

**Institutional or Structural:
Lessons from International Electricity Sector Reforms**

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I. Introduction

The widespread privatization of national electricity sectors across both the developing and developed world provides a broad base of experience to assess the relative performance of various countries in attracting private sector participation in the industry. Since 1980, when Chile commenced a radical restructuring, and later privatization program, over 60 countries have introduced reforms in the electricity sector. These reforms have been generally designed with the purpose of increasing the levels of private ownership and investment, thereby reducing the dominance of the state-owned vertically integrated enterprise, the traditional mode of organization. There is substantial variability in the nature of these reforms. Some countries have invited private investment in the generation sector only, financed by long-term supply contracts to state-owned utilities (e.g. China, India, Indonesia, Mexico); some have vertically separated the industry but only privatized part of the sector (e.g. Colombia, El Salvador, Kazakhstan, New Zealand); while others have privatized the entire industry and additionally created competitive generation markets (e.g. Argentina, Chile, U.K.).

The degree of private sector interest, however, has been markedly mixed across countries. There have been some notable successes in attracting significant levels of private investment in all sectors of the industry (e.g. Argentina, Australia, the U.K.). On the other hand, private investors have shown little interest in purchasing state-owned enterprises or in financing de novo infrastructure assets in countries such as Mexico, Turkey or the Ukraine, to name but a few. Indeed some countries, including Hungary and Venezuela, have had to postpone planned privatization programs due to lack of investor interest. In these countries, despite substantial state encouragement, governments have been unable to reverse sustained periods of under-funding in state ownership with large inflows of private capital.

As a consequence of the mixed experiences, and of the variety of alternative approaches undertaken, a debate has emerged on the design of “optimal” restructuring policies. Much of this debate has focused on classic industrial organization issues, such as the optimal degree of vertical integration between transmission, distribution and generation functions (Newbery, 1999), the extent of horizontal fragmentation, the design of competitive generation markets, the sequencing of reforms and so on. In practice, however, there is no clear empirical correlation between the method of restructuring implemented and the ultimate success of the reforms, casting some doubt on the notion of an “optimal” structural approach. Rather, the main lesson that emerges from the accumulated reform experience over the last two decades is different. Here we claim that the design of what Levy and Spiller (1994) call the sector’s “*regulatory governance*” regime is more important for attracting long-term private investment than the specific choice of industrial structure. Levy and Spiller’s (1994) approach to regulation is rooted in the transactions cost framework. They see regulation as having the features of an implicit contract between the government and the company. Under this contract, one of the parties, the operator, undertakes heavy specific investments, while the other party, the government, has strong incentives to behave opportunistically. In such an environment, *governance*, and in this case, regulatory governance, becomes crucial in order to motivate the operator to invest and to restrain the opportunistic behavior of the government. Thus,

regulatory governance frameworks that provide a credible commitment to safeguard the interests of potential investors and customers alike, particularly when economic shocks create political pressure to shift the balance of power among competing interest groups, are better suited to attracting the levels of long-term private capital necessary for securing an adequate and reliable supply of electricity. Weak regulatory governance institutions, however, offering few or no credible assurances against direct or indirect expropriation of private property, have difficulty in encouraging private investment. Indeed, the disappointing experiences with sectoral reforms observed in various countries are generally the result of design flaws at the level of the regulatory governance regime, and also of weaknesses in national political, legal and administrative institutions, rather than the result of the chosen industry structure. For policy-makers, our analysis suggests that the key to successful reforms is first to establish a credible regulatory environment, and only then to ponder on refinements of the chosen organizational structure for the industry.

We illustrate the critical role of regulatory governance and institutional structure by considering how several countries have responded to a common problem that has afflicted many wholesale generation markets, namely the alleged presence and exercise of market power. While each of the countries we examine have recently experienced strong political forces for policy reform in the generation sector, the speed and nature of adjustments to regulatory policies varied dramatically among the countries. This ‘natural experiment’ therefore allows us to analyze the extent to which different regulatory institutions protect investors’ interests while simultaneously providing sufficient flexibility to adjust to the appearance of unexpected shocks, some of which may require some tinkering with the ‘rules of the wholesale market game’.

We provide first a general discussion of the utilities' problem, and of the meaning of regulatory governance and regulatory incentives. Then, based on this framework, we discuss some common myths on structural reforms, showing how these common presumptions, normally found in international aid agency recommendations, are unsupported by the existing evidence, and how “having the institutions right” is more important than “having the structure right.” Finally, we go into the detail of three specific countries’ responses to the appearance of high wholesale electricity prices.

II. The Utilities' Problem: Regulatory Governance and Regulatory Incentives¹

In order to understand the relationship between the design of regulatory institutions and performance in the utility industries, it is helpful first to appreciate the particular features of the utilities sector that distinguish it from other industries: first, their technologies are characterized by large specific, sunk investments;² second, their technologies also exhibit important economies of scale and scope; and third, their products are massively consumed. What separates the utilities sector from the rest of the economy is then the combination of three features: specific investments, economies of

¹ This section draws heavily from Spiller (1996).

² Specific or sunk investments are those, once undertaken, whose value in alternative uses is substantially below their investment cost.

scale and widespread domestic consumption. These features are at the core of the contractual problems that have traditionally raised the need for governmental regulation of utilities.³ In turn, they make the pricing of utilities inherently political.

