Considerations for the Design and Transformation of Regulatory Systems

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Abstract

We examine the motivations for forming regulatory agencies and the features that are critical for their success. Governments create independent regulatory agencies to address two fundamental problems in the control of public utilities, namely the dampening effect that politics has on investment and the value of specialized knowledge. Agencies are more effective in stimulating investment if they are insulated from political pressures to behave opportunistically and if they have sufficient resources to overcome information asymmetries with operators. Forming or reforming regulatory systems create adaptive challenges for those whose authority, influence, and traditions are affected. Trained leadership professionals are often needed to help stakeholders through these transitions.

Keywords: Regulation, Energy, Natural Monopoly, Public Utility, Leadership

JEL codes: K23, L51, L94

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I. Introduction

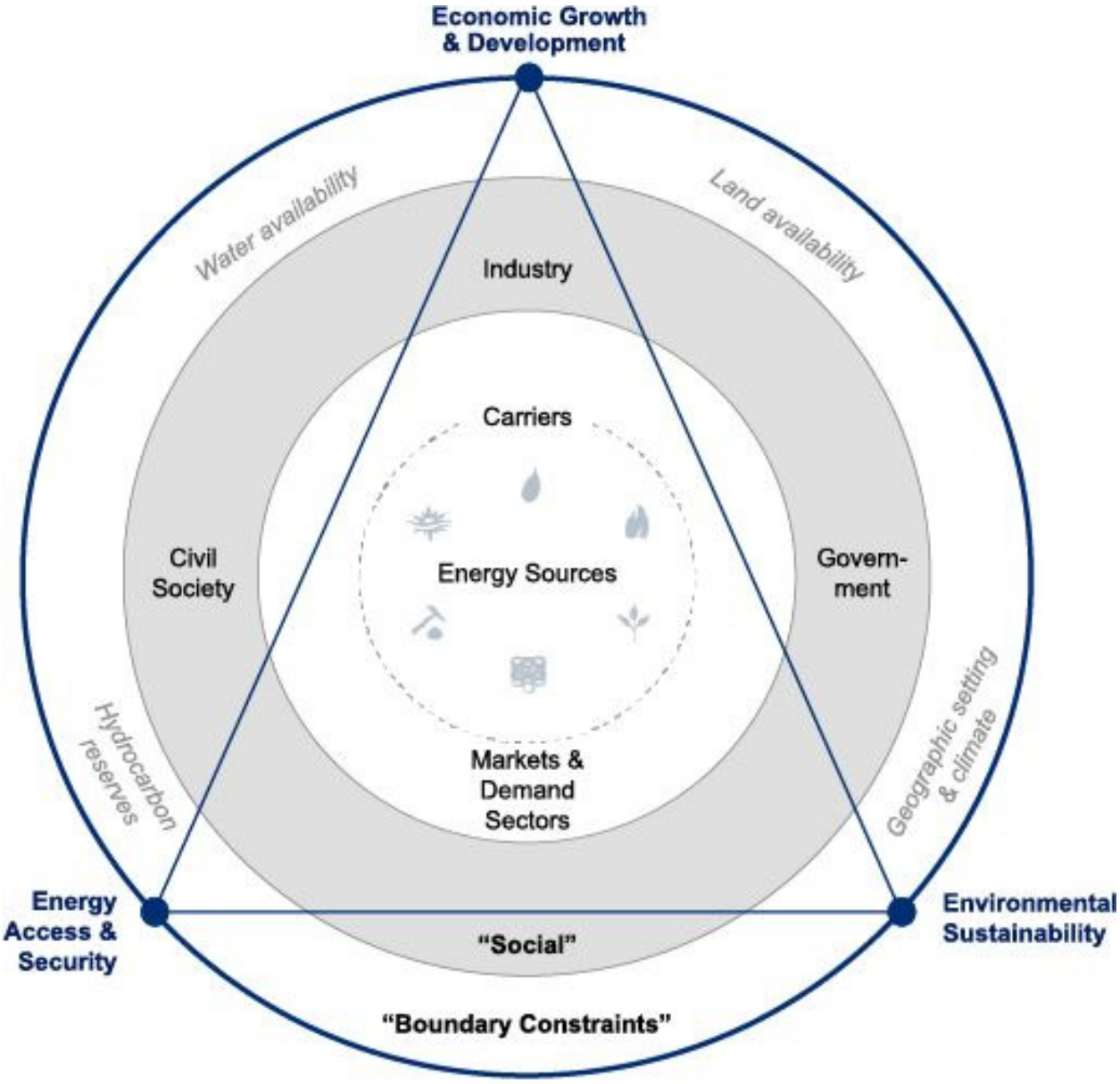
A country's effectiveness in how it uses energy has profound impacts on the country's economy, security, and environment. The World Economic Forum (2013) describes these three impact areas as the Energy Triangle. Efficient energy use is strongly linked to the first element, namely economic development and human development. (World Bank 2013) According to the World Bank, over 1.2 billion people, or 20% of the world's population, do not have access to electricity.[1] Research has shown that electricity has multiple impacts on the environment: On one side, environmental pollution resulting from the lack of modern, electric cooking and heating solutions cause an estimated 3.5 million deaths per year worldwide. (Lim et al. 2012) On the other hand electricity production contributes to carbon emissions, particulate matter pollution, acid rain, and atmospheric mercury.

As Figure 1 shows, the World Economic Forum (2013) illustrates the complexity of impacting energy effectiveness by overlaying its Energy Triangle with its Energy Architecture framework. The triangle represents the three central objectives of energy policies, namely achieving economic growth and development, providing universal energy access and security, and protecting the environment. Each country balances these objectives based on its stage of development, culture and population, relationships with other countries, etc. The architecture represents the systems by which each country creates and incentivizes its own balance. The mechanisms include the physical elements of energy (sources, carriers and utilities, and markets) and social elements, consisting of the political, industry and civil society institutions that shape

[1] The World Bank, "Energy – The Facts," http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTENERGY2/0,,contentMDK:22855502~pagePK:210058~piPK:210062~theSitePK:4114200,00.html, accessed October 1, 2014.

the use of the physical elements. While the three types of institutions are interdependent, the government's ability to control the other two makes government the central player.

Figure 1. World Economic Forum Energy Architecture and Energy Triangle



Source: World Economic Forum (2013).

This paper examines what has become a central feature of government policy for electricity, namely the economic regulation of the sector by an independent agency that plays a key role in sector governance. Economic regulation addresses the questions: Who will provide the electricity? How will the market be organized? How will the electricity be produced? Who will receive electricity and under what conditions? And how will costs be covered? Because these questions draw political interest with its inherent short-term focus, and because answering the questions well requires high levels of sector expertise, they are most successfully addressed with the involvement of an independent regulatory agency. The word "independent" should not be taken literally as it is not meant to imply that the agency is sovereign. Rather it means that the agency is directed by laws rather than by day-to-day political imperatives and, under law, is required to perform its work at arm's length from the government, politicians, operators, customers, and other stakeholders.

Some small systems, such as island countries, may benefit from sharing regulatory resources, perhaps through a multi country regulatory system. Examples of such approaches include the Eastern Caribbean Telecommunications (ECTEL) system, which includes five Caribbean countries[2], and the Channel Islands.[3] In the ECTEL case the islands share a supranational (or multinational) regulator each island has its own national regulator. In the Channel Islands case the islands have a common regulatory body. Multinational regulatory systems can provide economies of scale for the system, namely by making it more economical to have highly specialized staff and by avoiding duplication of efforts such as the creation of investigative reports, administration, and developing webinars or other educational resources specific to the region. Having a common regulatory body also facilitates learning across the

[2] Commonwealth of Dominica, Grenada, St. Kitts and Nevis, Saint Lucia, St. Vincent and the Grenadines.
[3] The Bailiwick of Jersey and the Bailiwick of Guernsey.

countries and permits the body to more quickly and effectively establish its credibility by regulating more utilities. In addition a multi country approach can improve harmonization across countries that could lower costs for energy suppliers selling in more than one of the countries, provide the regulator with authority to obtain information from operations that span the countries, and diffuse political pressures because many political players will have influence in only one of the countries. However, a multi country system has some possible deficiencies: It may be more difficult to hold accountable than a single country regulator, may become dominated by issues in a subset of the countries, and may force harmonization in instances where countries have legitimate differences.

This paper proceeds as follows. It begins with an explanation of the features of electricity providers that cause them to be considered public utilities. It then examines the motivations for regulating public utilities, the important features of an effective regulatory system, and the empirical evidence. It then studies the motivations for and challenges to a multi country approach to regulation. This paper concludes with an examination of the adaptive challenges of creating and reforming regulatory systems.

II. Public Utilities

A public utility is a natural monopoly whose performance has such a significant impact on customers and the country in general that effective regulation can provide substantial public benefit. Also, a utility generally receives a special designation from the government, perhaps in the form of a concession or franchise that provides the utility with specific rights that it must possess to perform well, such as access to rights of way, as well as special obligations such as an obligation to serve that are needed to limit the utility's ability to exploit its market power.

