

**Mechanisms to Mitigate Regulatory Risk in
Private Infrastructure Investment:
A Survey of the Literature**

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Section I – Background

Risk mitigation applies a set of institutional and financial instruments to make risks and rewards commensurate with each other, in order to enable good performance.¹ The effectiveness of these tools for private investments in infrastructure is of much concern because infrastructure is important for economic and social development, and risk limits infrastructure investment in developing countries. In developing countries in 1990-2001, nearly 2,500 infrastructure projects involved private participation attracting investment commitments of more than \$750 billion. According to World Bank estimates, developing countries will need an additional \$550 to \$600 billion in infrastructure investment by 2010; however, it is unlikely that this investment need will be met because new investment has declined steadily since 1997.²

One reason for this investment shortfall appears to be the perceived riskiness of infrastructure projects in developing countries. These projects often involve major “sunk” costs that may take more than a decade to recover under the best of circumstances, which raises the possibility of government opportunism to not honor contracts.³ This risk of opportunism can limit investments and output by pushing up the cost of capital by as much as 2 to 6 percentage points depending on the country or region,⁴ or may even cause investments to not be forthcoming. Clearly risk mitigation is an important issue to be resolved if developing countries are to attract the investments they need for infrastructure.

There are three basic approaches to mitigating this risk; namely, institutional instruments that limit the possibility of government opportunism, financial instruments that decrease financial risk, and investment strategies, such as choosing technologies that may not be cost-minimizing but that have lower “sunk” costs than more traditional alternatives. In this paper, we summarize the literature on the first two options. We include energy, telecommunications, water, and transport in the term “infrastructure.”

The remainder of this paper is organized as follows. Section II describes how we categorize the literature. Section III summarizes what we believe are the more important papers and books in the literature on institutional and financial instruments for mitigating investment risk in infrastructure. Section IV identifies gaps in the current literature and Section V is the conclusion.

¹ Asian Development Bank, Japan Bank for International Cooperation, The World Bank, 2005, “Accountability and Risk Management,” In *Connecting East Asia: A New Framework for Infrastructure*.

² Ada Karina Izaguirre, 2002, “Private Infrastructure: A Review of Projects with Private Participation, 1990-2001,” Note No. 250, Washington, D.C.: The World Bank; Antonio Estache, 2005, “PPI Partnerships versus PPI Divorces in LDCs,” World Bank Policy Research Paper 3470, Washington, D.C.: The World Bank; and Kathy Sierra, “The World Bank and Infrastructure: The Way Forward,” presentation at the workshop “Infrastructure Policy, Instruments and Approaches,” Bangkok, Thailand, October 15, 2004.

³ Opportunism is said to occur when the government changes the rules affecting cost recovery after the utility has made irreversible investments.

⁴ Attributed to Guasch and Spiller, 1999. See J. Luis Guasch, Jean-Jacques Laffont, and Stephane Straub, 2003, “Renegotiation of Concession Contracts in Latin America,” The World Bank, Policy Research Working Paper No. 3011, Washington, D.C.: The World Bank, at p.3.

Section II — Categories of Literature

The literature we review can be categorized along two dimensions. The first dimension characterizes the type of research and includes conceptual papers, empirical studies, case studies, and surveys. Conceptual work describes different ways to analyze or mitigate risk. We classify as empirical those studies that use econometric models to test competing theories of risk and methods for alleviating risk. Case studies are also empirical, but rely on more subjective analyses of specific situations or a small number of situations. Case studies provide practitioners with concrete, practical insights into the meaning of the conceptual and empirical studies. Surveys are literature reviews, such as the one we provide in this paper.

The second dimension along which this literature can be categorized is the issue addressed. For purposes of our review, these categories are:

- (1) Regulatory Framework – How the institutional design of the regulatory entity, the design of the government’s overall regulatory system (including courts, checks and balances within the government, etc.), and a country’s relationships with other countries and multilateral institutions relate to opportunism.
- (2) Corruption – The relationship between corruption and risk, and methods for mitigating risk resulting from corruption.
- (3) Sustainability – Approaches for increasing the political sustainability of policies and institutional mechanisms, including the application of pro-poor policies.
- (4) Renegotiation and Bailout – Approaches for dealing with unforeseen events or failures in institutional design, corruption prevention measures, or sustainability approaches that may trigger contract renegotiations or bailouts, including strategies for avoiding such situations.
- (5) Financial Instruments – Instruments, such as risk mitigation insurance, guarantees, and other risk reallocation products that decrease investor risk, given the set of institutional instruments.

The first three categories directly affect the regulator’s ability and flexibility to institute policies that increase the predictability of cash flow for investors. Arguably, corruption levels and pro-poor mechanisms are frequently considered features of the regulatory design (our first category). However, because these two indicators are often addressed separately in the literature we review, we want to designate them as separate categories. How governments deal with both greatly affects investors’ perceptions of the long-term viability of infrastructure project proposals.

Risk mitigation is a dynamic, iterative process. Contractual language and the application of risk mitigation products contribute to and affect a regulator’s or host government’s choice of risk reduction strategy. Regulatory decisions, in turn, affect the issues identified above. So we are looking at a process in which regulators are charged, on the one hand, with serving the interests of the citizens of the country (who themselves

have diverse needs) and, on the other hand, with providing proper incentives for service providers to meet contractual obligations to the country's taxpayers and ratepayers. To add to the complexity, investors are not passive actors; they both shape and respond to the business climate that underpins long-term investment decisions in infrastructure.

We include in our review literature that addresses the importance of stakeholder perceptions of institutional and financial risk mitigation instruments. Factors related to the regulatory framework, the presence of corruption, the political sustainability, the historic use of regulatory risk mitigation products, and the historic response by governments and regulators to unanticipated corporate losses, problems, or other adverse events arising from the project contract can contribute to investors' and rating agencies' perceptions of heightened risk to a project's cash flow. Risk mitigation products, for their part, are most effectively used if governmental entities and the private sector cooperate in various ways to protect against non-payments and non-delivery of infrastructure services. We review literature that examines public and private cooperative arrangements and the most propitious conditions for use of insurance guarantees and other risk allocation products. We also review literature that provides strategies used by host countries and regulators to help prevent contract renegotiations and taxpayer bailouts that result from factors controllable by regulators and governments.

Many of the policy issues related to risk mitigation are interlocking and are often treated as such in some of the literature referenced below. So we admit to a certain degree of subjectivity in how the literature is categorized. We also note that this review may not present an exhaustive spectrum of policy questions that affect risk mitigation but, in our opinion, it poses what appear to be the most important questions. Other issues that enter into the fray include sub-sovereign decision making and funding which complicates the governance issue and the divergent sets of problems facing regulators and service providers in extending infrastructure services to the poor in urban and rural areas of developing countries.

Section III -- Literature Review

Our literature review classifies articles, books, and types of reports under each of the five categories described above. We also indicate whether the item includes primarily conceptual research, empirical studies, literature surveys, case studies, or some combination. We also list background literature. As noted above, many of the policies pertaining to risk mitigation are inter-related. Therefore, a source that is subsumed under one category could also be subsumed under others.

A. Regulatory Framework.

Well-conceived regulatory frameworks, including independent regulators, sound price-setting regimes, and transparent regulatory processes that invite stakeholder participation, can improve the investment climate by increasing predictability and

reducing political risk. While this is the case, new regulators in developing countries might not have their “independence” explicitly guaranteed in law or perceive that they have legally based guarantees.⁵ Moreover, regulators do not operate in a vacuum and their effectiveness can be strengthened or diminished by what we call the regulatory system, which includes the host country’s governmental checks and balances (including the judicial and legal system), systems for regulating the financial sector, environmental policies, and the country’s conflict resolution mechanisms, political system, and relationships with other countries and with multilateral institutions. Because these factors are different for each country, there is no one-size-fits-all formal regulatory framework.⁶

However, certain basic principles are at play in all governmental systems and knowledge of these principles helps a country design its regulatory system and regulatory entity in ways that match the country’s institutional endowment. The effectiveness of the regulatory system and the regulatory entity are dependent on how policymakers answer questions such as: How does the country’s overall regulatory framework affect capital market development for infrastructure projects? How robust is the relationship between that country’s framework and capital market development? Are there strategies for increasing regulatory discretion in contracts commensurate with gained regulatory expertise over multiple years, and do these strategies actually work?