The reason for the politicization of infrastructure pricing is threefold. First, the fact that a large component of infrastructure investments is sunk implies that once an investment is undertaken the operator will be willing to continue operating as long as operating revenues exceed operating costs. Since operating costs do not include a return on sunk investments (but only on the alternative value of these assets), the operating company will be willing to operate even if prices are below total average costs.⁴ Second, economies of scale imply that in most utility services there will be few suppliers in each locality. Thus, the whiff of monopoly will always surround utility operations. Finally, the fact that utility services tend to be massively consumed implies that politicians and interest groups will care about the level of utility pricing. Thus, massive consumption, economies of scale and sunk investments provide governments (either national or local) with the incentive and opportunity to behave opportunistically vis-à-vis the investing company.⁵ For example, after the investment is sunk, the government may try to restrict the operating company's pricing flexibility, it may require the company to undertake special investment, purchasing or employment patterns, or it may try to restrict the movement of capital. All these are attempts to expropriate the company's sunk costs by administrative measures. Thus, expropriation may be indirect and undertaken by subtle means.

Expropriation of the firm's sunk assets, however, does not mean that the government takes over the operation of the company, but rather that it sets operating conditions that just compensate for the firm's operating costs and the return on its non-specific assets. Such returns will provide sufficient ex-post incentives for the firm to operate, but not to invest.⁶ Indeed, the expropriation of sunk assets has been more prevalent in Latin America than direct utility takeovers or expropriation without

³ See, among others, Barzel (1989), Goldberg (1976), Levy and Spiller (1993, 1994), North (1990), Williamson (1988).

⁴ Observe that the source of financing does not change this computation. For example, if the company is completely leveraged, a price below average cost will bring the company to bankruptcy, eliminating the part of the debt associated with the sunk investments. Only the part of the debt that is associated with the value of the non-sunk investments would be able to be subsequently serviced.

⁵ Observe that this incentive exists both for public *and* private companies. See Spiller and Savedoff (2000).

⁶ The company will be willing to continue operating because its return from operating will exceed its return from shutting down and deploying its assets elsewhere. On the other hand, the firm will have very little incentive to invest new capital as it will not be able to obtain a return. While it is feasible to conceive loan financing for new investments, as non-repayment would bring the company to bankruptcy, that will not however be the case. Bankruptcy does not mean that the company shuts down. Since the assets are specific, bankruptcy implies a change of ownership from stockholders to creditors. Now creditors' incentives to operate will be the same as the firm, and they would be willing to operate even if quasi-rents are expropriated. Thus, loan financing will not be feasible either.

compensation.⁷ While the government may uphold and protect traditionally conceived property rights, it may still attempt to expropriate through regulatory procedures.

The Political Profitability of Expropriation

Sunk assets' expropriation may be profitable for a government if the direct costs (reputation loss vis-à-vis other utilities, lack of future investments by utilities) are small compared to the (short term) benefits of such action (achieving re-election by reducing utilities' prices, by challenging the monopoly, etc.), and if the indirect institutional costs (e.g., disregarding the judiciary, not following the proper, or traditional, administrative procedures, etc) are not too large.

Thus, incentives for the expropriation of sunk assets should be expected to be largest in countries where indirect institutional costs are low (e.g., there are no formal or informal governmental procedures -checks and balances- required for regulatory decision making; regulatory policy is centralized in the administration; the judiciary does not have a tradition of, or the power, to review administrative decisions, etc.), direct costs are also small (e.g., the utilities in general do not require massive investment programs, nor is technological change an important factor in the sector), and, perhaps, more importantly, the government's horizon is relatively short (i.e., highly contested elections, need to satisfy key constituencies, etc). Forecasting such expropriation, private utilities will not undertake investments in the first place. Thus, government direct intervention may become the default mode of operation.

The Implications of Government Opportunism

If, in the presence of such incentives a government wants to motivate private investment, then it will need to design institutional arrangements that will limit its own ability to behave opportunistically once the private utility has undertaken its investment program. Such institutional arrangements are the design of a regulatory framework, stipulating, inter alia, price setting procedures, conflict resolution procedures (arbitration or judicial) between the parties, investment policies and so on. In other words, regulation, if credible, solves a key contracting problem between the government and the utilities by restraining the government from opportunistically expropriating the utilities' sunk investments.⁸ This, however, does not mean that the utility has to receive assurances

⁷ Consider, for example, the case of Montevideo's Gas Company. Throughout the 1950s and 1960s the MGC, owned and operated by a British company, was denied price increases. Eventually, during the rapid inflation of the 1960s it went bankrupt and was taken over by the government. Compare this example to the expropriation by the Perón administration of ITT's majority holdings in the Union Telefonica del Rio de la Plata (UTRP was the main provider of telephones in the Buenos Aires region). In 1946 the Argentinean government paid US\$95 million for ITT's holdings, or US\$623 million in 1992 prices. Given UTRP's 457,800 lines, it translates at US\$1360 per line in 1992 prices (deflator: capital equipment producer prices). Given that in today's prices, the marginal cost of a line in a large metropolitan city is approximately US\$650, the price paid by the Perón administration does not seem unusually low. See Hill and Abdala (1996).

⁸ See, Goldberg (1976) for one of the first treatments of this problem. See also Williamson (1976).

of a rate-of-return nature, or that it has to receive exclusive licenses.⁹ In some countries, however, such assurances may be the only way to limit the government's discretionary powers.¹⁰

Unless such a regulatory framework is credible, though, investments will not be undertaken or, if undertaken, will not be efficient. Investment inefficiencies may arise on several fronts.¹¹ A first order effect is underinvestment. Although the utility may invest, it will do so exclusively in areas where the market return is very high and where the payback period is relatively short.¹² Second, maintenance expenditures may be kept to the minimum, thus degrading quality. Third, investment may be undertaken with technologies that have a lower degree of specificity, even at the cost of, again, degrading quality.¹³ Fourth, up-front rents may be achieved by very high prices which, although they may provide incentives for some investment, may be politically unsustainable.¹⁴

A non-credible regulatory framework then, by creating strong inefficiencies and poor performance, will eventually create the conditions for direct government take-over. Thus, government ownership may become the default mode of operation, reflecting the inability of the polity to develop regulatory institutions that limit the potential for opportunistic government behavior.