A utility is a monopoly in that it provides 100% of the output for its market, the service has no close substitutes, and that the monopoly status endures over time. Bonbright et al. (1988) goes further to conclude that the enterprise must be a natural monopoly in the sense that the firm "cannot be operated with efficiency and economy unless it enjoys a monopoly of its market," although customers may have options at the margin, such as self-supply through small generators or solar panels.[4]

The most common approach to determining whether a firm is a natural monopoly is to examine the market from a production technology perspective. By this view, a monopoly is a natural monopoly if a single firm represents the least cost arrangement for serving the entire relevant market demand (Sharkey 1982). This implies significant economies of scale if the utility provides a single service or dominant cost subadditivity[5] if the utility provides multiple services. (Baumol 1977; Jamison 1999)

The importance of the utility to its customers and the economy is captured by the concept of a firm "affected with the public interest", which is a notion that evolved in the late 1800s and early 1900s in the United States. The effective starting point[6] was an 1876 court case, *Munn v. Illinois*,[7] involving Illinois grain elevators that the U.S. Supreme Court found were situated uniquely between a river harbor and railroad tracks. The grain elevators' location gave them control over grain movements from farmers in certain Midwestern states to markets on the East Coast. It was practically impossible to move either the harbor or the rails, so the elevators were

[4] As we explain later, it is the utility's ability to exploit monopoly power that gives rise to its form of regulation. For the enterprise to be able to exercise that market power, i.e., exploit or extort its customers (Werden 1998), there can be no close substitutes for the monopoly's product or service and there must be barriers to entry so that the monopoly's status persists over time (Harris and Simons 1989).

[5] Subadditivity extends the concept of scale economies to multiple products. More specifically, cost subadditivity incorporates the situation where a single firm represents the least-cost method for producing multiple products, perhaps because the products share inputs or human resource skills.

[6] Legal concepts that helped formulate the notion of a firm affected in the public interest have roots in British common law dating back to the Middle Ages.

[7] Munn v. Illinois, 94 U.S. 113, 130–32 (1876).

"virtual monopolies" for storing and transferring grain coming from the "seven or eight of the great States of the West." Customers of the elevators asserted that the elevators had market power and exercised it in a way that significantly hindered the economic wellbeing of farmers and others. In developing its foundation for deciding on behalf of the plaintiffs, the Court found that the elevators exercised "a sort of public office" and stood at the "gateway of commerce" because of their unique position that made farmers dependent on the elevators and without alternatives if grain was to be moved from the Midwestern states to the East. The Court concluded that it was proper for governments to use their policing powers to control the conduct of such businesses whose actions had such broad consequences, making them affected with the public interest. This public interest concept has both expanded and shrunk over time, but the essential core of the Court's finding has remained, namely that the firm must have an unusually significant impact on customers and the economy, provide an essential infrastructure upon which important segments of the economy rest, and have such a control over its market that, should it exercise its market power, it can do serious harm. (Trebing 2001)

The peculiar importance of energy to a modern or modernizing economy is well known. A survey of business managers in 137 economies found that they consider getting electricity to be the second biggest obstacle to their business success. Furthermore the managers estimated that power outages decrease their business's annual sales about 5.1% on average.[8] Calderon and Servén (2003) and Dollar, Hallward-Driemeier and Mengistae (2005) show that poor electricity supply hinders firms' productivity and diminishes investments.[9] Limi (2008) estimates that eliminating the electricity outages in Eastern Europe and Central Asia would increase gross

[8] World Bank, "Getting Electricity," http://www.doingbusiness.org/data/exploretopics/getting-electricity/why-matters (accessed September 25, 2014). World Bank Enterprise Survey results are available at http://www.enterprisesurveys.org/.
[9] See also Reinikka and Svensson (1999), Eifert (2007), and Limi (2008).

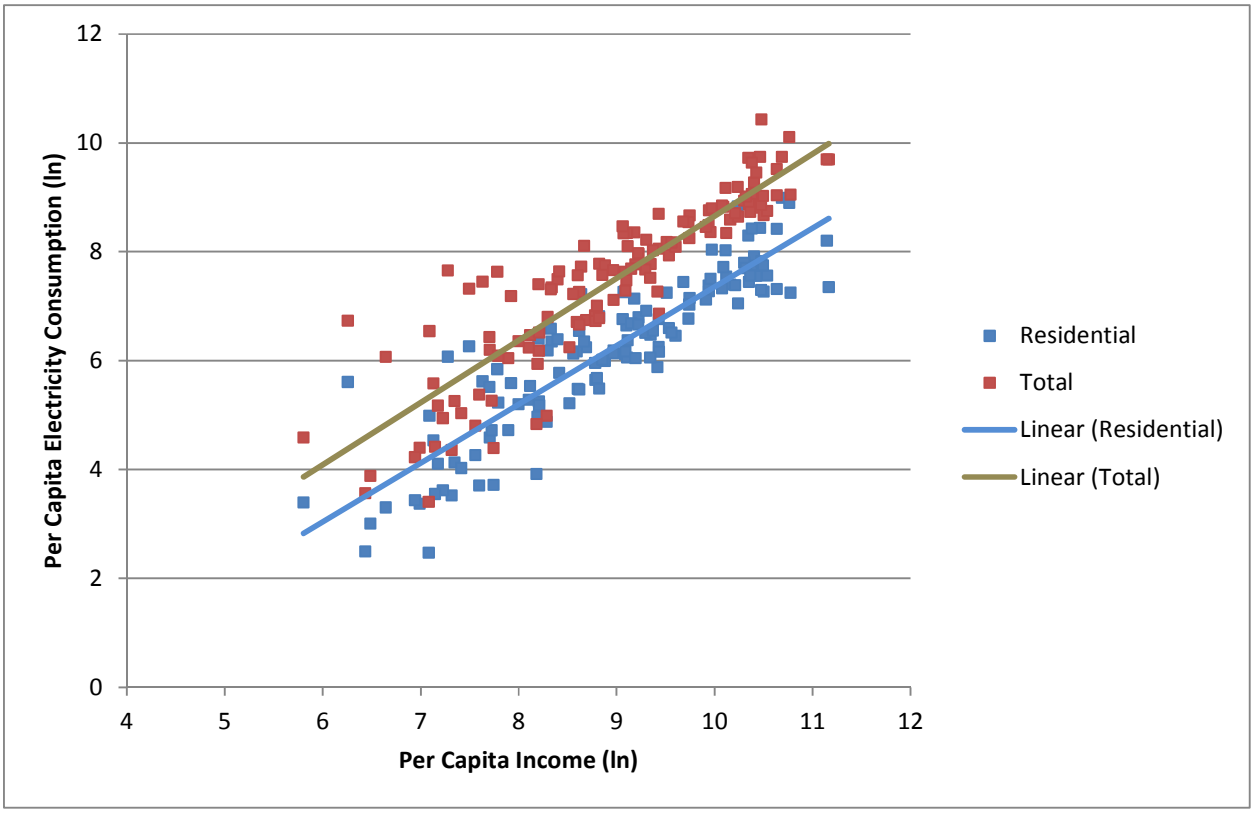
domestic product or GDP by 0.5%. The consulting firm IHS (2013) estimated that reductions in energy costs added about $1200 to the annual discretionary income of the average family in the United States in 2012.[10]

Figures 2 and 3 illustrate how electricity consumption is a contributor to economic growth and a consequence of that growth. Figure 2 compares per capita income to both total electricity consumption and residential energy consumption by country, showing strong, positive correlations. That residential consumption is higher with higher income illustrates how consumers improve their standards of living by consuming more electricity. The difference between the total consumption and residential consumption represents the electricity used to produce goods and services in the economies. This difference is greater when income is higher, indicating that stronger economies use more electricity for government and industry than do economically weaker countries. Figure 3 illustrates this point more directly. The vertical axis represents the per capita electricity consumption by non-residential customers. The strong, positive correlation between this consumption and per capita income illustrates the effective role of electricity in a modern economy. The data also show that the visual variance in consumption by government and industry is greater for lower income countries than for higher income countries, illustrating the opportunities for some low-income countries to make progress in their effectiveness of electricity use.

As we discuss in more detail in a later section, empirical studies demonstrate that the quality of regulation has a positive impact on electric industry performance.[11]

[10] This represents a 2% increase, based on the authors' own calculations using data from the U.S. Department of Commerce Bureau of Economic Analysis and the U.S. Census Bureau.
[11] See, for example, Cubbin and Stern (2006).