We divide the literature in this section into two subsections: the regulatory entity, which captures those functions that are controllable by the regulator, and the broader regulatory system, which is the institutional environment in which the regulator operates and does not directly control.

1. Regulatory Entity

Alexander, Ian and Clive Harris. 2005. “The Regulation of Investment in Utilities: Concepts and Applications.” Washington, D.C.: The World Bank.

This paper establishes a broad, conceptual framework for assessing alternative regulatory regimes for utilities’ investment decisions, reviews the applications of those strategies to practice, and assesses situations that might favor one approach over another. It includes fifteen case studies of approaches used in the water and sewerage, energy, and transportation sectors. Cost allocation and revenue recovery issues are also addressed.

⁵ *Connecting East Asia: A New Framework for Infrastructure*, at p. 144.

⁶ Sunita Kikeri and John Nellis, 2004, “An Assessment of Privatization,” *The World Bank Research Observer*, Vol. 19, No. 1: 87-118; at p. 111. They note that regulatory frameworks need to take into account each country’s unique political, legal, and institutional context, an observation attributed to World Bank, 2004, “Reforming Infrastructure: Privatization, Regulation, and Competition.” Washington D.C.: The World Bank.

Asian Development Bank, Japan Bank for International Cooperation, World Bank. 2005. "Accountability and Risk Management." In *Connecting East Asia: A New Framework for Infrastructure*.

This chapter addresses conceptual issues for each of the issue categories that we use in this review. We include it here because the regulatory framework and processes used to manage risk receive the most attention in this chapter. Several accountability measures are described, including the importance of transparent regulatory processes and the need for community and citizen involvement. In addition, there is discussion about the effects of subsidizing service providers and the effects of subsidies on competition. Several cases are cited to illustrate the ways in which policymakers in developing and developed countries have dealt with privatization by incorporating accountability and risk mitigation measures into contracts.

Bertolini, Lorenzo. 2004. "Viewpoint: Regulating Utilities." Note Number 269, Washington, D.C.: The World Bank.

This note summarizes cases of several developing countries that have contracted out certain functions of the regulatory framework, such as monitoring, tariff setting, and arbitration, to external experts or technical panels. Reasons have included: the need to supplement limited in-house capacity, cost reduction, and assurance to investors of the independence of the regulator.

Brown, Ashley C., and Ericson De Paula. 2002. "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., The World Bank.

Using Brazil as a case study, this paper explains the importance of transparency. It finds 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. The paper also explains that transparency also demands that all of the evidence, whether 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.

This paper also addresses issues relating to the regulatory system. It explains that having the government itself hear appeals of regulatory decisions removes any benefit from having an "independent" regulatory

agency. Also, in many jurisdictions parties can appeal government decisions to the courts. For example, special or pre-existing tribunals hear regulatory appeals in England, India, and Bolivia. The paper 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.

Burns, Phil and Christopher Riechman. 2004. "Regulatory Instruments and their Effects on Investment Behavior." World Bank Policy Research Working Paper 3292, Washington, D.C.: The World Bank.

This conceptual study examines key drivers of investment behavior of regulated infrastructure companies under performance-based regulation. It uses a case study of Railtrack in the U.K. to illustrate a situation where in the early stages of privatization, the incentives to improve quality were extremely weak and the incentives to cut costs and distribute profits to shareholders were stronger. Moreover, quality indicators for benchmarking performance were not included in the incentive regulation scheme. The authors note that the costs and benefits needed for establishing quality indicators are often difficult to determine, and quality indicators that capture both current and expected future output performance are difficult to derive. In addition, incentives need to be set properly to encourage companies to invest efficiently in operations and capital projects and in the interconnections needed to relieve network congestion. Moreover, incentives should encourage companies not to postpone investments until the end of a price review period. Several recommendations are offered to induce companies to provide higher quality, more efficient service under performance-based regulation.

Connors, Catherine R. 2003. "Introduction to the Regulatory Benchmarking Report on Southeast Europe." Prepared for USAID; Third Annual Energy Regulators Regional Association (ERRA) Conference.

This slide presentation provides case information in the form of a very general overview of ten Southeast European jurisdictions and their models of regulatory systems, their treatment of market development, market monitoring, tariffs, and institutional development.

Estache, Antonio. 1997. "Designing Regulatory Institutions for Infrastructure – Lessons from Argentina." Note No. 114 in *Public Policy for the Private Sector*. Washington, D.C.: The World Bank.

Using Argentina as a case study, this paper provides an analysis of the mutually related concepts of independence and economic autonomy. It

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.

The paper also addresses issues relating to sustainability of the regulatory system. It 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.

Estache, Antonio, Sergio Perelman, and Lourdes Trujillo. 2005. "Infrastructure Performance and Reform in Developing and Transition Economies: Evidence from a Survey of Productivity Measures." World Bank Policy Research Paper 3514, Washington, D.C.: The World Bank.

This literature survey focuses on the efficiency reforms attributable to privatization. The next generation of reforms reflects a move toward private sector management and delivery contracts, more hybrid pricing regimes, and performance benchmarking. Most of the studies on efficiency suggest there is no significant statistical difference between public and private ownership in terms of efficient performance. The authors review the literature on efficiency measures for energy, water and sewerage, transport, ports, and railways. Two alternative efficiency measures receiving increased attention are forward-looking cost proxy models used in telecommunications and the model-operator model used in the water and energy sectors. Across sectors, the most relevant variables affecting efficiency are competition, the design of regulation, the quality of institutions, and the level of corruption. Three main data problems include measuring capital, accurately modeling the size of employment with outsourcing, and poor accounting standards. Finally, the studies on efficiency tend to be econometric studies, which are difficult to use if regulators are not technically inclined.

Kelley, Elizabeth and Bernard Tenenbaum. 2004. "Funding of Energy Regulatory Commissions." Energy Working Notes, No. 1, Washington, D.C.: The World Bank.

Based on the authors' experiences and survey findings, this conceptual paper develops recommended practices for funding energy regulatory commissions that address levels of funding, sources of funding, approval of budgets and fees, commission authorization and treatment of penalties

against regulated companies, and accountability for commission use of expenditure and performance. The survey examines eight regulatory commissions.

Kirkpatrick, Colin, David Parker, and Yin-Fang Zhang. 2004. "Foreign Direct Investment in Infrastructure in Developing Countries: Does Regulation Make a Difference?" Centre on Regulation and Competition, University of Manchester, Working Paper No. 85.

This empirical paper examines the effects of quality of regulation on foreign direct investment (FDI). The authors hypothesize a positive relationship between the quality of infrastructure regulation and FDI revenue flows to the infrastructure industries. The hypothesis is supported by an extensive literature on the behavior of regulators in developed and developing countries. In developing countries, regulatory personnel are likely to be less trained and proficient in regulatory models and policy analysis. Regulatory offices are also more likely to be understaffed and lacking in resources. The authors confirm their hypothesis with an econometric model using World Bank data of private participation in infrastructure projects from 1990 to 2002.

Smith, Warrick. 1997. "Utility Regulators: The Independence Debate." Note No. 127 in Public Policy for the Private Sector. Washington, D.C.: The World Bank.

This concept paper analyzes the extent of discretion and the relationship between independence and accountability. It 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.

Stern, Jon and John Cubbin. 2003. "Regulatory Effectiveness: The Impact of Regulation and Regulatory Governance Arrangements on Electricity Industry Outcomes: A Review Paper," Preliminary Draft. Department of Economics Discussion Paper Series, City University of London, No. 04/01.

