April 27, 2000

Economic Concepts for Regulation

Sanford V. Berg and Mark Jamison[1]
Public Utility Research Center

This paper surveys some key lessons that have emerged in the course of PURC's work with regulators from around the world. These lessons relate to selecting appropriate market models, establishing a regulatory governance system that reflects independence and transparency, and making decisions that balance commitment to fundamental principles with flexibility. In addition, the authors identify key concepts to be utilized by regulators. These include:

(1) recognizing the fact of asymmetric information;
(2) promoting efficiency through "incentive regulation";
(3) designing optional incentive plans;
(4) ensuring cost-effective quality of service;
(5) utilizing statistical benchmarking;
(6) understanding trade-offs associated with rate design;
(7) recognizing inter-industry rivalry; and within the agency--
(8) recruiting and retaining high quality staff;
(9) creating analytical independence;
(10) utilizing team approaches to problem-solving;
(11) practicing strategic regulation; and
(12) managing stakeholder relationships.

These concepts need to be understood and applied if new regulatory institutions are to effectively promote infrastructure investment and stimulate efficiency in telecommunications, energy, and water.

When utility regulators from around the world get together for intensive discussion of their most challenging issues, everyone learns a lot, including the teachers. This is the experience of the Public Utility Research Center (PURC) at the University of Florida. PURC, which is sponsored by the Florida PSC and Florida utility companies, conducts international training programs for utility regulators. Our biannual flagship program, the *PURC/World Bank International Training Program on Utility Regulation and Strategy*, has trained over 600 regulators from 90 countries since its inception in January 1997. In addition, PURC has conducted specialized programs for the Florida PSC, Australia and New Zealand regulators, Latin America telecommunications policy makers, the Caribbean telecommunications government officials, Peru's water regulators, Argentina's

[1] The authors are PURC Director and Director of Telecommunications Studies at the Warrington College of Business, University of Florida. The first half of this paper appeared in the *NARUC Bulletin* (April 3, 2000) as "Lessons from the World's Utility Regulators".

gas regulators, the Alabama PSC, the New York PSC, and the Massachusetts DPU. PURC-affiliated researchers have also lectured on regulatory issues in other nations, including China, Mexico, Hungary, Brazil, Uganda, and Saudi Arabia.[2]

The insights that regulators from developing and developed countries alike can share never cease to amaze us. Each country's situation and problems are unique, but there is a common set of principles and lessons that each country can draw upon to fashion its own policies. The purpose of this paper is to review some lessons that have emerged from PURC's outreach and research programs.[3]

The market model is critical to all other regulatory decisions.

Governments should consider how much competition will occur and where it will occur before settling issues such as privatization, interconnection, incentive regulation, and universal service. The UK started with pure price cap regulation for BT, but had to shift to something closely resembling rate of return regulation because competition did not develop as quickly has had been hoped. US policies for long distance, Internet, and local telephone interconnection, and for telecom line-of-business restrictions, were created under continually changing assumptions about the nature and extent of competition. All of the old assumptions have proven false and now out-of-date regulatory tools sometimes shackle US regulators.

Uncertainty causes investors and businesses to worry and they avoid situations that present continual surprises. Some energy companies have pulled out of international markets because of uncertainty over profits. Because the success of utility market reform depends upon business incentives to serve customers, improve efficiency, and expand capacity, policy makers should provide an environment in which managers can plan and investors can earn profits commensurate with their risk.

Deciding the market model is difficult, so governments often delay the decision or continually revise it. Chile led the world in opening electricity markets to competition. Because it was first, Chile made mistakes and so is revising its market and regulatory models. The UK abandoned its duopoly in domestic telecommunications when Mercury proved to be ineffective competitor for BT. Globalization made Hong Kong's telecommunication monopoly unsustainable, so Hong Kong compensated Cable & Wireless for bringing its exclusive license to an early end. Companies in Colombia bought long distance licenses for US$150 million each, only to find that private lines and voice over IP made it impossible for the government to keep others from providing substitute services. India has experienced delays in power projects because changes in government policy made investors back off.