Figure 2. Worldwide Per Capita Income and Electricity Consumption by Country, 2003-2007

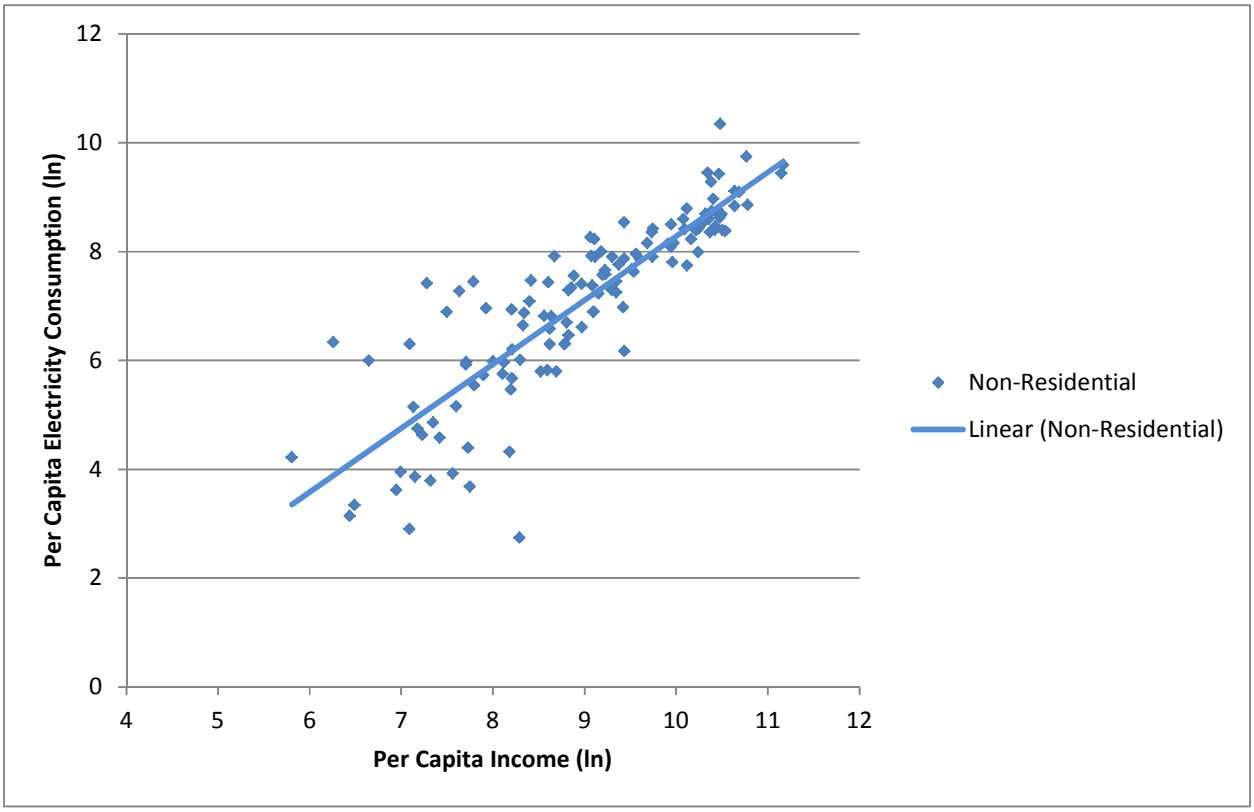


Source: U.S. Energy Information Administration and The World Bank, as cited by Gapminder.

III. Motivations for and Problems in Regulation

Governments subject utilities to significant regulatory oversight because the lack of competition often results in inefficiency, low service quality, limited investment, and high and exploitive prices, the effects of which are significant because of the importance of the sector in the economy. Lack of competition matters because market power allows a utility's management to pursue its own private objectives, which may be different from those of its customers or of the government, regardless of whether the utility is privately owned or state owned. Customers are generally concerned with adequate investments for efficient and adequate service, and with

Figure 3. Worldwide Per Capita Income and Non-Residential Electricity Consumption by Country, 2003-2007



Source: U.S. Energy Information Administration and The World Bank, as cited by Gapminder.

economical prices. However, a privately owned monopoly is likely to want to maximize profit, an objective that, left unchecked by either competition or regulation, is generally understood to be inconsistent with adequate supply and low prices across the board. Because of this tendency of privately owned utilities, some governments adopt state ownership, perhaps believing that it will result in a greater focus on customer needs. This belief doesn't seem to align with actual results. State-owned operators often want to satisfy key political supporters, maintain high levels

of employment for politically powerful unions, or secure large budgets, all of which are inconsistent with customers' interests.[12]

Today most governments respond to these problems of market power and private objectives by imposing economic regulation on the utility, even if it is state owned. In the early days of such regulation, government bodies such as legislatures and ministries performed this regulation directly. This proved to be ineffective for two reasons. First, the political bodies lacked expertise and the outcomes tended to be: (1) Prices became outdated as technology and economic conditions changed, often resulting in financial distress for the operator and poor service for consumers; (2) Politicians were out-negotiated by their utility counterparts, resulting in high prices and profits – in at least one instance the profits were so high that the utility was embarrassed and lowered its prices below the maximum negotiated by the politicians, resulting in embarrassment on the part of the politicians; and (3) Utility services were withheld from political opponents or given free (or nearly free) to political friends.[13]

These problems result in part from information asymmetries, i.e., the situation where the agent (in this case, the utility) knows more about its ability to perform and the effort it exerts than does the principal (in this case, the government). There are two information asymmetries that make regulation by political bodies unsuccessful. The first is that the utility knows more about its business than do the politicians. This information gap is sizeable because of the large number of issues that politicians address and because politicians are more focused on knowing constituents than on knowing utilities. The second information asymmetry is between the politicians and the citizens, i.e., politicians are able to pursue private agendas because citizens are unable to monitor all that the politicians do.

[12] Summaries of the literature can be found in Cuervo and Villalonga (2000), Newbery (2004), and Henisz and Zelner (2001).
[13] See generally, Glaeser (1927).

The second reason that regulation by political bodies is ineffective is because these government organizations behave opportunistically. Opportunism is commonly referred to as the hold-up problem. With respect to privately owned utilities, hold-up results from the absence of credible commitments by the government not to expropriate assets or the returns they generate.[14] Expropriation occurs in electricity when, once an operator has sunk its investment in generation, transmission, or distribution, the government effectively takes at least some portion of the value of that investment for its own uses. Examples of expropriation include keeping prices at non-compensatory levels, clawing back profits, or making new, uncompensated demands, such as adding environmental regulations. For example, when the Labour Party took control of the U.K. government several years after the country had privatized its power sector, the Labour government instituted a windfalls profits tax to capture some of the profits that the private owners had received since privatization. This claw-back of profits led some foreign investors to withdraw from the country shortly thereafter. (Jamison 2007) As another example, the potential for a hold-up problem was considered sufficiently problematic in Florida that the government instituted particular laws that increased investor certainty for how regulators would treat the investments in pricing. (Holt and Kury 2009)

As the Florida and U.K. examples illustrate, a government's inability to commit to allowing a utility to recover its costs increases risks associated with investments, and in particular investments that: (1) Are largely sunk, i.e., that cannot be reversed without significant loss of value; (2) Have economies of scale and scope,[15] which decreases the number of operators the political actors have to monitor; and (3) Have large political interest, i.e., political actors can attract positive public attention by challenging the recovery of the investment costs. (Spiller

[14] Henisz and Zelner (2001).

[15] Economies of scope are cost savings that occur because of producing multiple products. It is an element of cost subadditivity.

2005) Electric utility systems have these characteristics and, unless properly addressed through strong property rights laws and independent regulatory agencies, the risks of the hold-up problem cause utilities to under invest. (Heinisz and Zelner 2001)

The hold-up problem also exists for state-owned utilities, although there is evidence that the effects are less pronounced than for privately owned firms, at least in the electricity sector. (Cubbin and Stern 2006) For state-owned utilities, short-term political pressures can lead to budgetary restrictions that benefit current taxpayers, but cost future customers because the investment delays lead to shortages, poor quality, and higher maintenance costs. Political actors often promise that money will be forthcoming in the future when political pressures ease, but the promised budgetary relief rarely arrives. Sometimes the restrictions directly limit investment, but in other situations the knowledge that budgets will be insufficient leads managers to limit their political exposure by restricting the scale of their operations, perhaps by limiting coverage and expansions that would depend upon further technology investments. (Savedoff and Spiller 1999; Heinisz and Zelner 2001).

IV. Empirical Evidence

This section examines the empirical evidence that an independent regulatory agency improves sector performance. Studies of this issue examine the effects of elements of regulatory governance and firm characteristics on infrastructure services, normally using cross-country comparisons. The telecommunications industry has been the most frequently studied sector, primarily because of the availability of data. In this sector, polity, economic freedom and regulatory governance[16] are associated with increases in the penetration rate of telephone lines and mobile phones. For example, Gutierrez and Berg (2000) found for a sample spanning Latin

[16] Regulatory governance in this study is a measure representing enforcement of power and independence of the regulator.

America and the Caribbean that an increase of one standard deviation for these variables increased the penetration rate by 8.8 lines per 100 inhabitants. Ros (2003) also found that having an independent regulator is positively associated with operating efficiency and teledensity for main telephone lines in Latin America. For mobile phones, Maiorano and Stern (2007) found evidence linking the existence of an independent regulator to increased penetration rates for developing countries, while Gutierrez (2003) found that a well-governed regulatory environment in Latin America and the Caribbean was associated with higher teledensity for main lines. Montoya and Trillas (2007) studied the relationship between regulatory independence and fixed line penetration in Latin America and found that regulatory independence appeared to have a positive impact on penetration and estimated that "the predicted penetration for Colombia would be 38% higher if it had the independence level of Argentina as compared to the lowest independence level (that of Surinam)."

Several studies suggest a relationship between regulatory governance and positive outcomes in electricity, even though these effects sometimes have a time lag, illustrating the importance of experience and intervals between the time when a policy is enacted and when results come to fruition. For developing countries in Africa, Asia and the Caribbean that experience unsatisfied demand, the estimated impact of measures of regulation on per capita electricity generation capacity in the long run is around 15-25% (Cubbin and Stern 2006). Andres et al. (2003) examined labor productivity in electric utilities from Latin America and the Caribbean and found that utilities governed by a regulatory agency had higher labor productivity.