Sources of Regulatory Commitment

In Levy and Spiller (1994) it is argued that the credibility and effectiveness of a regulatory framework --and hence its ability to facilitate private investment-- varies with a country's political and social institutions. Political and social institutions not only affect the ability to restrain administrative action, but also have an independent impact on the type of regulation that can be implemented, and hence on the appropriate balance between commitment and flexibility. For example, relatively efficient regulatory rules (e.g., price caps, incentive schemes, use of competition) usually require granting

⁹ Indeed, the Colombian regulation of value added networks specifically stipulates that the government cannot set their prices, nor that there are any exclusivity provisions. Thus, regulation here means total lack of governmental discretion.

¹⁰ On this, see more below.

¹¹ Williamson's basic contracting schema applies here. See Williamson (1995).

¹² An alternative way of reducing the specificity of the firm's investment is by customers undertaking the financing of the sunk assets.

¹³ In this sense it is not surprising that private telecommunications operators have rushed to develop cellular rather than fixed link networks in Eastern European countries. While cellular has a higher long run cost than fixed link, and on some quality dimensions is also an inferior product, the magnitude of investment in specific assets is much smaller than in fixed link networks. Furthermore, a large portion of the specific investments in cellular telephony is undertaken by the customers themselves (who purchase the handsets).

¹⁴ The privatization of Argentina's telecommunications companies is particularly illuminating. Prior to the privatization, telephone prices were raised well beyond international levels. It is not surprising that, following the privatization, the government reneged on aspects of the license such as price indexation. The initial high prices, though, allowed the companies to remain profitable, even following the government's deviation from the license provisions. See Levy and Spiller (1993).

substantial discretion to the regulators. Thus, unless the country's institutions allow for the separation of arbitrariness from useful regulatory discretion, systems that grant too much administrative discretion may not generate the high levels of investment and welfare expected from private sector participation. Conversely, some countries might have regulatory regimes that drastically limit the scope of regulatory flexibility. Although such regulatory regimes may look inefficient, they may in fact fit the institutional endowments of the countries in question, and may provide substantial incentives for investment.

Levy and Spiller (1994) look at regulation as a "design" problem.¹⁵ Regulatory design has two components: regulatory governance and regulatory incentives. The governance structure of a regulatory system comprises the mechanisms that societies use to constrain regulatory discretion, and to resolve conflicts that arise in relation to these constraints.¹⁶ On the other hand, the regulatory incentive structure comprises the rules governing utility pricing, cross- or direct-subsidies, entry, interconnection, etc. While regulatory incentives may affect performance, one of the main insights from Levy and Spiller (1994) is that the impact of regulatory incentives (whether positive or negative) comes to the forefront only if a regulatory governance framework has successfully been established.¹⁷ Regulatory governance is a choice, although a constrained one, since the institutional endowment of the country limits the menu of regulatory governance mechanisms available. Thus, regulatory commitment has two sources: the institutional endowment and regulatory governance.

*Institutional Endowment*¹⁸

Levy and Spiller (1994) define the institutional endowment of a nation as comprising five elements: First, a country's legislative and executive institutions. These are the formal mechanisms for appointing legislators and decision makers, for making laws and regulations (apart from judicial decision making); for implementing these laws, and for determining the relations between the legislature and the executive. Second, the country's judicial institutions. These comprise the formal mechanisms for appointing judges and for determining the internal structure of the judiciary, and for resolving disputes among private parties, or between private parties and the state. Third, custom and other informal but broadly accepted norms that are generally understood to constrain the action of individuals or institutions. Fourth, the character of the contending social

¹⁵ The concept of regulation as a design problem was first introduced in Levy and Spiller (1993). Here we use the terminology subsequently developed in Levy and Spiller (1994).

¹⁶ Williamson would call such constraints on regulatory decision making "contractual governance institutions." See Williamson (1985, p. 35).

¹⁷ Commenting on the interaction among technology (institutions), governance, and price (regulatory detail) Williamson (1985, p. 36) says, "[i]n as much as price and governance are linked, parties to a contract should not expect to have their cake (low price) and eat it too (no safeguard)." In other words, there is no "free institutional lunch."

¹⁸ This section draws heavily from Levy and Spiller (1994).

interests within a society, and the balance between them, including the role of ideology. Finally, the administrative capabilities of the nation. Each of these elements has implications for regulatory commitment. We focus here on the first two.

The form of a country's legislative and executive institutions influences the nature of its regulatory problems. The crucial issue is to what extent the structure and organization of these institutions impose constraints upon governmental action. The range of formal institutional mechanisms for restraining governmental authority includes: the explicit separation of powers between legislative, executive and judicial organs of government;¹⁹ a written constitution limiting the legislative power of the executive, and that can be enforced by the courts; two legislative houses elected under different voting rules;²⁰ an electoral system calibrated to produce either a proliferation of minority parties or a set of parties whose ability to impose discipline on their legislators is weak;²¹ and a federal structure of power, with strong decentralization even to the local level.²² Utility regulation is likely to be far more credible -- and the regulatory problem less severe -- in countries with political systems that constrain executive discretion. Note, however, that credibility is often achieved at the expense of flexibility. The same mechanisms that make it difficult to impose arbitrary changes in the rules may also make it difficult to enact sensible rules in the first place, or to efficiently adapt the rules in the face of changing circumstances. Thus, in countries with these types of political institutions, the introduction of reforms may have to await the occurrence of a drastic shock to the political system.