This paper reviews research conducted in regulatory governance in developing and transition economies and points to shortcomings of formal governance studies and econometric studies in gauging the quality and effectiveness of regulatory agencies on electric and telecommunications utility outcomes. It also identifies research areas for improving evaluations of the performance and impact of regulatory agencies.

2. Regulatory System

Baldwin, R., and M. Cave. 1999. *Understanding Regulation: Theory, Strategy, and Practice*, Oxford: Oxford University Press, Chapter 5.

This chapter provides an overview of the roles of legislative bodies, courts, central government departments, and local authorities.

Barth, James, Cindy Lee, Don McCarthy, Triphon Phumiwasana, Sunny Zhitao Sui, and Glenn Yago. 2004. *Capital Access Index 2004: Emerging Growth in Asian Bond Markets*, Milken Institute. (Index; includes regulatory system indicators).

This paper explores the relationship between economic development and policies that expand bond markets, particularly in Asian countries. It identifies studies that suggest a significant and positive correlation between the development of bond markets and countries' economic efficiency and macroeconomic stability. The authors contend that a more developed bond market could lead to more sophisticated financial instruments, such as securitization and various types of derivatives. They develop a capital access index that ranks 85 countries according to the ability of entrepreneurs within those countries to access financial capital. Indicators for the index include 54 quantitative and qualitative variables, including various institutional governance and environment issues and corruption.

Cubbin, John, and Jon Stern. 2004. "Regulatory Effectiveness and the Impact of Variations in Regulatory Governance: Electricity Industry Capacity and Efficiency in Developing Countries."

This empirical paper examines whether the existence of regulatory law and higher quality regulatory governance is significantly associated with superior regulatory outcomes. The model uses data from 28 developing countries over a 21-year period (1980-2001). Performance outcomes include increased rate generation capacity per capita and increased efficiency. Controlling for relevant variables and country-fixed effects, the authors conclude that such a correlation is significant and positive. The index of regulatory governance used in the model includes four elements: whether the country has an electricity or energy law; whether the country has an autonomous or a Ministry regulator for electricity; whether the country's electricity regulator is funded from license fees (or equivalent) or out of the government budget; and whether the staff in the electricity market can be paid as appropriate given skill needs or whether staff have to be paid on civil service pay scales. No data on informal, practical aspects of regulations are included. Controlling for relevant variables and country-fixed effects, the authors conclude that the effects of

a regulatory law, an autonomous regulator, and license fee funding do improve utility performance, at least for electricity generation. There is some evidence, although weak, that better overall country governance improves generation capacity utilization. The authors were unable to find reliable time-series data for countries analyzed on commercial losses or quality of service or productivity. The authors recommend the use of case studies to explain why and how regulation operates to improve utility performance as econometric studies are more appropriately used to show relationships.

Henisz, Witold J., and Bennet A. Zelner. 1999. "Political Risk and Infrastructure Investment." Preliminary draft presentation for conference, Private Infrastructure for Development: Confronting Political and Regulatory Risks; September 8-10, Rome, Italy.

This empirical paper argues that commonly used macroeconomic and investor perceptions of risk have little actual correlation to a country's underlying political risk. It applies Henisz's political constraint index (1998) to the penetration growth of telephone lines for numerous countries. Henisz's index, which captures a country's political capacity to support and sustain investment decisions, includes data for 130 countries for the period 1945-1994.

Henisz, Witold J. and Bennet A. Zelner. 2002. "Political Risk Management: A Strategic Perspective." A Working Paper of the Reginald H. Jones Center, University of Pennsylvania, WP 2002-06.

This paper draws from field interviews of managers at firms in 13 emerging markets in the electricity generation and cellular markets to: (1) develop a framework for explaining how a foreign firm with bargaining power uses that power to protect initial investments; (2) explain how firm managers influence the political process; and (3) discuss the strategy used by managers to balance short-term profit projections with projected future political backlash.

Henisz, Witold, and Bennet Zelner. 2004. "The Political Economy of Private Electricity: Provision in Southeast Asia," Reginald H. Jones Center for Management Policy, Strategy and Organization, University of Pennsylvania.

This paper provides case studies of how the Asian financial crisis affected the electricity sector in four ASEAN countries: Thailand, the Philippines, Malaysia and Indonesia. It examines how differences in policy credibility affected government opportunism and investors' choices of strategic safeguards. The paper also explains how strong political ties between government agencies weaken formal checks and balances.

Henisz, Witold, and Bennet Zelner. 2005. "Managing Political Risk in Infrastructure Investment," Reginald H. Jones Center for Management Policy, Strategy and Organization, University of Pennsylvania.

On the basis of research and interviews with managers, regulators, lawyers, and consultants, the authors identify four basic principles that private infrastructure investors should apply to reduce political risk: develop business models that are appropriate for the country's normal business practices in the national context and that avoid special treatment; shape public opinion in favor of the investment; develop relationships with policymakers and key domestic businesses; and avoid doing business with governments that lack political checks and balances, have unclear authority, and weak regulatory institutions.

Jadresic, Alejandro, and Fernando Fuentes. 1999. "Government Strategies to Reduce Political and Regulatory Risks in the Infrastructure Sector." Preliminary draft presentation for conference, Private Infrastructure for Development: Confronting Political and Regulatory Risks; September 8-10, Rome, Italy.

This paper provides a framework of strategies governments can use to mitigate regulatory and political risk to private companies investing in infrastructure projects in developing countries. One section of the paper focuses on strategies that can improve transparency, independence, competence, and credibility of the regulator, but other aspects of government, as they affect regulatory and political risk, are also discussed.

Kaufmann, Daniel, Aart Kraay, Massimo Mastruzzi. Revised 2004. "Governance Matters III: Governance Indicators for 1996-2002," World Bank.

This paper presents a set of six dimensions of government for 199 countries and territories for four time intervals: 1996, 1998, 2000, and 2002. The authors constructed six aggregate governance indicators by using an unobserved components model. The indicators are: (1) voice and accountability (political process, civil liberties, and political rights), (2) political stability and absence of violence, (3) government effectiveness, (4) regulatory quality, (5) rule of the law, and (6) control of corruption. These indicators use 250 individual measures taken from 25 different sources, including international organizations, political and business risk-taking organizations, think tanks and non-governmental agencies. These indicators allow for cross-country, cross-temporal comparisons of governance. However, the margins of error, which the authors were able to establish for each country, must be interpreted with care because of differences across countries. The precision of estimates of governance increases as the number of sources for each country increases and as each data source becomes more precise. The authors rely on subjective perceptions in developing the aggregate governance indicators

because, for some dimensions of government – corruption and confidence in property protection – relevant objective data are impossible to obtain. They also empirically examined and discounted ideological biases in the perception data they used for the indicators.

Kurtzman, Joel, Glenn Yago and Triphon Phumiwasana. 2004. “The Global Costs of Opacity.” *MIT Sloan Management Review* 46(1): 38-44.

This paper develops a framework for projecting the factors in countries that increase risk for commerce and direct investment. The framework created is the Opacity Index, which uses 65 variables from 41 sources applied to 48 countries. There are five indicators in the index: (1) corruption, (2) efficacy of the legal system, (3) deleterious economic policy, (4) inadequate accounting and governance practices, and (5) detrimental regulatory structures. A discount rate is calculated for each country that reflects the additional or subtracted return on investment needed to compensate for risk.

Sirtaine, Sophie, Maria Elena Pinglo, J. Luis Guasch, and Vivien Foster. 2004. “How Profitable are Infrastructure Concessions in Latin America? Empirical Evidence and Regulatory Implications,” Washington, D.C.: The World Bank.