Disentangling the effects of regulatory governance on firms with differing types of ownership is important. Several studies compared the influence of regulatory governance as it relates to both private and public ownership. Edwards and Waverman (2006) found that

regulatory independence acts as an important check on governmental influence. More specifically they found that governments in the European Union sought to give favorable treatment to government-owned telecom operators relative to their privately owned rivals. Bortolotti et al. (2011) found that having an independent regulatory authority has different implications for private and publicly owned firms in infrastructure industries. Specifically, they found that firms with some degree of state ownership have higher market values if they have an independent regulator, implying that investors value the presence of the regulator. They further found that in instances where there was political interference despite the presence of a regulatory agency, investors valued some degree of government ownership, presumably in the belief that the state would be easier on the utility if the state was a partial owner. This finding points to the importance that investors place on political opportunism. Andres et al. (2003) found that "the mere existence of a regulatory agency, regardless of the utilities' ownership, has a significant impact on performance" in a study of electric utilities of Latin America and the Caribbean.

Estache, Goicoechea, and Trujillo (2009) found mixed results for the effects of independent regulators. Using a sample of developing countries, their study suggests that, ignoring corruption, establishing an independent regulatory authority influences performance in electricity and telecoms, but not in the water sector. They also found that the creation of an independent regulatory authority in electricity and telecoms was associated with a deterioration of quality indicators for developing countries. This suggests that either performance worsened or the creation of an independent auditor led to improved measurements of actual performance. If performance is measured more accurately in periods following the creation of independent regulatory agencies, it becomes difficult to compare performance before and after the change accurately. An important implication of these findings is that caution must be taken in suggesting

uniform models of regulation for countries with differing institutional environments. Estache and Wren-Lewis (2009) suggest that attention should be paid particularly in countries exhibiting modest market contestability and when dealing with politically sensitive services, such as water and transportation.

The importance of private investments in developing countries is well known, being one of the benefits commonly associated with credibility of institutions. Pargal (2003) found that, for telecoms in Latin America, private investment is positively associated with having a credible and independent regulator. The ability of the regulator to make reliable commitments was emphasized. Additional evidence about the importance of commitments in the electricity sector was provided by Bergara, Henisz, and Spiller (1998), who found that "well-defined and credible political institutions are positively and significantly correlated with national electricity generating capacity." This finding implies that countries pursuing investments in renewable energy, which in many instances is more costly than traditional forms of energy supply, will be more successful if they have independent regulatory agencies.

As mentioned earlier, one reason why regulation by political bodies is ineffective is that government organizations can behave opportunistically. Another aspect of regulatory governance that has been studied is its relationship to political opportunism and corruption. Upon examining the framework of concessions for infrastructure services of the water and transportation sectors in Latin America, Guasch et al (2007, 2008) found that "strong and experienced regulators are likely to act as barriers against political opportunism."

In regards to corruption, the evidence suggests that both the content of regulation (regulatory substance) and regulatory governance are associated with reduced levels of corruption, with the exception of Estache, Goicoechea, and Trujillo (2009) who upon examining

water, electricity, and telecom industries, found that the introduction of independent regulatory authorities had, "at best", only partial effects on the consequences of corruption for performance output. Other studies find lowered corruption levels. For example, Berg, Jiang, and Lin (2012) found that regulatory strategies that reduce information asymmetry and increase accountability tend to reduce corruption. They specifically found that a one standard deviation increase in regulatory governance led to an 8.51 percentage point decrease in the probability that a telecom firm reports it needs to pay an extra unofficial payment from "seldom" to "mostly", where "seldom" and "mostly" were answers to survey questions. Wren-Lewis (2013) examined 153 electricity distribution firms in Latin America and the Caribbean and found that, while greater corruption was associated with lower firm labor productivity, this association was lower when there was an independent regulatory agency. Furthermore, when these electricity distribution firms operated under an independent regulatory agency with greater regulatory governance, they were found to operate more productively.

In summary, higher quality regulatory governance is associated with improvements in sector performance, less corruption, more investment, and less political interference. Improved sector performance takes the form of greater efficiency, more effective investment patterns, greater output, and improved quality. In other words, customers receive greater value for what they pay for services. These improvements take longer for electric utilities than for telecommunications services because electricity investments and operations take longer to change. It is also important to keep differing institutional environments and contexts in mind, particularly when dealing with politically difficult services.

V. Design of Regulatory Systems

This section examines the design of regulatory systems. It begins with structural issues and then examines agency features.

A. Structure

Although there is general agreement that the solution to the information, expertise, and opportunism problems described above is to create what we now call independent regulatory agencies,[17] the institutional forms vary across countries: Some counties like the U.S. have commissions, other countries like Jamaica have a single director, and still other countries like the U.K. use a board-CEO structure. Although there are variations in agency structure, there is a typical overall governance structure for regulation, within which there are three primary roles, namely those of policy maker, regulator, and operator.[18] (Jamison and Castaneda 2014) Of course there are other roles that support this system, such as the roles of appellate tribunal (preferably an independent judiciary), but these are supporting roles rather than line roles. Some countries combine two or all these primary roles into a single organization, which leads to inefficiencies. (Eberhard 2014) This diminished effectiveness occurs largely because of the information, expertise and opportunism issues described earlier, but also because institutions take on particular natures as a result of the work they do and the relationships they maintain. These acquired and innate characteristics cause institutions to have different capabilities.

Figure 4 illustrates this governance model:[19] Authority runs vertically beginning with the country's citizens. Policy makers act as representatives of citizens, much as a board of directors

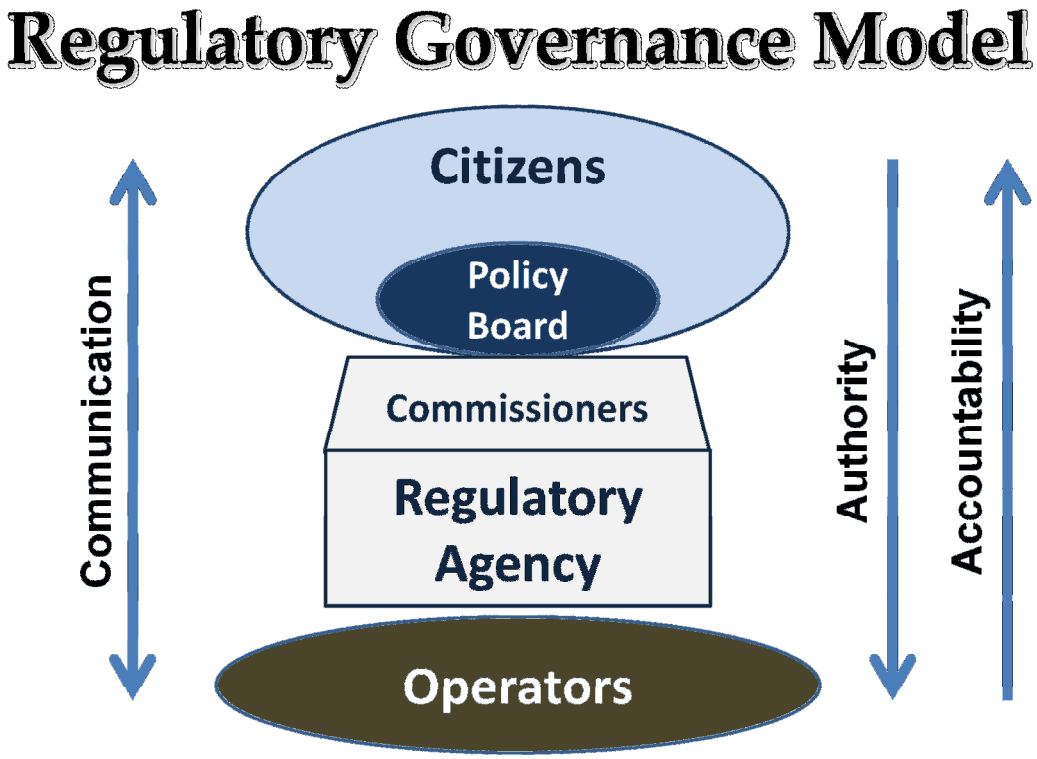
[17] See generally, Glaeser (1927).
[18] Eberhard (2014) includes owner as a separate function. We combine owner and operator into a single role for purposes of this paper.
[19] Jamison and Castaneda (2014) illustrate a modification of this model to reflect financial governance for a state-owned utility.

of a private company serves as representatives of shareholders.[20] Based on citizen values, policymakers identify policy priorities, such as illustrated in Figure 1, based upon interactions with the public and communicate these priorities to head(s) of the regulatory agency, who the policymakers also hire. These priorities should be expressed in laws so that they are transparent and stable. The agency leadership is responsible for developing the agency and its staff, establishing regulatory rules and procedures, and making decisions on prices, service quality, and the like in an effort to achieve the policy priorities. The utility's responsibility is to make efficient management decisions within the boundaries and frameworks set by the regulator. Accountability runs the opposite direction of authority and the primary channels for communication run vertically throughout the model. (Jamison and Castaneda 2014)

Table 1 illustrates the basis for this governance structure. It maps institutions to roles based on their inherent capabilities and weaknesses. This table illustrates the shortcomings of each institution that limit each institution's effectiveness to serve other roles (such as the policy body playing the regulator role) and that also provide hurdles to success even within its role. For example, the Government Policy Body's authority to act opportunistically together with its incentive to serve its own political needs can make it a very poor regulator because operators, realizing this body can be better off confiscating value rather than allowing the operator to profit from its investments, will keep their financial exposure low by reducing investment. (Levy and Spiller 1996; Spiller and Savedoff 1999). Each institution has an incentive to take on at least certain aspects of the other two roles, creating authority conflicts especially when the system is being established or transformed.