Legislative and executive institutions may also limit a country's regulatory governance options. In some parliamentary systems, for example, the executive has substantial control over both the legislative agenda and legislative outcomes.²³ In such

¹⁹ For analysis of the role of separation of powers in diminishing the discretion of the executive, see Gely and Spiller (1990) and McCubbins, Noll and Weingast (1987, 1989), and references therein.

²⁰ Non-simultaneous elections for the different branches of government tend to create natural political divisions and thus electoral checks and balances. See Jacobson (1990). For an in-depth analysis of the determinants of the relative powers of the executive, see Shugart and Carey (1992).

²¹ Electoral rules have also important effects on the effective number of parties that will tend to result from elections, and thus, the extent of governmental control over the legislative process. For example, it is widely perceived that proportional representation tends to generate a large number of parties, while first-past-the-post with relatively small district elections tends to create bipolar party configurations. This result has been coined Duverger's Law in political science. More generally, see Taagepera and Shugart (1993). For analyses of how the structure of political parties depends on the nature of electoral rules (with applications to the U.K.) see Cain, Ferejohn and Fiorina (1987) and Cox (1987).

²² On the role of federalism in reducing the potential for administrative discretion see Weingast (1995) and references therein.

²³ While parliamentary systems grant such powers in principle, whether they do so in practice depends upon the nature of electoral rules and the political party system. Parliamentary systems whose electoral rules bring about fragmented legislatures would not provide the executive -- usually headed by a minority party with a coalition built on a very narrow set of specific common interests -- with much scope for legislative initiative. By contrast, electoral rules that create strong two-party parliamentary systems -- as well as some other kinds of non-parliamentary political institutions -- would grant the executive large legislative powers. For an in depth discussion of the difference between parliamentary and presidential

countries, if legislative and executive powers alternate between political parties with substantially different interests, specific legislation need not constitute a viable safeguard against administrative discretion, as changes in the law could follow directly from a change in government.²⁴ Similarly, if the executive has strong legislative powers, administrative procedures and administrative law by themselves will not be able to constrain the executive, who will tend to predominate over the judiciary in the interpretation of laws. In this case, administrative procedures require some base other than administrative law.

A strong and independent judiciary could serve as the basis for limiting administrative discretion in several ways. For example, the prior development of a body of administrative law opens the governance option of constraining discretion through administrative procedures.²⁵ Also, a tradition of efficiently upholding contracts and property rights creates the governance option of constraining discretion through the use of formal regulatory contracts (licenses). This option is particularly valuable for countries where the executive has a strong hold over the legislative process. Further, a tradition of judicial independence and efficiency opens the governance option of using administrative tribunals to resolve conflicts between the government and the utility within the contours of the existing regulatory system. Finally, it provides assurances against governmental deviation from specific legislative or constitutional commitments that underpin the regulatory system.

The regulatory challenge therefore lies not just in designing regulatory incentive structures that restrain utilities' monopoly behavioral tendencies but also in designing regulatory governance frameworks that constrain the political and administrative actors who have ultimate jurisdiction over the industry. Designing regulatory institutions that are *flexible* enough to make balanced policy decisions in response to unanticipated events but that are also *rigid* enough to insulate policy from political pressures is a difficult task, however. In the United States, the country with the longest history of private ownership in the utilities sector, the regulatory solution that emerged in the electricity industry during the beginning of the twentieth century was to move regulation one step up from local politics. Regulatory authority over electric distribution utilities was moved away

systems, and the role of electoral rules in determining the relative power of the executive, see Shugart and Carey (1992).

²⁴ In the U.K., regulatory frameworks have traditionally evolved through a series of acts of Parliament. For example, major gas regulation legislation was passed in 1847, 1859, 1870, 1871, 1873 and 1875. Similarly, water regulation legislation was passed in 1847, 1863, 1870, 1873, 1875, and 1887. Systematic regulation of electricity companies started in 1882, only four years after the inauguration of the first public demonstration of lighting by a public authority. The 1882 Act was followed by major legislation in 1888, 1899, 1919, and 1922, and culminating with the Electricity (Supply) Act of 1926 creating the Central Electricity Board. See Spiller and Vogelsang (1993), for discussions of the evolution of utility regulation in the U.K., and references therein.

²⁵ This has traditionally been the way administrative discretion is restrained in the U.S., as regulatory statutes have tended to be quite vague. For an analysis of the choice of specificity of statutes, see Schwartz, Spiller and Urbiztondo (1993). Observe, however, that administrative law may not develop in a system where the executive has strong control over the legislative process.

from the highly politicized municipal environments, towards state-wide independent administrative agencies (state Public Utility Commissions) with statutory authority to monitor utility performance and to set final rates. Since PUCs normally operate in systems where legislative power is divided among the executive and two legislative chambers, they generally have substantial autonomy to determine regulatory policy without the threat of legislative override or overwhelming political interference. While PUCs operate under vague statutory objectives (“reasonableness” is the typical criterion for rate structures) and have the power to disallow imprudent or anti-competitive managerial behavior, their decisions cannot be made in an arbitrary fashion. First, the evolution of constitutional interpretation implies that utilities are allowed to earn a fair return on their investments. Second, due process requirements enshrined in states’ Administrative Procedure acts also ensure that PUC rulings must be based on the facts and evidence of the case (Vanden Bergh, 1998). In the event of disputes, utilities are able to challenge the PUC on both statutory and constitutional grounds in State and Federal courts which, given the nature of judicial appointments (and in the state courts, of the reelection process), normally operate independently of the political establishment (Spiller and Vanden Bergh, 1997). In the electricity sector, a second level of protection against local opportunistic behavior resides in that wholesale electricity generation markets, given the interconnection across states of transmission grids, are regulated at the federal rather than at the state level.²⁶ Given their independence and nation-wide range of interests, federal agencies are less able to be manipulated by local or state officials. Private investors thus have some assurance that regulatory policy will be protected from immediate political pressures as well as from agency arbitrariness. Although hard to assess, it appears that this regulatory arrangement has balanced utility and political tensions reasonably well: electricity costs, for example, are low compared to most other countries (IEA, 2000), and investment levels in generation, distribution and transmission capacity have usually ensured reliable network operations. Furthermore, since the deregulation process started across the states, electricity costs and prices have been falling (see Figure 1),²⁷ and investment levels in generation have been gathering speed (Rose, 2000).