This study estimates the returns on investments of private investors in 34 Latin American infrastructure concessions. It also examines whether the quality of regulation during privatization helps to bring into alignment a company’s rate of return and its cost of capital. This study shows that the quality of regulation makes a difference and explains at least in part the variance of returns across concessions.

Van der Walt, A.J. 1999. “Reducing Regulatory Risk in Infrastructure by Requiring Compensation for Regulatory Takings: A Comparative Perspective.” University of South Africa. Preliminary draft presentation for conference, Private Infrastructure for Development: Confronting Political and Regulatory Risks; September 8-10, Rome, Italy.

This paper focuses on the constitutional provisions used by several countries to compensate property owners for loss caused by the exercise of a state’s regulatory power. Such provisions should mitigate investors’ concerns about regulatory risk due to takings.

World Resources Institute, National Institute of Public Finance and Policy, and Prayas-Prune. 2005. *Electricity Governance Toolkit: Benchmarking Best Practices and Promoting Accountability in the Electricity Sector* (Pilot version).

This framework consists of a baseline survey of key facts about the electricity sector and more than 60 indicators assessing questions of good

governance in the electricity sector. The baseline indicators pertain to policy processes, regulation, and environmental and social aspects. This framework may be used as an assessment tool across countries to help public-minded organizations promote good governance in the electricity sector.

B. Corruption.

Corruption is a concern because it decreases service output by increasing costs, diverts capital from productive uses, and takes wealth from its legitimate owners. Ongoing corruption is a concern listed by respondents in World Bank investment climate surveys, who also expressed concerns about the effects of corruption on investment.⁷ Corruption is often an indicator in governance indices, and private participation contracts lacking transparent processes are especially vulnerable to various manifestations of corruption or unethical behavior. Corruption or unethical behavior can occur at various stages in a contractual infrastructure project cycle — project identification, contract award, negotiation, project finance, and implementation. Moreover, costs of corruption such as for nonpayment of tariffs resulting from bribery or collusion could be passed on to other ratepayers or utility owners, thus posing a challenge for regulators and undermining the confidence investors have in infrastructure projects.

Corruption raises several questions. For example, under what conditions is corruption most likely to occur in the various infrastructure sectors? How does corruption affect utility performance? To what extent do competition of service providers, the transparency of the regulatory process, budget oversight, performance audit capability, and other governance oversight institutions affect levels of corruption? Is corruption adequately addressed if strategies are applied only to the public sector? What strategies could be used to reduce the incidence of corruption? This literature review summarizes some papers that address these questions.

Clarke, George R.G., and Lixin Colin Xu. 2004. "Privatization, Competition, and Corruption: How Characteristics of Bribe Takers and Payers Affect Bribes to Utilities." *Journal of Public Economics* 88: 2067-2097.

The authors use enterprise-level data on bribes paid to electricity and telecommunications utilities in 21 countries in Eastern Europe and Central Asia. Approximately 2,000 firms were surveyed. The empirical results revealed that more profitable businesses, businesses with greater overdue utility bills, and *de-novo* private firms are more likely to be the bribe payers; utilities are less likely to receive bribes in countries with greater capacity in terms of better-developed

⁷ Mary Hallward-Driemeier and David Stewart, 2004, "How Do Investment Climate Conditions Vary Across Countries, Regions, and Types of Firms?" Background paper prepared for the *World Development Report 2005: A Better Investment Climate for Everyone*. The focus here is on the perceptions of local entrepreneurs but utility investors ranked corruption highly as a constraint in the "East Asia & Pacific Private Investors in Infrastructure: Perception Survey."

telecommunications systems, more competition in the telecommunications sector and utility privatization.

Kaufmann, Daniel. 2004. "Corruption, Governance and Security: Challenges for the Rich Countries and the World." In *Corruption, Governance and Security*.

This study presents an empirical analysis of data from the 2004 Executive Opinion Survey of the World Economic Forum. It provides evidence that improved governance results in higher incomes per capita. Of a list of 15 obstacles to global competitiveness, the eradication of corruption would have the greatest benefit for a country's ability to compete globally (as measured by its ranking on the World Economic Forum's Growth Competitiveness Index.) Poorer countries have higher levels of illegal corruption (bribery) than their richer counterparts. However, there is great variability among richer countries in the OECD and elsewhere in the level of corruption that could be described as "legal" (legal political financing or undue influence of political firms on policymakers).

C. *Sustainability*

Sustainability of government institutional structure and anti-corruption policies affect investment risk by improving the predictability of outcomes. The political, popular, and legal support of these features of government and culture determine sustainability. For example, a regulatory agency's ability to function is determined not just by its own technical capacity to perform its duties, but by legal rules that define its formal authority, the willingness of the courts and other governmental entities to recognize and follow these legal rules, and the belief and acceptance of operators, customers, foreign governments, and multilateral organizations (such as The World Bank) that the regulatory agency is legitimate and capable.⁸

As countries become more democratic, infrastructure projects that fail to deliver affordable services to the poor can result in political pressure on governments to renegotiate or terminate private contracts. For example, subsidies are often part of pro-poor strategies. If they are not effectively targeted or services are under-priced, revenue streams needed to meet contractual performance outcomes may be jeopardized. Therefore, risk mitigation policies need to consider pro-poor strategies.

Sustainability of the institutional and anti-corruption policies raises several questions. What leadership and other skills do utility regulators need to succeed in their roles? To what extent can changes in government institutions and policies affect behavior and at what pace can behavior change? How can regulators and others exercise leadership for the capacity and stability of government institutions? How do political party, personal, and informal relationships affect the effectiveness of formal policies on regulatory systems, regulatory agencies, and corruption? To what extent have past

⁸ Mark A. Jamison, 2005, "Leadership and the Independent Regulator," Public Utility Research Center, University of Florida, Gainesville, Florida.

infrastructure reforms in developing countries improved access of the poor to utility services? What are the most effective pro-poor strategies used in developing-country infrastructure concessions to date and why have these strategies been effective? How do direct subsidies granted by government ministries for an infrastructure concession dovetail with pro-poor subsidies used in ratemaking and what are the ramifications?

Brook Cowen, Penelope, and Nicola Tynan. 1999. "Reaching the Urban Poor with Private Infrastructure, Finance, Private Sector, and Infrastructure Network, Note No. 188, Washington, D.C.: The World Bank.

In this conceptual paper, the authors recommend that policymakers consider the market structure and potential for entry before entering into privatization contracts. They need to ensure that the privatization agreement does not cut off service options for the poor or reduce choices. Contractual provisions should focus more on output standards (quality of service) and less on input standards, such as standards based on an international company's technology. Other items to consider include: alternative interconnection arrangements for the poor, subsidies that are targeted and not tied to one supplier, and changes in the regulatory process to improve service for the poor and gauge willingness to pay. The authors note that the policy decisions made during the transition to a concession will likely need to be made sequentially. Once a contract is finalized, it is difficult to change entry and competition rules, provide for alternative supplies, and stipulate lower technical standards.

Estache, Antonio, Vivien Foster, and Quentin Wodon. 2002. *Accounting for Poverty in Infrastructure Reform: Learning from Latin America's Experience*, Washington, D.C.: The World Bank.

This paper examines strategies for serving the poor. It explains macroeconomic and microeconomic linkages between infrastructure reform and the poor and discusses setting priorities. It also describes reforms' impacts on access and affordability for the poor; approaches for improving access for the poor, including operator obligations, connection targets, low-cost technologies, subsidies and cross-subsidies, and open entry; and approaches for improving affordability, including lifeline subsidies, means-tested subsidies, vouchers, balancing connection and usage charges, billing options, and prepaid service.

Foster, Vivien and Maria Caridad Araujo. 2004. "Does Infrastructure Reform Work for the Poor? A Case Study from Guatemala." Policy Research Working Paper 3185, Washington, D.C.: The World Bank.