[20] Policy makers may be a legislative body, a ministry, or some other body that is in touch with citizen needs, is answerable to the citizens, and has sufficient strategic and executive skills to establish policy, respect roles, substantively reflect on outcomes, and evaluate and reform strategies.

Figure 4. Electricity Governance Model



Jamison and Castaneda (2014) and Brown (2006).

An important feature of the model illustrated in Figure 4 is placing authority in institutions that have the proper information, expertise, and accountability. For example, making decisions as to how energy is provided is in the hands of the utility in this model. If the regulator or policy maker concluded that the status quo might not be providing the energy security or environmental protection that is needed, they might be tempted to impose solutions. In some countries, for example, Prime Ministers or line ministers have signed power purchase agreements presumably in the belief that the country could benefit from the additional generating capacity or technology choice. However, because of its information advantage and expertise, the utility is in a superior position relative to policy makers and regulators to evaluate the technology, capacity

Table 1. Typical Governance Model for Electricity Policy, Regulation, and Provision

Institution	Capabilities	Weaknesses	Role
Government Policy Body	• Proximity to public perspectives and pressures • Generalist regarding public policy priorities • Incentivized to respond to public opinion and public information	• Lacks sector and technical expertise • Authority to act opportunistically • Incentive to focus on own political needs • May be protective of its role	Strategic Direction: Like a board of directors, identifies priorities, develops strategies, reflects on outcomes, and oversees regulatory body
Regulatory Body	• Proximity to customers and operators • Sector and technical expertise • Distance from political pressures	• Limited sector operational and financial expertise (relative to operator) • Lacks close proximity to public • Specialist regarding government policy • Incentive to expand and protect role, and to serve the desires of the agency	Implementation of Laws: Developer and enforcer of rules relating to operator conduct
Operator	• Expertise in operations • Knowledge of costs, technologies, and capabilities • Financing • Customer relations	• Focuses on how to deliver rather than on what should be delivered and why • Has private information that it may use to its advantage • Incentive to serve the desires of the managers • May be protective of its role	Provision of electricity within the boundaries of regulatory rules and within physical and financial realities

needs, and costs.[21] Furthermore, the utility may also be the organization that bears the financial risk of the decision[22] because a common practice is for the contract to have specified that the utility will pay for the power. In other instances customers are held accountable in the sense that they ultimately pay for the power through their bills, through lower service quality, or both. Economic decisions are more likely to be sound when they are made by those who have the best information and expertise and who have the economic incentives to make the right decision.[23] If the policy maker believes that environmental standards are not being met and could be, it should talk with the regulator about whether the system is underperforming and possibly adopt laws that allow the regulator to create new incentives. If the regulator believes the utility can perform better, it should engage the utility in adaptive work (discussed in the next section), create new incentives for proper performance, or both. In these ways the policy makers and the regulators are performing the functions for which their institutions are designed. For the regulator or the policy maker to substitute its judgment for the utility's operating expertise is to take away the utility's authority to manage itself without taking away the utility's accountability for outcomes.

B. Features

Experience and research have shown that, regardless of the regulatory model, the essential features of a regulatory agency remain consistent across well-designed systems: To

[21] Ensuring that the utility uses this information for the good of customers generally requires development of incentives that align the utility management interests with the customers'' interests.

[22] Private owners bear financial risk unless that risk is transferred to someone else, such as customers or taxpayers. In the case of state-owned enterprises, taxpayers are the owners and effectively underwrite the financial risk. Management and employees also bear financial risk if poor performance limits their incomes, scope of work, or future prospects.

[23] Hayek (1944). Also, as Milton Friedman observed in a 2004 interview, there are four ways to spend money. The approach that incentivizes the most careful consideration is when the person making the decision has earned the money and is the beneficiary of how it is spent. Ross, Ron, "A Further Perspective: Friedman's Four Ways: Who's spending whose money? That's the critical question," The American Spectator (October 5, 2011) http://spectator.org/articles/36815/friedmans-four-ways. (Accessed October 29, 2014.).

ensure that the agency has an arm's-length relationship with operators, consumers, other private interests, and politicians, successful systems include:[24]

1. A distinct legal mandate for the regulatory agency, free from ministerial control, with formalized relationships between the agency and governmental bodies
2. Staggered terms for decision makers so that the terms do not coincide with the election cycle and, for boards and commissions, so that members do not turnover at the same time
3. Involvement of both the executive and legislative branches of government in the process appointing decision makers
4. Appeals of regulatory decisions through courts rather than through ministries
5. Security for decision makers in that they cannot be removed from office except for cause, such as corruption
6. Prescribed professional criteria for employees
7. Reliable funding, typically earmarked levies on regulated firms
8. Ethics standards that limit conflicts of interest.

Features 1-5 are intended to keep the agency free from political interference. This serves two purposes. First, it addresses the holdup issue. Second, it restricts the utilities' and other interest groups' abilities to interfere with the regulator via political pressures. Feature 6 is intended to address the information asymmetry issue and should be accompanied by strong information gathering powers for the regulator (in Feature 1). Features 7-8 are intended to further distance the regulator from stakeholder groups, including the operator and politicians.

These features are also designed to hold the agency accountable to the long term interests of the country. Features 1 and 4 ensure that the agency acts only within its legal authority. Time-

[24] Smith (1997); Jamison and Castaneda (2014).

bounded terms (Feature 2), multi-faceted selection processes (Feature 3), and ethics requirements (Features 5 and 8) ensure that there are clear processes for holding individuals accountable for the quality of their work. While it is true that these accountability-oriented features can be used to effect political interference (Jamison and Castaneda 2014), their importance for limiting other opportunities appear to make them valuable.

There are other agency features that are important for effectiveness. These include:[25]

- Communication: Information made available to all stakeholders equally and on a timely and accessible basis
- Consultation: Participation of stakeholders in meetings and education of those affected by regulatory decisions
- Consistency: The logic, data sources, and legal bases for decisions consistent across market participants and over time
- Predictability: Priorities, values, and decision making models are well known
- Flexibility: Decisions are adapted to new, known realities consistent with laws and prior decisions
- Effectiveness and Efficiency: Cost effectiveness in data collection and in policy implementation
- Accountability: Processes clearly defined, decision rationale explained, and specified appeal procedures
- Transparency: Openness of process to stakeholder involvement.

[25] Australian Regulatory Forum (1999); Berg et al. (2000).

These features are not intended to create independence directly, but they support independence because they help create public and other stakeholder backing for the agency. They encourage support by

1. Establishing legitimacy, which is the public trust that is garnered by following due process,[26] engaging the public, and having a clear and effective appeals process. Low levels of public trust make the agency vulnerable to political interference.
2. Creating stability, which allows operators to attract needed capital at economical prices, allows for a friendly environment for new investors, and ultimately provides customers with higher value for the rates they pay.
3. Developing professionalism and expertise, which decreases the information asymmetry, provides investor confidence, and facilitates fact-based decision making.
4. Providing clarity of roles, which diminishes authority conflicts and forum shopping, improves accountability, and facilitates public involvement.

VI. Special Considerations for Small Systems

A. Complexities and Approaches

Designing, implementing, or reforming a regulatory system presents particular challenges for small systems, such as island nations. Some aspects of regulatory systems exhibit economies of scale. For example, a small agency may not have enough staff to allow individuals to become specialized, with the result being that each member has to divide his or her time among multiple important issues. This puts the agency at an information disadvantage relative to operators who have much larger organizations and who interact with other operators. Some small agencies

[26] Due process recognizes that stakeholders have rights to know when decisions may be made that affect them, the opportunity to provide input in those decisions, and knowledge of how decisions are ultimately made.

compensate by hiring a number of consultants, but this has the disadvantage of being costly and having the expertise that is gained leave the country once the contract is over. In essence a reliance on consultants reduces the operator's information advantage, but less so than if the regulator performs the learning and expertise development itself.

Small systems may not be able to afford sufficient administrative structures, making it difficult to hire and retain qualified staff and effecting adequate processes for decision making and stakeholder engagement. Insufficient resources may also make it too costly to engage in information gathering and institutional development.

Smaller countries have developed several means by which to diminish the inherent challenges of being a small system.[27] Some have developed arrangements for sharing resources and functions with other regulators. This occurs even in large systems: National Regulatory Authorities in Europe share resources for research projects and U.S. state regulators rely upon the resources of federal regulators, as well as each other's time, information, and expertise. U.S. state regulators have also formed the National Regulatory Research Institute, which provides decision-relevant reports on current issues and conducts webinars that inform regulators on recent developments in industry and regulation. In Africa regulatory agencies that hold workshops on particular issues often invite regulators from other countries to participate.