---

2 For more information see http://www.purc.org

3 Two recent papers address related issues: Sanford Berg, "Lessons in Electricity Market Reform: Regulatory Processes and Performance," *The Electricity Journal*, June 1998. 13-20; and Sanford Berg, "Developments in Best Practice Regulation: Principles, Processes and Performance."

Independence and transparency are essential for effectiveness

One of the primary purposes of regulation is to provide for the long-term efficiency of utility services. Too often regulators are pressured to avoid decisions that cause short-term political or financial pain. In Hungary, government elections caused delays in electricity price increases even though investors had been promised the higher prices. Mexican regulators have been reluctant to force Telmex to lower its long distance access prices, which are higher than Telmex's retail prices for long distance. Clear statutory authority, budgets independent from the operator and ministry, and fixed terms of office help regulators resist this pressure, but a strong will is critical. For example, the regulator in Jamaica developed its independence by challenging the government on a price increase for Cable & Wireless.

Transparency means that regulators operate in the open, including public decision making, published decisions, and explanations of decisions. The energy regulator in Ontario established public working groups to address gas competition issues. The UK water regulator provides an extensive web site of information, but (in the past) other UK regulators have been criticized for not explaining decisions. Transparency safeguards regulators' independence and leads to legitimacy and credibility. Legitimacy means that consumers trust the regulator because they view the regulator as independent from the industry. Credibility means that investors trust the regulator because they view the regulator as dependable and able to withstand the shifting winds of politics.

Commitment and flexibility are important for investment and efficiency

Without commitment, businesses lose confidence in the government. New entrants have been slow to develop their businesses in certain Latin American countries where regulators are seen as favoring incumbents. Several energy companies pulled out of the UK after the government clawed back profits that had been earned under the government's incentive regulation schemes.

Businesses should bear their normal business risks and be allowed keep profits that are due based on the commitments policy makers have made. When regulators let businesses, consumers, or politicians change the rules when the going gets tough, investors see this as increasing risk and require higher returns and shorter payback periods. Higher required returns mean higher prices, which make customers worse off. Regulators can often be better off opting for competition and deregulation, which research has shown generally reduce costs, improve services, and cause businesses to focus on markets rather than political processes.

Understanding Key Concepts is essential for Agency Design and Decision-making

What is the best indicator of good regulation? We would argue that the benchmark should be the performance of infrastructure industries within the jurisdiction of the regulatory agency. Although the political and legal context may give the agency

inadequate resources and instruments for promoting fairness and efficiency, an independent regulatory commission can have a positive or negative impact on productivity advance, the financial viability of suppliers, the expansion of service, and the operating efficiency of firms. Thus, we would emphasis industry performance, based on a view that ultimately regulation is serving as a mediator between consumers and suppliers. A case can be made that industry performance (including efficiency) ought to be given at least as much weight as procedural rules when evaluating a commission. No doubt, regulation is also about "fairness" and public acceptability. However, unless weight is given to long term industrial performance, commentators will focus on individual trees and not the health of the forest.

Regulation has a significant impact on the operation of markets. Regulators have a number of instruments available to influence markets. The instruments can be directed at three main targets: structure of the industry, behavior of firms, and market outcomes (or performance). Market design is one of those *forest topics* having a significant impact on ultimate market performance. Market structure is affected by regulations creating entry barriers and limiting product offerings. A second set of rules constrain corporate behavior (price levels and rate structures, promotional activity, service quality, input choices, and environmental rules--to list a few). Other regulatory instruments directly impact the performance of firms--as in sharing rules (if returns exceed some specified limit). Depending on the instruments used by regulators, value is created, destroyed, and/or allocated among various stakeholder groups.