This paper explains how utility sector policies have affected poor Guatemalan households since the 1996 Peace Accords. Infrastructure reform has significantly affected electricity and telecommunications services but not water and sanitation services. Specifically, the paper analyzes the barriers to universal access of services in those sectors, analyzes the impacts of tariff reforms and subsidy

policies on service affordability, and quantifies the broader benefits, in terms of improved health and productivity from infrastructure services. The authors use ENCOVI 2000 Survey data, covering 7,276 households in the country. The authors found an appreciable expansion of service coverage in all sectors. However, one-third of households lacking electricity and piped water are located in neighborhoods where these services are available, but they have not connected to them. The apparent reasons for non-connectivity include high connection costs, cultural priorities, and utility non-responsiveness to customer requests. Subsidies for electricity are poorly targeted so that the majority of households benefiting from the subsidy are not poor (65%). The savings, according to the authors, would be better applied to expanding coverage to unserved households. Water tariffs are also not financially sustainable and the financial state of the water utilities is contributing to poor service quality.

Jamison, Mark A. 2005. "Leadership and the Independent Regulator," Public Utility Research Center, University of Florida, Gainesville, Florida.

In this concept paper, the author argues that being a utility regulator is dangerous because the independence of the regulator necessarily removes power from politicians, operators, and others. Furthermore, regulators are sometimes scapegoats for unpopular policies and unavoidably become involved in shaping the policies that they are supposed to implement. As a result of such frictions, regulators are sometimes removed from office or marginalized in some way. How can regulators not only survive in such an environment, but also thrive? This paper describes a leadership concept called adaptive leadership that regulators can use to help their countries adapt to new policies and changing situations, while allowing the regulator stay in the game. The first leadership skill discussed is the ability to get on the balcony to see what is really going with operators, politicians, consumers, and others. Once this perspective is obtained, then the regulator can engage stakeholders in an adaptive process in which people make necessary changes to traditions and expectations, while hanging on to the things that are truly important. Regulators can do this by bringing attention to problems that people want to ignore because they involve difficult trade-offs, by providing certainty and stability when tensions become too high for work to be done, and by keeping attention focused on the work and the issues.

Lovei, Laszlo, Eugene Gurenko, Michael Haney, Philip O'Keefe, and Maria Shkaratan. 2000. "Scorecard for Subsidies: How Utility Subsidies Perform in Transition Economies," Note No. 218 in *Public Policy for the Private Sector*. Washington, D.C.: The World Bank.

This paper 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. It analyzes the main types of utility subsidies in Central and Eastern Europe and the former Soviet Union.

Public Private Infrastructure Advisory Facility. 2002. *New Designs for Water and Sanitation Transactions: Making Private Sector Participation Work for the Poor*. Washington, D.C.: The World Bank.

This report examines the extent of urban poverty in developing countries, concerns of the poor in responding to water sector reform proposals, elements of water sector reform, legal frameworks that can affect the poor in privatized arrangements, contractual incentives for providing water services to the poor, tariff and subsidy mechanisms that help and hurt the poor, and the types of information that should be collected as part of the transaction preparation phase.

D. Renegotiation and Bailout

What happens if an unforeseen shock makes existing utility policies ineffective, counterproductive, or even unsustainable? What if the regulatory system or agency proves to be unsustainable? Such breakdowns often result in contract renegotiation and bailouts, and governments address these possibilities in several ways.⁹ Sometimes contracts or concession agreements provide specific provisions for renegotiation, arbitration, or bailouts. Breakdowns involving foreign investors may also be the subject of trade agreements between countries. Governments may also provide sovereign guarantees of loans involving multilateral institutions, such as The World Bank or International Monetary Fund.

Formal provisions for renegotiation and bailouts can reduce investment risk by providing certainty for how unusual circumstances will be dealt with. However, once renegotiation and bailout become formal options, they can also become strategic variables for operators interested in behaving opportunistically. Governments can restrict such opportunistic behavior on the part of operators by formally limiting renegotiation and bailout options, but the enforcement of these formal restrictions is in part dependent on the stability and legitimacy of the government institutions that are being stressed by the unforeseen shock or institutional breakdown. One strategy for addressing this problem is to use international institutions and other countries to enforce renegotiation and bailout policies.

These tensions between the need for adaptability and the need for certainty, the dependence during times of crises on government institutions that are themselves either involved in or the source of the crisis, and the need for national sovereignty and the need for international support make risk mitigation and risk allocation difficult. In risk allocations between the public and private sectors, the general consensus is that risk should be borne by the party most equipped to manage it, generally through

⁹ Approximately 50% of all concession contracts signed since the mid-1980s were ultimately renegotiated either by government or provider initiative. See Antonio Estache, 2005, "PPI Partnerships Versus PPI Divorces in LDCs." World Bank Policy Research Working Paper 3470, Washington, D.C.: The World Bank, at p. 1.

diversification of risk. For certain situations, at least in practice, the determination of the appropriate party to manage the risk might not be obvious.

The topics of renegotiation and bailout raise several questions: For the host country and its regulator, what is the impact of contract renegotiations on private investment in future infrastructure projects? Are such renegotiations always bad? How could the incidence of renegotiations be reduced and what is the role of the regulator to that end? Regulators and host countries also must contend with the prospect of bankruptcy or of failure of private infrastructure providers in concessions to deliver on contractual obligations. What strategies could be taken to respond to those possibilities and minimize the risk of such occurrences in the first place? What elements and principles should be considered for inclusion in effective regulatory contracts?

Bakovic, Tonci, Bernard Tenenbaum, and Fiona Woolf. 2003. "Regulation by Contract: A New Way to Privatize Electricity Distribution?" World Bank Working Paper No. 14, Washington, D.C.: The World Bank.

This concept paper explains what regulation by contract is, sets out the key characteristics of such contracts, explains the reasons why private investors like power purchase agreements but also identifies what their limitations are, and outlines reasons why regulatory contracts differ from commercial contracts. The balancing act of the two competing objectives addressed in regulatory contracts is neatly captured by the authors: "The idea is to limit the discretion of the regulator in areas that are known to deter investment while at the same time using independent regulation to avoid uncertainties for investors created by political micromanagement and changes of government or governmental policy." The authors also address the question of whether regulatory contracts should be a transitional mechanism in developing countries. They conclude that the underlying principles of regulatory contracts – performance-based, multi-year tariff-setting systems – have been adopted successfully in developed countries. Therefore, they are applicable to the regulation of private distribution systems in developing countries.

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

Using Chile as a case study, this paper explains that disputes leading to renegotiation 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.

Ehrhardt, David, and Timothy Irwin. 2004. "Avoiding Customer and Taxpayer Bailouts in Private Infrastructure Projects: Policy Toward Leverage, Risk Allocation, and Bankruptcy," World Bank Policy Research Working Paper No. 3274, Washington, D.C.: The World Bank.

Using case studies and an empirical study, this paper examines how governments and regulators respond to the prospect of bankruptcy through analysis of the capital structure and risks involved in five infrastructure projects. The paper also presents an empirical framework for analyzing the effect of leverage and regulation so as to estimate the probability of bankruptcy given different degrees of leverage and risk. The final section of the paper identifies several options governments can use to increase the operator's financial capacity to assume risk, including: on-balance sheet financing, parent company guarantees, minimum equity levels in the company undertaking the project, performance bonds, and third-party guarantees. Alternatively, contracts could explicitly include risk-sharing mechanisms, such as rate-of-return bands and profit-sharing, trigger-point resets, cost pass-through mechanisms, and so-called "shipwreck clauses."

Estache, Antonio. 2005. "PPI Partnerships versus PPI Divorces in LDCs." World Bank Policy Research Working Paper 3470, Washington, D.C.: The World Bank.

This paper examines the distributional effects and the historical context of PPI partnerships to explain why so many partnerships have failed while others continue to occur. Latin America with its richer developing countries has been the most successful region in attracting private investment. The next most successful are East Asian countries for electricity generation and distribution and Eastern Europe for telecommunications. For transportation, high-traffic road systems seem to be most successful in attracting private investment. Only 25 percent of rail system projects in 131 countries reported PPI arrangements for operations or management in 2003. The water sector has fared worst with these arrangements. The poorest countries have been least successful in entering into PPI arrangements.