Some regions have formed supranational regulatory structures to improve effectiveness. The Eastern Caribbean states and the Channel Islands provide examples and there have been discussions among islands in other regions. Such supranational systems provide specific advantages. Because they involve multiple nations, the existence of the supranational regulator can provide an additional degree of buffer between the regulatory agencies and the daily political

[27] See Berg and Horrall (2008) for a discussion of how regulators use the professional associations for collaboration and capacity building.

tensions in each country. This decreases the possibility of opportunism, which should stimulate investment. It also reduces the possibility of political interference that would favor state-owned utilities over new enterprises (Edwards and Waverman 2006), limits opportunities for regulatory capture where a national utility has political and economic influence, improves regulatory quality by expanding the scope of utilities regulated (Lyon and Li 2003), and increases opportunities for and effectiveness of utility benchmarking by creating uniformity in accounting and other data reporting systems. A supranational system has an additional benefit of ensuring that potential investors do not pit countries against each other. For example, some power producers have encouraged countries to think that if a particular producer is not given special treatment by the country, the producer will invest its capital elsewhere. If regulators are involved in the purchased power discussions and have established relationships with other regulators, then each country knows what is happening elsewhere, which gives them greater bargaining power.

Furthermore, formal relationships between countries can allow them to bargain collectively with power producers. Pooling of resources has also allowed regulators to address issues of political pressure and weak systems. In one region regulators from multiple countries joined together for meetings with each country's politicians. This enabled the regulatory voice to be heard more clearly because each government had no formal authority over neighboring countries' regulators. (Kapika and Eberhard 2013)

A supranational system explicitly addresses the challenges of small agency size by formally increasing shared resources. Specialists employed by the supranational regulator are available to each country, and the supranational regulator can likewise tap the resources of each national regulatory authority. Multinational regulatory systems can provide economies of scale for the system by avoiding duplication of efforts such investigating issues, conducting audits,

developing reporting systems including uniform systems of accounts, creating investigative reports, administering the agencies, and developing webinars or other educational resources specific to the region. Capacity sharing is particularly important when jurisdictions do not have experience or a track record. The shared capacity accelerates learning by doing because the supranational nature of the regulatory institution(s) means that an experience in one country becomes an experience for all countries.

Finally, a multi country approach can improve harmonization across countries where it improves effectiveness. Harmonized regulatory requirements can lower costs for energy suppliers selling in more than one of the countries, as well as for businesses providing energy efficiency solutions. A supranational regulator can have broader authority than a national regulator to obtain information from suppliers whose operations span across countries.

It should be noted, however, that a multi country system has some possible deficiencies. It may be more difficult to hold a supranational regulator accountable than a single country regulator because of the diffused political authority. Such a regulator may become dominated by issues in a subset of the countries, causing other countries to be neglected and with little recourse because their national regulators lack authority that has been given to the supranational regulator. It may also happen that the members of a multinational governance body engage in a form of log rolling in which countries trade favors rather than engage in effective regulation. In addition a multi country regulator may force harmonization in instances where countries have legitimate differences: The supranational regulator's limited country-specific may lead it to believe that commonality exists even when it does not, leading to authority conflicts.

The success of a multinational approach depends upon the details. There are inherent tensions between agencies that share jurisdiction or compete for it. In the United States, the state

and federal communications regulators form joint committees to coordinate their regulatory efforts, but as with the federal and state energy regulators, some conflicts result in court battles over authority. However, when the U.S. Federal Communications Commission has adopted a decision by a Federal-State Joint Board, which is one of the primary models for joint committees, the decision has never been overturned by a U.S. court.[28]

Tensions between national and supranational authorities can also arise over funding. It might be that the regulatory bodies view funding as a zero sum game and so compete over budgets. It might also be that the agencies perceive that their budgets are tied to their scopes of authority, and so might engage in jurisdictional conflicts as proxies for resource conflicts. Funding might also become an issue if the supranational regulator is funded by direct assessments on customers' bills: The budgetary cost would be transparent to customers, but the benefits would not.[29]

B. Options

In this section we discuss three models for multinational regulation:[30] (1) Centralized Model; (2) Shared Authority Model; and (3) Coordination Model. We describe each model and assess its possible characteristics, recognizing that the actual properties of any particular model will greatly depend upon the details and how it is implemented. A common feature of the models is a multinational policy board, which performs the same functions as the policy board shown in Figure 4, but which is comprised of representatives of the member states.

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[28] A Joint Board is made up of state and federal regulators and its role is to investigate issues and made recommended decisions to the federal regulatory body. There are two Joint Boards. One addresses separations issues, which is the process for dividing telecommunications company costs between the federal and state jurisdictions. The other is on universal service.

[29] As we explain in the next section, the formation of a regulatory agency, even a multinational one, should not result in new work unless there were deficiencies in the old system. However, ministries and established government agencies may be unwilling to give up personnel even if their work is diminished, leading to an overall increase in the cost of regulation.

[30] There is no international best practice as the functioning of multinational regulators is a relatively new concept and ECTEL is the primary example.

Figure 5. Centralized Multinational Regulator Governance Model

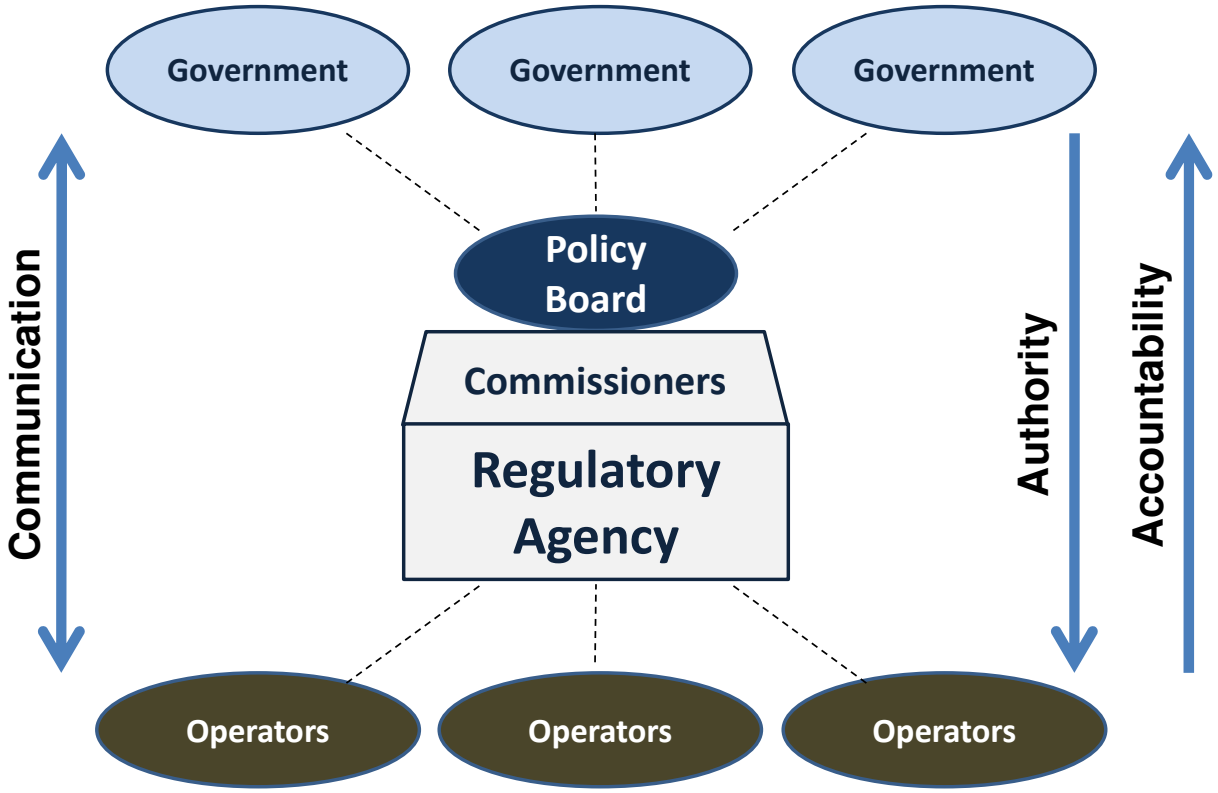


Figure 5 shows the Centralized Model.[31] In this approach there is a single regulatory agency, which is multinational. The single regulatory agency simply has jurisdiction over the industry in each of the countries. In terms of formal lines of authority, accountability, and communication, this model works like any single country regulatory, but informally the political pressures will reflect the broader relationships between the countries. The extent to which the policy board's treatment of regulation and the regulatory decisions themselves reflect these broader relationships will depend upon how well the institutional features keep regulation and politics at arm's length. This model maximizes the use of specialization and other practices that

[31] To ease drawing the figures, we show only three countries and one set of operators per country.

exploit scale economies, but perhaps at the cost of greater inter-country pressures, less specialized knowledge of each country's situation, and less regular contact with each country's stakeholders relative to other models. Because exploiting scale economies means that the regulator will be physically located in a particular country, there is a danger that other countries will perceive a bias in the regulator's focus and decision making.

