosure of financial interests, prohibition on the ownership of any regulated operator, recusal from decisions where the regulator is personally affected by the issue or someone close to the regulator is personally affected, and procedures for the agency to deal with commissioners or staff who have a conflict of interest.

Indiana State Ethics Commission, Code of Ethics for the Indiana Utility Regulatory Commission, Executive Order #93-12.

> Establishes a code of conduct for the Indiana Utility Regulatory Commission. Commissioners and their family members shall refrain from having economic interests with the regulated operators.

3. Developing and implementing a code of ethics

Core References

Indiana State Ethics Commission, Code of Ethics for the Indiana Utility Regulatory Commission, Executive Order #93-12.

> A state ethics commission established this code of conduct for the Indiana Utility Regulatory Commission. Commissioners will maintain the independence of the commission, avoid impropriety and the appearance of impropriety, and be faithful to the law. A commissioner is disqualified from a decision if the commissioner is biased or has a conflict of interest.

Independent Commission against Corruption, "Practical Guide to Corruption Prevention."

Describes what a code of conduct should contain and provides guidelines for developing a code of conduct.

New Jersey Board of Public Utilities, "Code of Ethics."

The Board established this code of ethics, which addresses outside employment and interests, financial interests in regulated companies, acceptance of gifts, use of official position or information, outside activities, post-employment, conferences and conventions, and representation before and contracts with the state government. An ethics commission is responsible for enforcement.

OECD, Principles for Managing Ethics in the Public Service: OECD Recommendation, PUMA Policy Brief No. 4, May 1998.

Summarizes standards that a code of ethics should meet.

OECD, Building Public Trust: Ethics Measures in OECD Countries, PUMA Policy Brief No. 7, September 2000.

Describes common ethics criteria in OECD countries. Discusses reasons for ethical conduct. Scores criteria according to frequency of application. Describes approaches for developing and implementing ethical practices.

Winston, Kenneth, "Moral Competence in the Practice of Democratic Governance," in For the People: Can We Fix Public Service, edited by John D. Donahue and Joseph S. Nye, Jr. Washington, D.C.: Brookings (forthcoming).

Explains moral competence, which it defines as "the set of individual attributes and dispositions (latent moral resources) that make for good governance." Identifies virtues for a public servant, namely "fidelity to the public good, the duty of civility, respect for citizens as responsible agents, proficiency in social architecture, and prudence."

Key Words

Ethics, Conflicts of Interest, Transparency

D. Stakeholder relations

1. Managing relations between the Government, investors, consumers, and other interest groups

Core References

Estache, Antonio, "Designing Regulatory Institutions for Infrastructure – Lessons from Argentina." Note no. 114 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

> Explains that accountability requires transparency in the regulatory agency's decision-making process, and clear, simple procedural rules. Processes to ensure that all concerned parties have the opportunity to express their views in public hearings and to appeal decisions are important.

Nigerian Communications Commission, Five-Year Strategic Management Plan: 2003 – 2007, 2003.

> Describes NCC's relationships with government and stakeholders.

Smith, Warrick, "Utility Regulators: The Independence Debate." .Note no. 127 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

> Explains the mechanisms of independence, such as having a legal mandate distinct from the ministry, appointment criteria, checks and balances in appointments, fixed terms, protections from arbitrary removal, staggered terms, and earmarked funding.

Smith, Warrick, "Utility Regulators—Decisionmaking, Structures, Resources, and Start-up Strategy." Note no. 129 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

> Examines practices for making decisions that are "well informed and accepted as fair and legitimate" by consumers, regulated firms and other stakeholders. Key regulatory processes and advisory bodies are explored.

Uganda Communications Commission, Business Plan 2000-2002, 2001.

> Describes UCC's relationships with stakeholders.

Sectoral References

ELECTRICITY

Brown, Ashley C., and Ericson De Paula, "Strengthening of the Institutional and Regulatory Structure of the Brazilian Power Sector," World Bank Report on the PPIAF Project for Brazil Power Sector, Task 4, December 2002.

> Describes potential conflicts of interest in having regulators involved in concessions and auctions. Also describes key considerations in deciding whether regulators should have roles in sector planning. Explains the importance and mechanisms of transparency.