In contrast to the United States, the utilities sector in almost all other countries operated under state ownership for most of the second half of the twentieth century. This, however, did not exempt utilities from the risk of governmental opportunism.²⁸ As many of these countries have sought to partially or fully privatize their electricity sectors over the last two decades, they have needed to create regulatory institutions that simultaneously restrain private operators from exploiting their incumbency advantage and yet credibly commit to not expropriate their returns. Designing regulatory

²⁶ They are under the supervision of the Federal Energy Regulatory Commission.

²⁷ The U.S. Energy Information Administration estimates that competitive pressures in the generation sector will reduce retail electricity prices from an average of 6.3c/kWh in 1996 to 4.2c/kWh by 2005 (“Competitive Electricity Pricing: An Update” by J. Alan Beamon)

²⁸ See Spiller, P.T. and W. Savedoff, “Government Opportunism and the Performance of Public Enterprise,” Chapter 1 in Spiller, P.T. and W. Savedoff, *Spilled Water: Institutional Commitment in the Provision of Water Services*, InterAmerican Development Bank Series, 2000.

frameworks that satisfactorily achieve this balance is not a straightforward task, though. The ability to infuse credibility depends not only on the willingness of the current government, but also on the country's broader political, administrative and judicial institutions. Regulatory institutions, then, must be tailored to the specific circumstances of the country at hand and may not be simply transplanted from other countries (Levy and Spiller, 1994).

In the next two sections we illustrate the critical role that regulatory institutions play in the performance of privately-owned electricity sectors. In section III, we examine some recent international aid agency proposals for electricity sector reforms that emphasize industry structural solutions over regulatory institutional reform. By introducing an institutional perspective, as described above, we suggest that structural reform by itself, without attention to the reform of regulatory institutions, will have only a minimal impact on industry performance. While we propose these arguments at a general level, we go on in section IV to explore in detail the impact of regulatory institutions on industry outcomes in three countries, El Salvador, the U.K. and the U.S. (California), each of which differs in its regulatory incentive and governance frameworks.

III. "Optimal" Restructuring Myths in the Electricity Industry

The decision to privatize state-owned electricity assets naturally raises a series of questions about the optimal organizational approach to transferring assets to private owners. Should all asset types, whether generation plants, high voltage and distribution networks, be privatized or should private ownership be limited to the sectors where competitive markets can be feasibly implemented? And, if markets are small, should competition be attempted? In the former case, what is the optimal degree of vertical integration between privately-owned generation, transmission and distribution activities, bearing in mind that investments or operational decisions in one sector can have important consequences for operational efficiency in other sectors? Similarly, given the need for investment and real-time operational coordination between, as well as within geographic regions, what is the optimal level of horizontal fragmentation?

Although policy-makers and government advisors have paid considerable attention to these and other issues in the development of reform programs, there is little empirical evidence to suggest that one particular structural configuration of a fully or partially privatized electricity industry is more conducive for long-term private investment than another. In spite of the heated debate among advocates of particular reform policies, the experience of various countries suggests that no single organizational structure obviously trumps another.^{29,30} To illustrate, we examine several of the common

²⁹ For example, private investment in transmission networks has been secured under a variety of ownership and structural arrangements. Substantial investment has occurred in Argentina (private, vertically separated, fragmented transmission) and in Chile (private, vertically integrated between generation and transmission, concentrated transmission). Low levels of transmission investment have occurred in the U.K. (private, vertical separation between generation and transmission, concentrated transmission), in California (private, vertical integration between distribution and transmission and some generation), and in New Zealand (public, vertical separation, concentrated transmission). Similarly, among countries implementing

structural prescriptions for encouraging private investment in transmission, distribution and generation assets.

III.i Transmission investment

Myth #1: Large economies of coordination imply that vertical separation of transmission and generation or lack of a transmission monopoly will lead to inefficient investments.

Transmission networks play a critical role in ensuring a low cost and reliable supply of electricity. In the absence of transmission capacity constraints, electricity generated in one region is able to flow to other regions where local generation supplies are either insufficient to meet demand, or else are relatively costly compared to out of area supplies. The construction of additional transmission infrastructure can therefore serve as a partial substitute for building extra generation capacity when demand and supply are uneven across regions. For this reason, vertical integration between transmission and generation functions is sometimes seen as an efficient organizational structure for a newly privatized industry, particularly when the size of the market is small. A vertically integrated owner faces incentives to invest in generation and/or transmission assets in a manner that minimizes combined generation and transmission costs, whereas under separate ownership contracting difficulties may prevent such an outcome, potentially leading to under-investment.

While efficiency rationales have led to proposals for vertically integrated, horizontally concentrated industry structures, concerns about the exercise of market power on the other hand have led to opposing recommendations. Difficulties in setting and regulating efficient transmission charges, so it is argued, enable vertically integrated suppliers to devise charging structures that favor their own generation plants over those of competitors in dispatch decisions (Newbery, 1999). By separating the ownership of transmission and generation assets, the incentives for transmission owners to discriminate against particular generation companies are reduced, thereby encouraging efficient entry into the generation sector.³¹

competitive wholesale markets, there is no discernible pattern of vertical integration between transmission and generation functions or in the ownership of transmission assets and their relative performance (see Table 1).