Figure 6. Shared Authority Multinational Regulator Governance Model

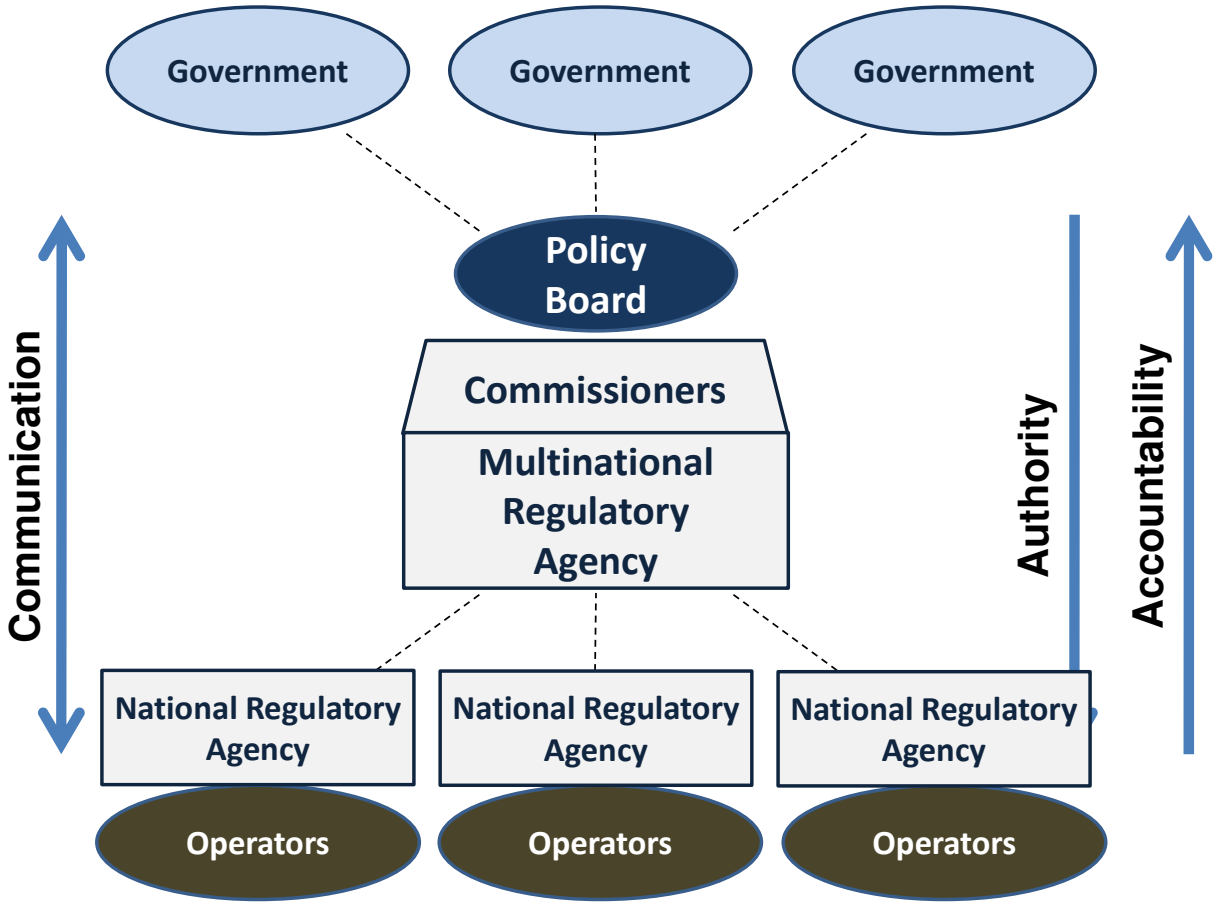


Figure 6 shows the Shared Authority Model. In this approach there is a single multinational regulator that addresses regulatory issues for which it is important to have a

common framework, and national regulators who address local issues and implement the regulatory decisions of the supranational regulator. This model should be able to exploit scale economies nearly as well as the Centralized Model, but authority conflicts between the regulatory agencies could lower efficiency of decision making and provide an avenue for each country's political actors to intervene in the multinational regulatory process by influencing its own national regulator. Having a single policy board helps mitigate this potential, but local proximity is likely to still have its affects.

Figure 7. Coordinated Multinational Regulator Governance Model

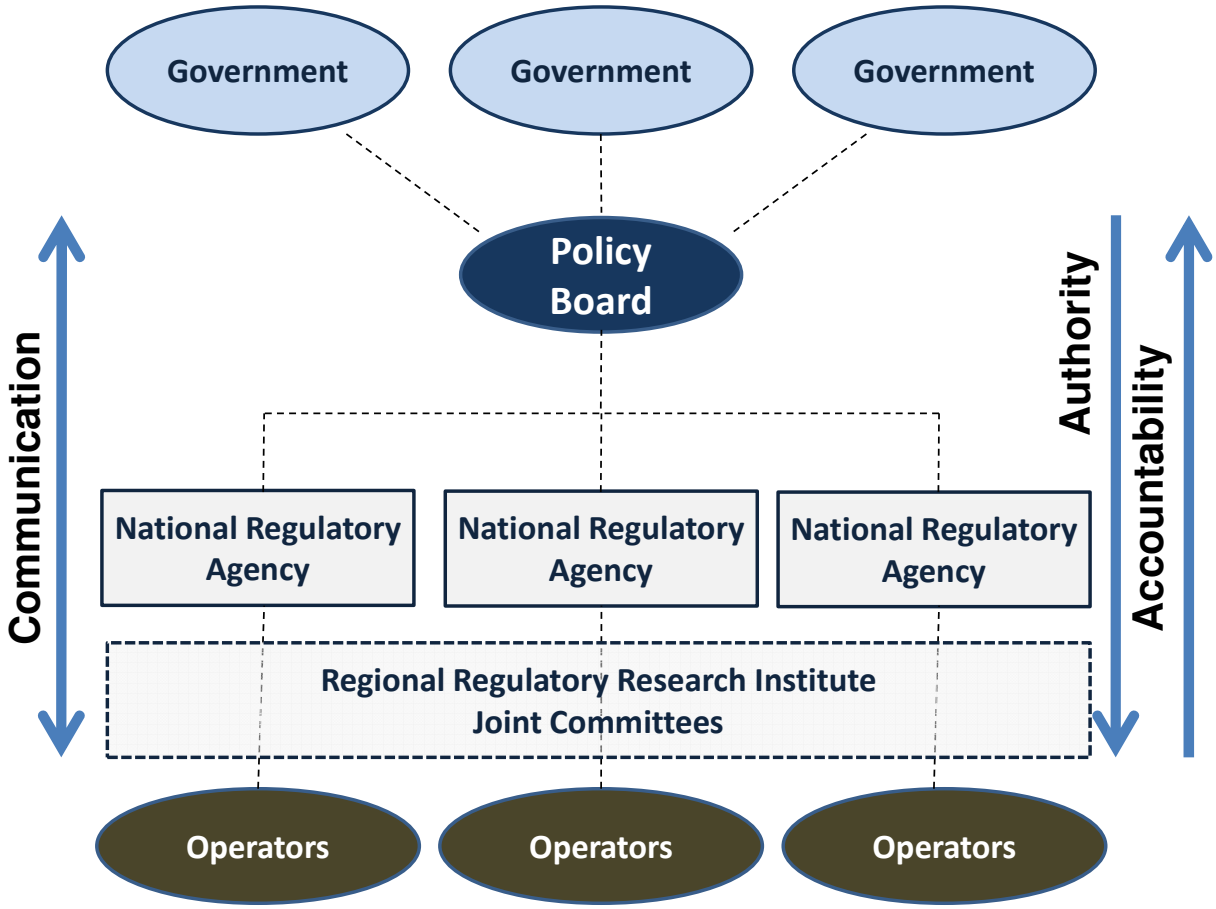
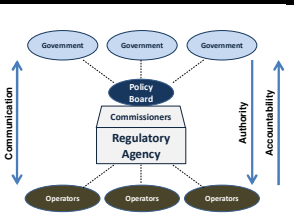
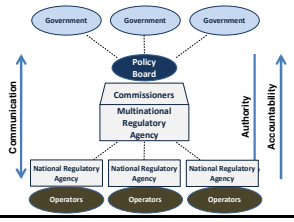
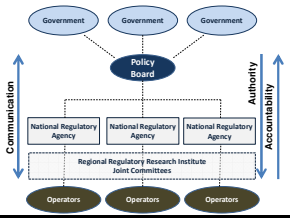


Figure 7 shows the Coordination Model. In this approach there is no multinational regulator, although there is the single policy board that oversees the individual national regulators in the same way that the policy board oversees the multinational regulator in the Centralized Model and oversees the supranational and national regulators in the Shared Authority Model. Each national regulator carries out its national regulations. There is a Regional Regulatory Research Institute, similar to the U.S. National Regulatory Research Institute, that serves as a shared resource for background research. There are also Joint Committees that serve to conduct regulatory rulemakings for topics where harmonization is important. This approach is less likely to exploit scale economies because shared expertise requires extra effort on the part of the agencies. It could also happen that the national regulators do not share information with the regulatory institute in order to protect their own space. Finally there could also be a challenge of issues not being referred to the Joint Committee and of the Joint Committee not meeting when harmonization is important, but threatens individual latitude and authority in the national regulators. The common Policy Board helps mitigate these tendencies, but it will be pulled by national political differences as well.

Table 2 summarizes likely properties of the three models in their relative abilities to achieve independence from political and industry influence, communications within the system, clarity of authority, accountability, consistency across countries, transparency for citizens within each country, scale economies, and responsiveness to local conditions, with the caveat that actual results depend upon details and people adapting to the new situation. Adaptive challenges are discussed in the next section.