TELECOMMUNICATIONS

Intven, Hank, Telecommunications Regulation Handbook. Washington, D.C.: World Bank, 2000, Module 1.

> Describes telecommunications regulators' roles as implementers of policies set by the government.

Key Words

Stakeholders, Transparency, Public, Government, Consumers

2. Role of advisory bodies

Core References

African Forum for Utility Regulation, "Background Note: Consumer Involvement in Utility Regulation," 2001 (second meeting at Accra, Ghana).

> Addresses issues in establishing advisory bodies, including identifying existing groups and determining whether the group should be formal or informal, the types of members, the appointment process for members, meeting schedules, remuneration, geographic scope, and sector.

Green, Richard, "Checks and Balances in Utility Regulation—The U.K. Experience." Note no. 185 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1999.

Explains that in the U.K., parliamentary select committees oversee the regulatory agencies. The committees usually aim for unanimous reports. There is a committee for each ministry. The committees invite written and oral evidence. Some committee members build up great expertise, but the committees also appoint expert advisers, often academics, to assist them.

OFWAT, Ofwat Annual Report 2003-2004, 2004.

Describes use of advisors for technical issues, Ofwat's service in advisory groups, the setting up of new advisory groups, and working with existing advisory groups.

Smith, Warrick, "Utility Regulators—Decisionmaking, Structures, Resources, and Start-up Strategy." Note no. 129 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

Describes best practices for advisory bodies.

Key Words

Advisory bodies, Transparency, Stakeholders

3. Handling of consumer grievances and relations with consumer representative bodies

Core References

African Forum for Utility Regulation, "Background Note: Consumer Involvement in Utility Regulation," 2001 (second meeting at Accra, Ghana).

Provides an overview of alternative approaches for: (a) fostering consumer awareness of the regulatory system; (b) dealing with consumer complaints; (c) involving consumers in regulatory decisions, and (d) designing regulatory institutions. Holds that credibility with consumers will depend in part on how regulators deal with consumer complaints.

Even complaints that may not be valid are opportunities for regulators. States that consumers should understand their rights and obligations, and the role of the regulatory agency. No single communication medium will be ideal for all consumers on all issues. Procedures for handling complaints can be structured in different ways.

Gillis, William. "State Commissions in Transition: The NARUC Consumer Issues Challenges," *National Regulatory Research Institute Quarterly Bulletin* 20(2): 1999, pp. 171-176.

Describes the importance of consumer education and how state commissions in the U.S. can cooperate in this area. Items for collaboration include establishing electronic listserves, compiling consumer education materials, publishing surveys, cataloguing consumer education resources, and establishing shared goals.

OFWAT, Ofwat Complaints Procedure, March 2003.

Informs customers how to contact Ofwat and make a complaint. Further describes Ofwat's complaint handling procedures and standards.

Key Words

Complaints, Consumers

4. Institutional strategies to solicit stakeholders' input

Core References

Goetz, A. M., J. Gaventa et al., "Bringing Citizen Voice and Client Focus into Service Delivery." Institute of Development Studies Working Paper no. 138, University of Sussex, U.K., 2001.

Examines case studies of public sector services and their performance, especially in their service to the poor. Examines both voice and responsiveness mechanisms.

Nigerian Communications Commission, Five-Year Strategic Management Plan: 2003 – 2007, 2003.

Describes NCC's processes of public hearings and other means of obtaining stakeholder input.

Smith, Warrick, "Utility Regulators – Roles and Responsibilities." Note no. 128 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

Describes approaches for obtaining stakeholder input.

Sectoral References

WATER

OFWAT, Having Your Say: Ofwat's code of practice on consultations, January 2002.

Describes Ofwat's consultation processes, including notice, timetables, and documents.

OFWAT, Paying for Water Customer Research. Accent Research for WaterVoice and Ofwat September 2003.

Summarizes research on customers' attitudes towards paying their bills, what encourages customers to pay bills, operator techniques for managing debt, and customer awareness of the water and sewage bill.