³⁰ Indeed, it could be argued that independently of market structure, as long as the regulatory governance of the sector is properly designed, the following six structural conditions are sufficient for generating incentives for private investment in liberalized electricity markets, and hence for developing a competitive generation market:

- a) free entry into generation
- b) some amount of direct access, including access to large users
- c) fragmented demand (in most cases this implies a fragmented distribution sector)
- d) dispatch operations run by an entity independent of the generation companies
- e) open access to transmission and distribution grids
- f) incentive regulation of transmission and distribution charges

³¹ This, however, assumes that dispatch is run by the transmission company, which violates condition (d) in the list of sufficient conditions for a competitive environment in Footnote 30.

The presence of market power concerns thus suggests that the policy of vertically integrating transmission and generation ownership will not necessarily be the optimal restructuring approach, and that the decision will depend on a careful consideration of the pros and cons in each individual situation. Indeed, among countries adopting competitive wholesale markets, there is no uniform preference for vertical separation or integration; approximately forty percent allow integration, sixty percent forbid it (see Table 1), suggesting that a “one size fits all” policy of integration is inappropriate.

For the same reasons motivating vertical integration proposals, it has been argued that since efficient investment in national transmission networks also requires coordination *among* operators in various regions, the optimal degree of horizontal fragmentation in transmission under private ownership should be low. Dynamic concerns again contradict efficiency-driven policy recommendations. Generation companies require access to transmission networks in order to compete effectively against rival generation companies. When transmission is organized as a monopoly franchise, implying that generation companies are not free to invest in their own transmission assets, transmission owners are in a position to “hold up” generators through a variety of means. Monopoly transmission owners have an incentive to extract rents from generation companies by manipulating access to the network; for example, by using uncontracted network upgrades or maintenance schedules as bargaining points. A natural solution to this problem is to remove ownership restrictions in the transmission sector to allow generation firms to invest in their own competing transmission assets, thereby creating an a priori argument for horizontal fragmentation.

Turning again to the evidence, we find no common consensus in the degree of transmission concentration or fragmentation, raising further doubts about the optimality of the former policy prescription. Out of the eight countries with predominantly privately-owned transmission networks, three have systems that are quite fragmented with four or more owners (see Table 1).

Myth #2: Public ownership of transmission assets is required to facilitate coordination and efficient investment.

Recognizing the plethora of conflicting tensions under private ownership, still others (in particular Labor Party led European governments) have argued that the best policy is in fact to retain transmission networks under public ownership (Newbery, 1999). An important assumption underpinning this proposal is that the government has less incentive to hold-up private generators than a private owner of the transmission network. As we discuss below, however, the highly politicized nature of electricity consumption in all countries makes the industry especially susceptible to government control, irrespective of the ownership structure. Under public transmission ownership, the government may actually find it easier to hold-up private generation firms since it has direct control over day-to-day managerial decisions than in the private ownership case where the government may have to pressure a regulatory agency to implement its preferred policy. Thus, while public ownership may allay concerns over the exercise of private market power in transmission it also exposes generation firms to greater political hazards. Indeed, by transferring transmission assets to private owners and by establishing an

independent regulatory agency – both actions that are politically difficult to reverse – the government can send a strong signal to the private sector that it will not readily meddle in operational affairs for political ends, thereby encouraging higher levels of private entry in all parts of the electricity sector. Eight out of seventeen countries implementing competitive wholesale markets during the 1990s have done so under private transmission ownership regimes (see Table 1).³²

III.ii Generation Markets

Myth #3: Economies of scale in generation limit the potential for competition in relatively small markets.

In addition to the organization of transmission, governments have several options for reform in the generation sector. Chief among these is the decision to create a competitive wholesale generation market where sellers bid against each other to supply electricity on a continuous basis, with prices determined by a market-making mechanism. Following the lead of Argentina in the 1980s, a number of jurisdictions have made competitive generation markets a central component of privatization and restructuring programs (e.g. Australia, California, Chile, Finland, Norway, Sweden, U.K., Ukraine). Although the introduction of wholesale markets is generally perceived as being a desirable policy goal, questions have been raised about the feasibility of implementing similar reforms in smaller countries where, it is argued, only a small number of generation companies can be supported, leading to an oligopolistic situation. Competitive markets have been established, however, in several small countries where installed capacity is a small fraction of that in larger wholesale markets, such as Bolivia, El Salvador and Guatemala.³³ Similarly, there have been disastrous results in some large countries; in the Ukraine, for instance, repeated attempts by the government and international aid agencies to breathe life into the spot generation market have failed since 1996, and most generation trades are now arranged on an ad hoc bilateral basis among generators and distributors or final consumers.³⁴ Legal uncertainties about the status of contracts and private property in the Ukraine, as well as strong concerns over bureaucratic corruption,³⁵ have undermined the incentives for entrants to invest in new, more efficient generation capacity, to write long-term contracts and to engage in the spot market. The experience of the Ukraine suggests that, rather than geographic or population size, the main constraint on the operational feasibility of wholesale markets is the ability of new generation companies to enter the market, access transmission resources on a non-discriminatory basis and enter into enforceable contracts with new or existing buyers.

³² As we discuss below, the proposal by the California Governor in 2001 to take over the transmission system was designed not to alleviate investment or market power issues, but rather to effect a cash transfer ("bailout" according to critics) to the utilities that would otherwise have been politically infeasible.

³³ For further analysis of this particular issue, see Spiller (1999), "Restructuring Myths: On the Possibility of Competition in Small Power Sectors," mimeo, University of California, Berkeley.