Although short-run effects of PPI have been positive, the longer-run situation is more complex because many countries eventually returned to subsidization for sectors other than transport, where intermodal competition exists. With respect to the water sector, cream skimming has been fairly typical. Reforms have increased access in most sectors in most regions, with greater access being realized in the telecommunications sector and the least in the water and sanitation sector. In terms of improved affordability, few countries paid much attention to tariff design and progressively targeted subsidies. The establishment of autonomous regulators varies across country and sector; while not a sufficient condition for attracting PPI, the presence of such agencies might help. Reforms appear to improve efficiency, quality, and access but at higher fiscal and distributional costs than anticipated. Finally, the paper examines the distributional effects of PPI by region and sector, as well as the user groups most supportive of PPI (bankers, some

operators, mostly nonresidential users) and groups most likely to abandon PPI (politicians, NGOs, unions, taxpayers, residential users, and operators with bad PPI experiences). The author concludes that reforms have generally realized efficiency gains but have failed to improve the lot of the poorest. Politicians and the international community need to support developing tools of regulators to provide service efficiently and fairly. Opportunities for the private sector to assume more responsibility for minimizing operation and maintenance costs also needs more emphasis. Additional reform needs to take into consideration weaknesses of the capital markets. Greater transparency governing PPI transactions is needed. The new international accounting standards scheduled for 2006 should improve transparency, but strict enforcement will be required.

Guasch, J. Luis, Jean-Jacques Laffont, and Stephane Straub. 2003. "Renegotiation of Concession Contracts in Latin America," Policy Research Working Paper No. 3011, Washington, D.C.: The World Bank.

This paper takes an empirical approach to determining factors that contribute to the increased probability of concession contract renegotiations initiated by firms. The existence of a regulator at the time the concession is awarded reduces the probability of renegotiation, but price cap regulation increases that probability. Contracts exclusively financed by private money increase the probability, and minimum income guarantees do not appear to offer protection against shocks (contrary to expectations). Finally, the probability of renegotiation increases significantly in the years after a national election, which suggests that political cycles matter.

Harris, Clive, John Hodges, Michael Schur, and Padmesh Shukla. 2003. "A Review of Canceled Private Projects." Note No. 252, Washington, D.C.: The World Bank.

This paper reviews infrastructure projects that were canceled if one or more of the following events occurred before the end of the project's expected life, as determined in a contract or license: 1) the private company sold or transferred its economic interests in the project to the public sector, 2) the private company physically abandoned the project (such as withdrawing all staff from the project), and 3) the private company ceased to provide services to all customers or halted construction of the project for around 20 percent or more of the project's expected life following the revocation of a license or repudiation by the relevant contracting or licensing authorities. The authors found that only 48 private infrastructure projects were canceled in 1990-2001, 1.9 percent of nearly 2,500 infrastructure projects that reached financial closure during that period. More than a third of the projects were from the Mexican toll road program. The water sector had the second highest rate of cancellation (3.5 percent of projects canceled) followed by electricity distribution projects. Most water and sewerage and electricity sector projects were canceled because of problems with and controversies over price increases and payment collections from consumers. In contrast, projects in the telecommunications sector were usually canceled because

they failed to attract a sufficient customer base or the government decided to change the market structure. Some of the projects encountered problems in the bidding phase, and more than half of the 48 projects encountered political and social opposition attributable to lack of transparency in the contract award or to alleged corruption and propriety. The authors recommend ensuring transparency in the award process, building public consensus for the reform, phasing in tariff increases, making judicious use of transitional subsidies, and being realistic in the user fee structure.

The International Bank for Reconstruction and Development/the World Bank. 2005. *Doing Business in 2005: Removing Obstacles to Growth*, Oxford: Oxford University Press.

This report analyzes data from a large cross-section of countries to identify limits to economic development. The study finds that extensive regulation of business is a key limiting factor in economic growth. For example, if the government requires numerous approvals for a business to enter a market or to change in response to changing demand, beneficial business activity is limited, and both investors and consumers suffer. The report provides indices that represent the extent of economic regulation in a country.

Tremolet, Sophie, Padmesh Shukla, and Courtenay Venton. 2004. "Contracting Out Utility Regulatory Functions, Environmental Resources Management."

Through use of a survey instrument, the authors gather information on regulators' reasons for contracting out, their experiences with it, and the critical decisions they had to make once the decision to contract out was made. The survey results indicate that the functions most contracted out are tariff reviews and output measures, although the supply of consultants is not considered abundant. Facing resource limitations, regulators are often forced in their contracting decisions to make choices between independence in decision-making, developing in-house competence, and improving agency legitimacy. From an analysis of survey findings, the authors developed a conceptual framework to guide policymakers and regulators in their decision-making ability. The survey instrument and case studies are included in this paper.

Wells, Louis T. 1999. "Private Foreign Investment in Infrastructure: Managing Non-Commercial Risk." Harvard University. Preliminary draft presentation for conference, Private Infrastructure for Development: Confronting Political and Regulatory Risks; September 8-10, Rome, Italy.

This concept paper notes that contract instability is especially likely to occur if the host government or political opposition group receives information (however incomplete) about deals struck elsewhere that appear to be more favorable than the existing agreement. This paper explains the motivations for countries to seek contract renegotiations and for contract managers to resist them, and identifies

steps that international institutions could take to reduce the likelihood of renegotiations.

E. Financial Instruments

Innovative financial instruments for risk mitigation are used to encourage private sector investment in infrastructure in developing countries. If applied effectively, they might increase output and investment by decreasing the cost of capital, improve sustainability of utility policies, and reduce the incidence of renegotiated contracts and bailouts. What products have been developed to help strengthen the link between infrastructure development and private financial markets? What are the factors constraining their effectiveness and availability? Are they best applied to privatized infrastructure projects with certain financing structures?

Alington, Nigel A. 1999. "Recent Developments in Private Markets for Political Risk Insurance." Preliminary draft presentation for conference, Private Infrastructure for Development: Confronting Political and Regulatory Risks; September 8-10, Rome, Italy.

This conceptual paper summarizes recent developments in private insurance to address political and regulatory risks.

Bubnova, Nina. 1999. "Guarantees and Insurance for Re-allocating and Mitigating Political and Regulatory Risks in Infrastructure Investment: Market Analysis." Preliminary draft presentation for conference, Private Infrastructure for Development: Confronting Political and Regulatory Risks; September 8-10, Rome, Italy.

This paper reviews the types of private and multilateral and national investment insurers, features of these insurance products and risks covered, provides economic arguments for public and private provision of risk insurance, and identifies new market developments in the industry.

Correia da Silva, Luis, Antonio Estache, and Sakari Jarvela. 2004. "Is Debt Replacing Equity in Regulated Privatized Infrastructure in Developing Countries?" World Bank Policy Research Working Paper No. 3374, Washington, D.C.: The World Bank.

This empirical paper analyzes data from 121 utility companies (electric, gas, water) in 16 mostly developing countries and 23 transport infrastructure and 23 transport service providers in 15 developing countries to gauge trends in the financing structure of utilities and transport services from 1991 to 2002. The findings show that debt has been increasing relative to equity over that period and particularly after the 1997 Asian crisis and the stock market downturn in 2001. The paper holds that this change in funding mix could slow privatization efforts and might imperil the financial viability of infrastructure projects. Higher leveraging occurred in the electricity and transport sectors, and the lowest occurred in the water sector. Leverage levels have also increased more in South

American and Asian countries than in East European countries. Equity flight might be reduced through selection of rate-of-return or hybrid regulation where the cost of equity is apparently lower than under price cap regulation, the use of guarantees and various types of risk mitigation insurance, and through use of leasing or other arrangements. The authors recommend that regulators monitor the trends of the utility's leverage rates to minimize the risk of unexpected shocks.