To understand how regulation affects managerial decision-making, it is helpful to survey some of the concepts and principles that capture key features of the regulatory environment[4]:

(1) **Asymmetric information** is a technical term (jargon) that attempts to capture the different knowledge bases of managers and regulators. Managers have much more information about production possibilities, demand patterns, and the impacts of technological changes than regulators. In some ways the point is quite obvious, but its implications for regulatory policy are profound. Admitting ignorance is not easy. Yet, if knowledge is power, surely ignorance represents weakness. If agency staff have a limited, incorrect, or distorted view of cost-containment opportunities and customer valuations for various service qualities, then regulatory mandates that presume otherwise are likely to yield sub-optimal performance. This point is not intended to imply that executives and managers always have better information or make great decisions. The principle of information asymmetry merely underscores the need to provide appropriate incentives so managers utilize their information in ways that ultimately benefit consumers. Simultaneously, the system should provide the opportunity to maintain the financial integrity of the firm.

[4]These features were identified by participants in a two-day PURC training course at the Massachusetts Department of Telecommunications and Energy (May 1999). The authors had provided overviews of regulatory principles and incentive regulation. Attendees saw these twelve concepts as representing fundamental building blocks in developing policies that promoted good industry performance.

(2) **"Incentive Regulation"** involves agency policies that are designed to induce managers to apply their information in ways that improve cost containment activities and promote new service introductions. Opportunities for capturing some of the added value (often labeled "rents") created though managerial effort and risk-taking will tend to promote good performance in the sector. Cost of service, expenditure disallowances, price caps, benchmarking, and hybrid schemes all provide incentives of one form or another. A key point is that when firms can gain more via the hearing room (or legislature) than through operational effectiveness, they will devote resources to influencing regulatory rulings rather than value-creation.

(3) **Optional incentive plans** represent one method to force the firm to reveal its capabilities. Given information asymmetries, the firm will be better off than if regulators had complete information. But performance is improved under plans that give firms some flexibility in selecting targets. A firm that agrees to attempt to meet very high performance goals is rewarded with the opportunity to also earn higher returns. Customers gain from having the firm accept such targets. However, executives may choose a lower target (associated with commensurately lower potential returns).

(4) **Quality of service** can suffer under price cap as well as other forms of regulation, so special attention must be paid to establishing rewards for good performance and penalties for poor performance. Of course, quality improvements take resources, so determining the optimal level of quality can be problematic. There is much to be learned from experience in other nations. Two related issues arise in the context of current restructuring initiatives around the globe: the impact of mergers (and reduced competition?) on quality and the impacts of vertical disintegration on system reliability.

(5) **Statistical benchmarking** can reduce information asymmetries. Regulatory agencies can share information or use data filed at the federal level to make comparisons across comparable firms, generating units, or other entities. For example, if advertising is a concern, what is the ratio of advertising to revenue of comparable firms. For incentive purposes, the best comparisons are on some overall dimension. Focusing on heat rates or unit availability can result in an electric utility devoting excessive resources to meeting a specific target. The publication of overall performance comparisons can also put pressure on poorly performing firms.

(6) **Rate design** influences allocative efficiency. The topic raises important issues. Should firms be the ones to initiate new price structures or should regulators actively participate in this area? The case of *price discrimination* in terms of senior citizen discounts (say, for low levels of electricity consumption) illustrates a dilemma facing regulators. Many elderly are well off, while many young families have little earning power. Targeting specific groups for the receipt of social subsidies is less costly than a generalized rate reduction that limits the firm's ability to expand service to new (often poor) customers. Allowing firms to respond to different price elasticities can enable them to recover fixed costs, while offering service to a larger number of

people. Of course, reasonable people can differ on what is legitimate price differentiation and what is undue price discrimination.

(7) **Inter-industry rivalry** presents complex regulatory issues: cable vs. wire-line telephone companies, and gas vs. electric for residential heating. Agencies will be called upon to mediate disputes on a regular basis. A related difficulty is judging whether gains in one industry (eg. from a gas/electricity merger) are sufficient to offset potential losses of competition in another industry. It will be very difficult to determine when competitive options are adequate to allow agencies to step back from the process. We can expect many issues to arise in the future as industry boundaries become blurred due to convergence.

(8) **High quality agency staff** must be rewarded if they are to be retained by regulatory agencies. Studies reveal relatively low salaries for staff salaries compared with comparable utility managers. Without highly motivated technical staff, the studies analyzing alternative policies will be inadequate—leaving Commissions to base their judgements on meager data and insufficient supporting information. Attracting good engineering capabilities is particularly important. Many observers recommend separating the salaries of regulatory analysts from general civil service constraints so that a high caliber staff can be maintained.