Other References

Palast, Greg, Jerrold Oppenheim, and Theo MacGregor. Democracy and Regulation - How the Public Can Govern Privatised Essential Services. London: Pluto Press, 2003.

Examines U.S. regulation in international context, considering how decisions are made by public debate in a public forum.

5. Public communication strategies

Core References

Intermedia, "Goal-Oriented Communications Strategies," Intermedia Communications Training (undated).

Identifies keys for communications strategies, including building trust, knowing the media's goals, meeting the public's and government's goals, and meeting the operator's and other stakeholders' goals.

Intermedia, "Holding a Press Conference," Intermedia Communications Training (undated).

Identifies key steps and strategies for holding a press conference. Considers defining the message, timing, audience, and conference format.

Intermedia, "Making Allies with the Media," Intermedia Communications Training (undated).

Identifies techniques for working with the media, including using word pictures, identifying what is new, understanding the angle, developing a lead, accuracy, deadlines, balance, trust, and supporting material. Also provides ground rules.

Nigerian Communications Commission, Five-Year Strategic Management Plan: 2003 – 2007, 2003.

Describes NCC's processes of public hearings and other means of obtaining stakeholder input.

Smith, Warrick, "Utility Regulators—Decisionmaking, Structures, Resources, and Start-up Strategy." Note no. 129 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

Explains importance of open regulatory processes. Discusses approaches in the U.S., U.K., Argentina, and Bolivia.

Key Words

Press, Journalists, Communication, Stakeholders, Transparency, Public

6. Public hearings

Core References

"Consultation and Participation: Overview" in Best Practices in Dealing with Social Impact of Hydrocarbon Operations, Washington, D.C.: World Bank Group.

States that consultation is the process of receiving input from all stakeholders in a decision. Best practices are reviewed. Practical recommendations include placing consultations in the appropriate legal, cultural, and linguistic contexts; using facilitators; providing background; recognizing that there may be local factions; providing resources for public participation; ensuring that interpreters are present; and dealing with gender issues. Managing a consultation involves planning, testing proposals, involving subject matter experts, training personnel, maintaining

overall responsibility, coordinating related activities, building trust, reaching out to normally underrepresented groups, managing expectations, involving appropriate levels of government and NGOs, and preparing an action plan.

Smith, Warrick, "Utility Regulators—Decisionmaking, Structures, Resources, and Start-up Strategy." Note no. 129 in Public Policy for the Private Sector. Washington, D.C.: World Bank Group, 1997.

Describes processes in U.S., U.K., Argentina, and Bolivia.

Key Words

Transparency, Hearings, Stakeholders

7. Negotiation techniques and strategies

Core References

Fisher, Roger, and William Ury, Getting to Yes: Negotiating Agreement Without Giving In. Middlesex, England: Penguin, 1981.

Says to focus on and talk about the interests of the negotiators, not their positions. Identify interests by examining the parties' situations and the effects of their choice options. Identify common interests and areas of mutual gain. Identify your BATNA (Best Available Alternative to a Negotiated Agreement) and the BATNA of the other parties. Work to improve our BATNA and to decrease the other parties' BATNAs.

Shell, G. Richard, Bargaining for Advantage. New York: Penguin Books, 1999.

Says an information-based bargaining approach should be used, focusing on planning and preparation, careful listening, and attending to the "signals" the other party sends through conduct. Six foundations of effective negotiation include your personal bargaining style, your goals and expectations, authoritative standards and norms, relationships, the other party's interests, and the diverse ingredients that go into the most important of all bargaining assets: leverage. The four stages of the negotiating process itself are preparation, information exchange, proposing and concession making, and commitment.

Thompson, Leigh, The Mind and Heart of the Negotiator. New Jersey: Prentice-Hall, 2001.

Says the use of power and persuasion comes primarily from the negotiator's BATNA, which must continually be improved. Other sources of power include information, social networks, physical appearance, and persuasion tactics. Creativity and problem solving can overcome fixed-pie perceptions. The key challenges in multiparty negotiations are the development and management of coalitions, the complexity of information management, voting rules, and communication breakdowns. Also explains importance of and techniques in assessing BATNAs and describes negotiation skills.

Key Words

Negotiation, Coalition, Stakeholders