James, David. 1999. "Political Risk Insurance in the Private Market." Brockbank Syndicate Management. Preliminary draft presentation for conference, Private Infrastructure for Development: Confronting Political and Regulatory Risks; September 8-10, Rome, Italy.

This paper explains how Lloyd's underwriting market operates and what it covers. It also compares the private insurance market to coverage provided by export credit agencies and multilateral agencies, such as MIGA, and identifies conditions under which cooperation between these three markets has been appropriate.

Matsukawa, Tomoko, Robert Sheppard, and Joseph Wright. 2003. "Foreign Exchange Risk Mitigation for Power and Water Projects in Developing Countries." Energy and Mining Sector Board Discussion Paper No. 9, Washington, D.C.: The World Bank.

This paper focuses on foreign exchange risk mitigation for water and power projects. It explains what foreign exchange risk is, the arguments for assigning risk to various stakeholders (investors, consumers, government), why infrastructure projects are more exposed to exchange rate risk than are other sectors, and the mechanisms for allocating exchange rate risk. The paper discusses regulatory risk, which is even more pronounced in developing countries with new regulators and little track record of performance. Regulatory agreements that are sensitive to affordability issues are more likely to be respected in times of crisis. Strategies might include tariff methodologies that reduce price volatility, tariff structures that provide pro-poor protections, and transparent contingent subsidy schemes in response to sharp tariff increases. Credible regulatory and appellate frameworks also increase investor confidence that tariff structures will be respected. The paper also describes various forms of government guarantees to mitigate concerns about regulatory risk. However, if available, long-term fixed-rate local currency debt is considered a preferred option for mitigating foreign exchange rate risk.

Moran, Thomas. 1999. "Political and Regulatory Risk in Infrastructure Investment in Developing Countries: Introduction and Overview." Georgetown University. Preliminary draft presentation for conference, Private Infrastructure for Development: Confronting Political and Regulatory Risks; September 8-10, Rome, Italy.

This paper provides a framework for explaining the methods and reasons for mitigating risk and probes the limits of risk mitigation instruments. The risks addressed are traditional political risks, regulatory risks, and parastatal performance risks. The author also explains the difficulties in separating political and regulatory risks caused by government actions, or failure to act, from commercial risks.

Rigby, Peter. 1999. "Project Finance: Technical Risk Criteria," Standard & Poors Infrastructure Finance.

This concept paper argues that the dependability of a project's design, construction, and operation is a precondition for a successful project. Without it, most contractual and other legal remedies will not protect investor. S&P reviews and critiques the reports of independent engineers and other supporting documentation as part of due diligence for infrastructure projects. After doing so, S&P assigns a debt rating to projects, which provides information to debt holders as to how much construction risk they will need to assume. The activities that are subject to S&P evaluation include: engineering and design, siting plans and permits, construction, testing and commissioning, and operations and maintenance. For example, projects that complete permitting and siting with widespread political and legal support are more likely to enter the construction phase without disruption. The highest rated projects will be those that have assigned construction risk to those parties most likely to assume that risk (e.g., construction contractors and vendors). Turnkey, fixed price contracts effectively allocate construction risk, as do owners with extensive experience in the proposed technology who serve as general contractors, if complemented by strong and acceptable completion guarantees. Contractual provisions protecting against damages for delays are also important for risk mitigation, but the creditworthiness of the contractor to honor those liabilities is even more important. A letter of credit that is unconditional, irrevocable, and drawable upon a highly reputed bank, is likewise important in mitigating risk. Although no contract can eliminate all risks, the better projects try to minimize risks through insurance, sovereign guarantees, and provisions to renegotiate tariff cost-offsetting power purchase agreements terms.

Salinger, John J. 1999. "Guarantees and Insurance: Future Directions for Public Agencies." Preliminary draft presentation for conference, Private Infrastructure for Development: Confronting Political and Regulatory Risks; September 8-10, Rome, Italy.

This concept paper contends that it is better for the public sector to complement rather than compete with the private sector to provide political risk insurance. To

that end, three strategies could be followed: (1) the public agency could be an insurer of record and syndicate risk to the private sector by buying reinsurance from credit-worthy reinsurers, (2) stand behind the private sector by selling reinsurance to qualified underwriters, and (3) work alongside private underwriters by sharing the risk of co-insurers. The paper covers the author's assessment of various types of insurance coverage but notes that regulatory risk is beyond the scope of insurance coverage. He observes that there might be a basis for underwriting those risks if there is a way to internationalize standards or regulatory behavior.

Section IV – Gap Analysis

In this section we identify gaps in research on risk mitigation in utility regulation. We first discuss the lack of synergy in some areas of research. We then examine gaps in specific themes in the literature. More specifically, we identify gaps in tradeoffs between instruments that have conflicting effects, the dynamic process of policy development, sustainability of infrastructure policies, leadership, and the effects of multilateral institutions.

Cumulative Nature of Knowledge

In many instances, contributions to the literature do not build on each other. This could result from an author's not knowing about other authors' work, not understanding that his or her research relates to the broader question of risk mitigation, or some other reason. Two remedies seem possible. One remedy would be to develop a website that pulls together the various research threads along with databases that are relevant to the research. Another remedy might be to organize annual research conferences that would include the relevant research threads and that would be used to identify gaps in the literature and promote a research agenda.

Tradeoffs

Between Predictability and Flexibility. There are several areas where research on tradeoffs is needed. One such area is the tradeoffs between predictability and flexibility. Much of the literature appears to assume a consistent, positive relationship between investment and regulatory instruments that increase policy stability. However, arguably there exist situations where policy stability might increase risk or lower expected returns on investment, both of which would discourage long-term investment. Telecommunications provides an example where policy stability might increase risk. Telecommunications markets and technologies can change quickly. If a country's institutional structure makes it hard to adopt policies for new situations, this rigidity might increase risk by causing earnings to fluctuate more than they would if it were easy for the country to adjust to new realities. Electricity provides an example where policy stability might lower expected earnings. A country engaging in new electricity reforms is likely to make mistakes. If the initial policies discourage investment by overly restricting earnings and if the country's institutional structure makes it hard for the country to

change policies based on new information, then the policy stability would lead to lower long-term investment than a less rigid institutional structure would.

Both conceptual and empirical research are needed for a better understanding of the tradeoffs between predictability and flexibility. Conceptual research should formalize the tradeoff parameters and provide theoretical models that could form the basis for case studies and empirical research. Such models could, for example, consider a situation where policymakers have available a set of policy instruments that vary in their effectiveness depending on economic conditions and where future economic conditions are unknown at the time instrument choices are made. The research could identify conditions under which (1) governments should adopt a policy instrument that performs modestly well in many situations or (2) change policy instruments once economic conditions are known. Empirical research should examine whether such tradeoffs are limited in practice to only a few situations.

Between Independence and Accountability. Similarly, research is needed to explore the nature of independence and the tradeoffs between independence and accountability. Countries vary in their approaches to independence of their regulatory agencies. Choices include various forms of budgetary independence and political independence, different methods of court and tribunal review, different appointment and termination procedures, and varying degrees of control by license and legislation. Empirical research and case studies are needed to examine the effectiveness of these different instruments and the extent to which effectiveness is influenced by specific cultural, legal, and political contexts. Effective independence may reduce opportunism, but independence also limits politicians' abilities to respond to situations that may jeopardize the sustainability of the regulatory agency and elements of the regulatory system. For example, the *PURC/World Bank International Training Program on Utility Regulation and Strategy* includes in its curriculum an exercise in which a regulator has to consider whether to implement a price increase that is required by law, but that also would likely lead to a political change that would derail the country's utility reform process. This exercise, although hypothetical, is based on real world examples in which regulatory independence was challenged by policymakers who wanted to hold regulators politically accountable. Research is needed to examine the nature of this tradeoff between independence and accountability, and the extent to which situations like the exercise just described are rare or a common feature of regulation. Additional research could shed light on qualities of various checks and balances alternatives, degrees of effectiveness, how checks and balances affect adaptability of the regulatory system, and mechanisms for ensuring that checks and balances do not result in inappropriate barriers to entry, rigidity, and gridlock.