³⁴ *Power Economics*, September 30, 1998; *East European Energy Report*, October 25, 1996 and August 1, 1997; *Utility Week*, June 1, 1998; *International Private Power Quarterly*, Fourth-Quarter 1998

³⁵ *The Electricity Daily*, May 10, 1999

III.iii Distribution Investment

Myth #4: Large economies of scale in distribution imply that too much fragmentation of distribution facilities will lead to high distribution costs.

Within the distribution sector, perceptions about the degree of scale economies have also led to prescriptions for the optimal level of geographic fragmentation for inducing private sector investment. A common concern is that while horizontal fragmentation of the distribution sector creates regulatory benefits – in that a larger number of companies facilitates “yardstick” regulation – it may also increase distribution costs and encourage inefficient investment decisions if economies of scale are ignored. For this reason, low levels of fragmentation are frequently prescribed in reform programs.

The hypothesized relationship between geographic fragmentation and distribution costs and investment is questionable, however, on several grounds. First, economies of scale in distribution are driven by the *density* of customers, implying that optimal geographic footprints can be very small, and that the degree of fragmentation can be quite large. Thus, in Norway, distribution activities are divided among more than 240 firms and in New Zealand among more than 40. Chile, which started its reforms with a dozen distribution companies, has doubled its number over the period. Secondly, the ability to induce efficient levels of distribution investment depends on private sector expectations about future regulated rates of return and the possibility that once assets have been put in place, attempts will be made by political actors to expropriate their rent streams.

III.iv Summary

Although it is hard to empirically identify the relative success of alternative structural reform policies in terms of encouraging new private investment, the absence of a clear pattern linking the structural nature of industry reforms to performance casts some doubt on the assertion that a single structural approach is uniformly optimal. We suggest that the lack of empirical consensus is not an accident but the indirect result of a commonly-held implicit assumption in the debate on optimal restructuring policies, specifically that the supporting regulatory institutions have a neutral impact on the players’ behavior. In practice, however, the design of the regulatory governance of the sector has a critical effect on investors’ incentives to make long-term asset commitments. In the next section we explore this proposition in some detail by focusing on the recent experiences of three countries, each of which differs substantially in its regulatory institutions but each of which came under significant political pressure during the period 2000 – 2001 to reform its wholesale electricity market. As we shall argue, the nature of the regulatory institutions, by more or less insulating regulatory policy from political forces, played a critical role in determining the direction of regulatory reforms.

IV. Regulatory Responses to Market Power Allegations in the Generation Sector

Market power allegations have emerged as an unanticipated major policy concern in many jurisdictions that have implemented competitive wholesale power markets over the last decade (Borenstein and Bushnell, 2000; Joskow, 2000). Unlike most other industries, power generation firms with small as well as large aggregate market shares are

sometimes in a position to exploit local market power by raising prices above a competitive level. Given the physical characteristics of electricity network operations, including the need to maintain system reliability, the impossibility of storing electricity and the existence of local transmission constraints, individual generation plants must occasionally be operated under certain demand and supply conditions to maintain the stability of the network. If generators anticipate that they will be called upon by the system operator to supply electricity to the network almost independently of the offered price, they can bid very high prices for their services in auction settings. Since the short-run price elasticity of demand is relatively low,³⁶ such prices can reach almost any level unless restrained by demand or capped by administrative rules. Thus, under specific supply and demand rules and scenarios, generators will enjoy substantial local market power. This market power may be limited, however, by contracts between the dispatch entity or final users and the generator, by transmission investments that relieve congestion, or by *de-novo* entry.

In addition, the auction rules that govern wholesale generation markets in many jurisdictions are highly complex and susceptible to ‘gaming’ by generators. In the U.K., for example, generation firms were able to withhold capacity from the market in order to drive up the spot market prices for other generating plants, and also employed bidding strategies that achieved the same result but without withholding capacity (Wolfram, 1999; OfGem, 2000). Similar results obtained in California, particularly in the market for ancillary services, leading to significant increases in wholesale prices and in retail rates in some regions.³⁷ El Salvador also experienced a serious increase in wholesale prices during early 2000, leading to drastic retail price increases.

As a result of the increasing concern with generators gaming trading systems to their advantage,³⁸ political actors came under pressure during the late 1990s to “fix the system” and to reform regulatory policy through a variety of means. In spite of common political forces, however, regulatory policy responded in dramatically different fashion in the three countries whose recent experiences we examine in greater detail below. While the U.K. redesigned the rules governing the power market taking care as much as possible to follow established administrative rules, providing a level of protection for the generation companies, El Salvador responded by shifting ex post some of the costs of

³⁶ The demand elasticity is often made lower by not allowing the demand-side to bid into the spot or balancing markets.

³⁷ Similarly, in California, auction rules and particular regulations (particularly, the requirement that the large distribution companies trade exclusively in the formal power exchange, and that wholesale market prices are capped), provided some distributors with the incentives to bring down their costs by under-scheduling demand in the day ahead market. Under-scheduling demand generates prices in the day ahead market which are below the price cap. The remaining demand traded in the real time market would be priced at the cap. Would the distribution company schedule its whole demand on the day ahead market, the day ahead price would have hit the price cap limit, increasing the distribution company’s overall energy payments.

³⁸ It should be emphasized that so far there has not been a claim of the coordinated exercise of market power, an action that is illegal in both the U.K. and the U.S. but not in El Salvador which has no antitrust legislation.

increased wholesale market prices onto the distribution companies, effectively expropriating some of their quasi rents, and also by diminishing the role played by the wholesale market. California also reduced the role of the wholesale market through political attempts to move the accumulated costs of high wholesale prices onto the distribution companies, and also onto the generation companies, were limited by the prospect of independent judicial review.