(9) **Analytical independence** may be as important as political independence from the standpoint of developing sound regulatory policies. Given the growing complexity of the issues associated with a transition to more competitive markets, staff skills become even more important. The use of contract consultants (possibly paid for by regulated firms) represents one technique for augmenting expertise at an agency. Note that the separation of regulation from management is a prerequisite for agency independence.

(10) **Team Approaches** can enhance regulatory performance. In particular, economists can help those with legal backgrounds understand why certain strategies are being emphasized. Legal experts can help in the design of programs that are consistent with relevant laws. They can also help develop rationales for changing those laws. Similarly, engineers can be helpful in developing forward-looking measures of costs. Accountants can help the team understand the implications of alternative rate designs for covering embedded costs.

(11) **Strategic regulation** is a natural response to strategic behavior by other stakeholder groups. Improved analysis can strengthen responses to various proposals (or positions) presented by important groups. Furthermore, if new objectives are added to those initially given the agency (say, energy conservation), additional instruments must be given to the agency as well. In some countries, competition is viewed as both an objective and as an instrument of regulation. For example, Australian access regulation raises its own set of incentive issues related to investment in facilities that might be subject to third party access to "essential"—natural monopoly—facilities. Setting the terms and conditions of access raises

incentive issues and jurisdictional problems (Maddock and Marshall, 1997). Clearly, the ACCC must identify and prioritize its objectives if policies are to be effective.

Stakeholder Relationships are important, so getting the commission's intentions, objectives, and policies clearly laid out by the press becomes a significant agency activity. Headlines sell newspapers and sound bites make the evening news. So the education of journalists and the general public warrants substantial attention. The best technical studies and innovative regulatory incentive schemes will not be accepted if their rationales cannot be communicated to major stakeholder groups. In fact, those with narrower interests need to be brought into the decision-process early on so that their perspectives can be heard and taken into account—to the extent that important objectives are not sacrificed. One technique utilized by regulatory agencies involves supporting All Parties Settlements process. Where possible, agencies try to reduce resources that go into formal "hearings" processes. Technical workshops and other mechanisms may enable participants to achieve consensus on what are often very complicated issues.

Today's regulators know how to network across national boundaries

As the electricity and telecommunications industries go through restructuring and (partial) deregulation, agencies have to deal with a variety of stakeholders, including incumbents, recent entrants, potential entrants, suppliers to those firms, and (of course) various customer groups. Finding win-win outcomes is a challenge (and may be impossible). Dealing with information asymmetries presents a challenge for regulatory commissions.

In addition, technological change and economic globalization are revolutionizing infrastructure. Telephone service is a thing of the past. Soon, voice telecommunications will simply be a software application provided by the likes of America Online, and issues that have occupied regulators for many years--cost allocations, subsidies, billing practices, and portability for telephone numbers--will become moot. Companies and markets are becoming regional and global, forcing regulators to collaborate across national boundaries and to increasingly work with antitrust authorities around the world. The EU, US DOJ, and US FCC regularly communicate with each other on telecommunications mergers. Norway and Sweden have formed a common energy market. Countries in Africa and in the Caribbean have held discussions about creating regional regulatory agencies in their respective areas.

The web serves as an important tool for sharing information and developing data sets to be used for benchmarking firms. Regulators are recognizing the potential for improving internal procedures and external relationships with stakeholders. Internet capabilities can promote consumer education, improved background material for journalists, and world-class reference sources for technical analysts.

We have much to learn from each other.

A recent attendee of the PURC biannual program (in this case, from a developed country) commented on how much he learned from the regulators from developing countries: "I thought that regulators in my country had done a superior job addressing regulatory issues. Seeing so many other countries solving problems in so many creative ways showed me that we could all learn from each other."

As we move forward in improving the world's utility infrastructure, we will all share this regulator's enhanced awareness of “best practice” in the area of regulatory design and regulatory incentives.