Table 2. Possible Properties of Alternative Models for Multinational Regulation

Selected Characteristics	Centralized Model	Shared Authority Model	Coordination Model
Efficiency and Effectiveness with Respect to:			
Political Independence	H	M	M
Industry Independence	H	M	M
Inter-organization Communication	H	M	L
Clarity of Authority	H	L	H
Accountability	H	M	M
Consistency Across Countries	H	M	L
Transparency	L	M	H
Exploiting Scale Economies	H	H	M
Responsiveness to Local Conditions	L	M	H

H = High degree of achieving efficiency and effectiveness
M = Moderate degree of achieving efficiency and effectiveness
L = Low degree of achieving efficiency and effectiveness

Our assessment is that the Centralized Model is most likely to achieve independence, effective intrasystem communication, clarity, accountability, consistency, and scale economies, but at a cost of transparency and responsiveness to local conditions. The Shared Authority Model is almost as effective as the Centralized Model in its ability to exploit scale economies and suffers most in terms of clarity of authority, i.e., there are likely to be authority conflicts amongst the regulatory agencies. The degree to which it achieves independence, consistency, and

responsiveness to local conditions depends on the specific arrangements. The Coordination Model is the least likely to achieve scale economies and harmonization, but is the easiest politically because each country maintains a high degree of discretion.

VII. Formation and Transitions for Regulatory Systems

Thus far this paper has focused on the technical issues that motivate and affect the design of regulatory systems. As anyone who has been involved in creating or changing an organization knows, getting the technical aspects of organization right does not guarantee success. Indeed the change itself brings about many challenges. This section discusses these challenges in a regulatory context and examines how they could be addressed.

There are three basic changes that can occur regarding regulatory systems. The first is the formation of the system itself, where ministries, operators and others give up activities and roles that they used to perform to the newly created regulatory agency. The traditional participants also change how they operate, giving up what they have done to be successful in the old system and creating new habits and practices. The second basic change is system adjustment, which may be minor or large. Relatively minor adjustments would include moving some licensing responsibilities from the ministry to the regulatory agency. Major adjustments would include merging of sector regulatory agencies into a multisector agency, and forming a supranational regulator, such as ECTEL and the proposed Eastern Caribbean Energy Regulatory Authority or ECERA. The third type of change is reform within an agency by reorganization, for example.

These changes are often met with resistance, not because people inherently resist change – many people change jobs or get married with great eagerness – but because they resist loss. The losses that people experience in regulatory change can be quite varied. For some it might be a loss of prominence, such as a political body giving up its authority over prices. It might also be

a loss of control, such as a politician giving up the ability to direct the utility where and when to make investments. In some instances the loss might simply be that a person or group knew how to operate in the old environment and, even if they agree that a change is needed, they still experience a loss of certainty or of comfort because the new approach has unanswered questions at the start.

These losses represent adaptive challenges that, if not adequately addressed, can lead to failure or dysfunction. (Jamison 2007) Adaptive challenges are those that question established values, customs or habits, attitudes, and behaviors that people hold dear. This is in contrast to technical challenges, which in this context are those that involve writing laws, conducting economic and financial analyses, designing organizational structures, and the like. (Heifetz and Linsky, 2002) Addressing adaptive challenges involves a different set of skills than does attending to technical challenges because adaptive work addresses feelings of loss that are experienced when, for example, individuals must rethink basic goals, lose authority or identity, or give up traditions and time-honored strategies. According to Laurie (2000, pp. 39-40), successfully performing this adaptive work includes helping people identify the deeply held beliefs that are in conflict with the new direction, discovering what has to be learned and what new habits have to be formed, and determining what competing values are at stake. Leadership in such situations questions the status quo and exposes people to the reality of the new situations.[32] Table 3 summarizes the differences between technical and adaptive challenges.

Table 4 illustrates adaptive challenges in role development or realignment more directly. In this example, the ministry gives authority over some politically important topics, such as prices and technology choice, and shares responsibility for licensing, performance, and media information. These changes represent adaptive challenges for the ministry, operators and others.

[32] See generally Heifetz (1994), Heifetz and Linsky (2002), Laurie (2000), and Pascale et al (2000).

The ministry and operators give up roles they previously played, incenting them to resist. Others, such as media contacts and certain politicians, who had traditions of working directly with the ministry or operator on particular topics, might also face adaptive challenges because of the required relationship changes.

Table 3. Technical and Adaptive Challenges[33]

Kind of Challenge	**Technical**	**Technical & Adaptive**	**Adaptive**
Problem Definition	People know the problem and are ready for solutions	People know the problem and are ready for solutions	Requires learning because people disagree on whether there is a problem and the nature of the problem
Solutions and Implementation	People know the problem, are ready for solutions, and accept the technically correct answer	Requires learning because people disagree on what is most important in possible solutions	Requires learning because people disagree on what is most important in possible solutions
Primary Locus of Responsibility for the work	People in authority task the work to technical experts	Stakeholders engage in adaptive work. People in authority provide resources and space for learning and implementation.	Stakeholders engage in adaptive work. People in authority provide resources and space for learning and implementation.
Sample Tools and Approaches	• Delegation to experts (accounting, economics, law, etc.) • Provide resources and training for subject matter experts • Traditional hearings and legal proceedings • Negotiations	• Get on the balcony • Exercise leadership to help stakeholders see problems rather than "solving" the problem • Think politically about stakeholders' relationships and perspectives • Manage stress levels	

[33] Jamison, Rowe and Perlman (2005).

Table 4. Illustration of Adaptive Challenges in Regulatory Transitions

Illustrative Responsibilities	Before Agency		After Agency Implemented		
	Ministry	Operator	Ministry	Regulator	Operator
Issue Licenses	✔		✔	✔	
Set Performance Standards	✔			✔	
Monitor Performance	✔			✔	
Evaluate System	✔		✔		
Define Sector Vision	✔	✔	✔		✔
Determine Prices	✔	✔		✔	
Choose Technologies	✔	✔			✔
Determine Investments	✔	✔			✔
Conduct Management Audits				✔	
Establish Market Rules				✔	
Receive Public Input	✔	✔		✔	
Create Due Process				✔	
Balance Environmental and Economic	✔		✔		
Determine Market Structure	✔		✔	✔	
Negotiate Purchased Power	✔		✔	✔	
Receive Consumer Complaints		✔		✔	✔
Provide Information to Media	✔	✔	✔	✔	✔

Table 4 is only an illustration and actual adaptive challenges vary across countries. More complex adaptive changes would be changes that involve crossing national boundaries. In such situations existing regulatory bodies might give up certain portions of their jurisdiction and some ministries might give up control of policies that are harmonized, creating adaptive challenges that are hard to work out.

The first step in the formation or reform of a regulatory system is to identify and distinguish the technical and adaptive challenges. Both types of challenges must be addressed, but they require different approaches. As Table 3 shows, technical work requires the involvement of the technical experts, who perform the legal, organizational, etc. tasks assigned. In contrast adaptive work requires the involvement of those facing the adaptive challenges because they are the ones whose roles, traditions, and the like will change if the work is to succeed and it is their attitudes, habits, and the like that are challenged. Those practicing leadership in adaptive work can do so by stepping back (taking a balcony perspective) to view the work broadly, including seeing who is affected by the activity and the losses they experience; helping the stakeholders see their challenges and keeping them engaged; and managing stress levels by pacing the work in a way that gives people time to adapt.

An effective strategy for managing the adaptive stress is to involve those with the challenges in the technical work of agency formation or system reform by, for example, engaging the affected parties in the "project" of forming or changing the regulatory system in a way that keeps them active and gives them ownership of results.[34] (Heifetz and Linsky 2002, pp. 107-111) It is tempting for those in authority to delegate tasks that raise adaptive challenges, perhaps to ease their own tension. Several years ago the founders of a biotech company hired a

[34] A comprehensive stakeholder analysis may be necessary to map the possible adaptive challenges. Freeman, Harrison, and Wicks (2007) provide a useful framework for considering stakeholders.

human resources expert to bring the firm into compliance with labor laws that the firm was required to follow once it reached a certain size. Bringing the firm into compliance meant that its informal, science-oriented culture needed to change into one where procedures and formalities were part of everyday life. Once the founders began to experience the adaptive challenge, they disengaged and refused to cooperate with the newly hired specialist, in effect hoping that they could avoid loss by avoiding responsibility. Of course, the transformation failed and the firm remained out of compliance until the founders engaged in both the adaptive and technical work of changing their enterprise.

In summary, formation and reform of regulatory systems require complex technical work and adaptive work. Technical work and adaptive work require different leadership approaches and different leadership skills. Indeed the differences are so significant that some authors object to using the term "leadership" to describe the guidance of technical work.[35] The adaptive challenges involve the loss that at least some stakeholders experience when thinking about changing a regulatory system, leading these stakeholders to resist the change. The leadership challenge is to find ways to help these stakeholders manage their losses and find compensating value in the future.

VIII. Conclusion

This paper describes the motivations and institutions for economic regulation of the electricity sector by an independent regulatory agency. Regulatory oversight is justified by the lack of competition in infrastructure industries, which can lead to inefficiency, low quality, high prices, and limited investment. Independent regulatory agencies appeared as a response to the information, expertise and opportunism problems facing countries over the years.

[35] See generally Heifetz and Linsky (2002).

This paper also describes the main characteristics of successful agencies and shows the empirical evidence of studies examining the effectiveness of independent regulatory agencies. The evidence is consistent that independent agencies improve sector performance. Understanding how changes to the regulatory system affect governance and the roles of players involved is also important. For this reason, the paper concludes with a section on the formation and transitions for regulatory systems.

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