Dynamics of Policy Development

Little research exists on the dynamic interplay between policy outcomes – both perceived and actual – and next-generation policy adoption. We were unable to identify empirical research that treats policy outcomes as intermediate steps in an evolutionary process. This is an important gap because a country in the early stages of its reform

process is unable to adopt best-practice policies (and uncertain as to what is best practice for its situation) and so begins taking intermediate steps without knowing what sequence of steps might be optimal and how policy initiatives lead to next-generation reforms. Some case studies describe what the authors believe to be the evolution of policy learning and policy development, but there is a need for clear theoretical models and statistical tests of the validity of the models and the case-study conclusions.

Sustainability of Infrastructure Policies

A specific area of research in the dynamics of policy evolution is the issue of sustainability of infrastructure reforms. Positive theories of regulation describe why countries choose the policies that they do. These theories generally employ static models (in contrast to the dynamic process described above) and usually tell us that a stakeholder who has or can obtain political power and who can benefit from a particular policy should be expected to work to obtain that personally beneficial policy. Positive theories of regulation also tell us that people who receive the concentrated benefits of a policy are more likely to work to sustain that policy than the general population – over whom the costs of the policy are broadly distributed – is likely to work to change the policy. A limited number of empirical studies exist that examine the distribution of costs and benefits of infrastructure reforms. Missing from this literature are assessments of how these distributions of benefits change over time and affect next steps in policy evolution. Specifically, research is needed on the effects of pro-poor policies on the sustainability of infrastructure policies, how infrastructure development changes stakeholder groups (for example, some assert that telecommunications development increases international influence and empowers the poor and the young in many countries by providing them with information), and the interplay between sector policies. For example, rural telecommunications policies have prompted rural electrification in some instances. Furthermore, learning from regulation of one sector is often used in a country to shape the regulatory policies for other sectors.

Related to this issue of sustainability is the issue of the allocation of risk. There are many examples of countries (and thus the citizens of the country) assuming commercial risk for investors. This may appear attractive to investors, but they are generally in a better position to diversify risk than is the general population, especially in poor countries. Research is needed to examine whether these approaches to mitigating investor risk might actually challenge policy sustainability, a lack of which ultimately increases risk.

Leadership

Much has been learned about the institutional, economic, financial, legal, and political instruments of infrastructure policy. Missing from this literature is work on the human processes of making changes when they are needed and staying the course when short-term anxieties or specific interest groups are pressing for changes that are not in the country's long term interests. Several areas of research are needed. Surveys of well-performing regulatory institutions could identify the leadership characteristics that have

facilitated their successes. Similar research has been done for private businesses, but we know of no such research for regulatory agencies. Possible areas of study include finding policy champions, creating and orchestrating dialogue, and identifying gaps between assumptions and reality. Case studies of leadership in infrastructure regulation – including both instances of success and cases of failure – are needed to provide real-life examples that practitioners can use as models for their own situations. Surveys of regulators should be conducted to gain an understanding of their attitudes and beliefs on leadership.

Another area of research is the relationship between roles and leadership. Given the dynamics of policy evolution described above, it is clear that leadership is needed from multiple sources. For example, the regulator might be the first to see a discontinuity between an established policy and a new industry trend. The regulator would need to exercise leadership to get policymakers, industry, and customers to examine the issue and engage in the adaptive work of solving the problem. In other situations the person first encountering the problem might be in industry, with a consumer group, or in another part of the government. Unfortunately for these situations, the formal structure of utility regulation disperses authority, so often there are no readily available mechanisms for engaging people in adaptive work. Research should examine situations where regulators, policymakers, multilateral institutions, industry, and other stakeholders have provided leadership in the formation and sustainability of infrastructure policies. Included in this research should be an examination of how formal and informal institutions affect behavior and people's willingness and ability to change behavior.

Effects of Multilateral Institutions

Extensive work is needed on the effects of multilateral institutions and international relationships on policy development, sustainability, and risk. Work has been done on cross-country learning, but little work has been done that ties this learning with multilateral institutions and with regulatory risk.¹⁰ Given that much of the literature on regulatory risk has been conducted by multilateral institutions or with funding from such institutions, the effects and effectiveness of this work should be examined to see what, if any, changes might be in order.

Section V – Conclusion

In this literature review we identify and summarize key elements of the literature on risk mitigation in infrastructure. We focus on two elements of this literature, namely how regulation affects investment risk and the financial instruments that investors can use for mitigating risk. We also identify gaps in the research in understanding tradeoffs

¹⁰ See Witold J. Henisz, Bennet A. Zelner, and Mauro F. Gullén, 2005, “International Coercion, Emulation and Policy Diffusion: Market-Oriented Infrastructure Reforms, 1977-1999,” The Wharton School, University of Pennsylvania, and Witold J. Henisz and Bennet A. Zelner, 2005, “Resistance to Multilateral Influence on Reform: The Political Backlash Against Private Infrastructure Investments,” The Wharton School, University of Pennsylvania, for recent work in this area.

between instruments that have conflicting effects, the dynamic process of policy development, sustainability of infrastructure policies, leadership, and the effects of multilateral institutions. We also find a lack of synergy in some areas of research and recommend approaches for increasing awareness and collaboration.

Some of the numerous papers, books, etc., that are useful background on regulation and risk but that we did not review are listed below.

1. Investment Climate

Dollar, David, Mary Hallward-Driemeier, and Taye Mengistae. 2004. "Investment Climate and International Integration. World Bank Policy Research Working Paper 3323, Washington, D.C.: The World Bank.

Hallward-Driemeier, Mary and David Stewart. 2004. "How Do Investment Climate Conditions Vary Across Countries, Regions, and Types of Firms?" Background paper prepared for the *World Development Report 2005: A Better Investment Climate for Everyone*.

Lamich, Ranjit and Kazim Saeed. 2003. "What International Investors Look for When Investing in Developing Countries: Results from a Survey of International Investors in the Power Sector." Energy and Mining Sector Board Discussion Paper No. 6, Washington, D.C.: The World Bank Group.

The World Bank Group. 2004. "East Asia & Pacific Private Investors in Infrastructure: Perception Survey." Washington, D.C.: The World Bank.

2. Private Participation Infrastructure Background

Easterly, W. and L. Serven, editors. 2003. *The Limits of Stabilization: Infrastructure, Public Deficits and Growth in Latin America*, Palo Alto, California: Stanford University Press.

Estache, Antonio. 2004. "Emerging Infrastructure Policy Issues in Developing Countries: A Survey of Recent Economic Literature." Background Paper for the October 2004 Berlin meeting of the POVNET Infrastructure Working Group, Washington, D.C.: The World Bank.

Estache, Antonio and Maria Elena Pinglo. 2004. "Are Returns to Private Infrastructure in Developing Countries Consistent with Risks Since the Asian Crisis?" World Bank Policy Research Working Paper 3373, Washington, D.C.: The World Bank.

Guasch, Jose-Luis. 2004. *Granting and Renegotiating Infrastructure Concessions*. The World Bank Institute of Development Studies, Washington D.C.: The World Bank.

Harris, Clive. 2003. "Private Participation in Infrastructure in Developing Countries: Trends, Impacts, and Policy Lessons," World Bank Working Paper No. 5, Washington, D.C.: The World Bank.

Izaguirre, Ada Karina. 2002. "Private Infrastructure: A Review of Projects with Private Participation, 1990-2001," Note No. 250, Washington, D.C.: The World Bank.

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