We argue that differences in regulatory governance frameworks, in particular in the rules governing the relationships between regulatory agencies, the courts and political institutions, played a central role in explaining why different countries adjusted their regulatory policies differently to an unexpected common shock.

IV.i Market Power and Regulatory Reform in the U.K.

After the Conservative government privatized and restructured the U.K. electricity industry in 1990, concerns were voiced about the structure and operation of the generation sector, notably over the degree of competition in the newly created power pool. Critics argued that two characteristics of the generation market reforms enabled incumbent generators to exert a strong degree of market power. First, at the time of privatization the government essentially established a generation duopoly by dividing the state-owned CEBG into two private companies, National Power and PowerGen, with a combined share of national capacity of more than eighty percent, and a third state-owned corporation, Nuclear Electric, holding the CEBG's nuclear assets. Studies have suggested that the presence of two dominant players in the electricity pool facilitated Cournot-style implicit collusion, raising prices, on average, 20 to 25 percent above marginal costs (Wolfram, 1999).³⁹ The second source of market power lay in the design and governance arrangements of the power pool, the electronic quasi-market place that balanced demand and supply on a continuous basis and that generated a single spot price, the System Marginal Price (SMP), in the process. Unlike other competitive wholesale markets, such as in California, El Salvador or Scandinavia, the U.K. power pool did not allow negotiated bilateral prices and trades among buyers and sellers, either within or outside the pool, and operated purely on a day ahead basis.⁴⁰ It was compulsory for licensed generators to sell the vast majority of their output through the pool, and contracts were based on the SMP.⁴¹

The emphasis on the day ahead price as the lone market clearing mechanism created strong incentives for the generation companies to develop trading strategies that manipulated the pool price through a variety of means. A chosen one was the withholding of capacity to drive up the capacity payments for electricity purchased from

³⁹ See also Green and Newbery (1992) and Newbery and Pollitt (1997) for theoretical and empirical analyses of the operations of the U.K. electricity pool.

⁴⁰ Buyers and sellers are free, though, to enter into financial forward contracts known as "Contracts for Differences".

⁴¹ See Gilbert and Kahn (1996) for an extensive discussion of electricity regulation arrangements across fifteen countries including an insightful chapter by Newbery and Green (1996) on the U.K. electricity industry.

other plants in the company's portfolio.⁴² The limited involvement from the demand side in the pool also reduced buyer pressure on prices, leading to higher prices overall and taller price spikes than otherwise.⁴³ Since the committee responsible for the operation of the pool was governed entirely by the industry⁴⁴, administrative attempts by the Director General (DG) of Ofgem, the regulatory agency, to significantly reform the system – so as to reduce the inherent biases in favor of the generation firms – were not surprisingly stymied.⁴⁵

As a consequence of these features, while fuel, operating and capacity costs for generation fell by fifty percent in the decade after 1990, and in the face of substantial entry by combined cycle operators, wholesale prices for electricity remained largely unchanged,⁴⁶ lending considerable support to the claim that incumbent generators exploited a position of market power.

The U.K.'s de facto single chamber parliamentary system that unites legislative and executive functions might offer the government unbridled opportunities to implement regulatory reforms through legislative means or else by directly pressuring regulatory agencies. As a consequence, at the time of industry privatization, the government undertook a variety of institutional designs precisely to, on the one hand, provide the government with flexibility in the design of regulatory policies while at the same time safeguarding the rights of interested parties. This allowed the U.K. government to respond to the market power issue and to commence a broad consultative process of redesigning the generation sector.

At the administrative level, regulation is primarily implemented through the award of long-term licenses to generators that specify their rights and obligations, as well as those of the regulatory agency, Ofgem, which has broad oversight responsibility for the industry. Licenses include the procedures for firms to appeal Ofgem decisions, which in this case consists of a complex set of checks and balances involving appeals to the Competition Commission (the U.K. anti-trust agency, formerly known as the "Monopolies and Mergers Commission") and a potential veto by the Secretary of State.⁴⁷ Thus, the appeals process provides some protection to the firms by limiting the ability of the DG to unilaterally change regulatory policy. Within this framework, Ofgem retains considerable flexibility in the design of policy since few quantified objectives or

⁴² Capacity payments have been extensively criticized as an ineffective way of promoting capacity investment. For a recent critique, see Oren (2000).

⁴³ Office of Gas and Electricity Markets, *The New Electricity Trading Arrangements*, July 1999, pp. 3

⁴⁴ The Pool committee consists of generation and supply company representatives. In order to protect minority interests, such as small generators and suppliers, and potential entrants, changes in the operational rules of the pool may only be implemented upon a supermajority vote of the committee.

⁴⁵ *Ibid*, pp. 28-29

⁴⁶ *Ibid*, pp. 2

⁴⁷ See Spiller and Vogelsang (1997) for a discussion of how the U.K. system of administrative checks and balances provides a measure of credibility to the UK regulatory process not otherwise found in its polity.

constraints are written in statute. For example, Ofgem has considerable discretion over final rates, making periodic determinations about price cap levels, without requiring formal political approval.

The formal authority enjoyed by Ofgem to regulate the industry on an independent basis is reinforced by the existence among the highly expert civil service of a strong norm of administrative independence, making direct political interference in the design of regulatory policy, except in highly unusual circumstances, damaging to the government in terms of its public reputation and support within the administration. In addition, the judicial system has a strong tradition of probity in upholding contracts. Indeed, the courts have ruled against the government in the past, providing further reassurance for license holders against administrative expropriation (Baldwin and McCrudden, 1987).⁴⁸

The balance of flexibility (through administrative means) and protection of private property rights (through the use of licenses, administrative constraints and judicial norms) inherent in the U.K. regulatory governance framework is apparent in the way that the Labour government reformed the generation sector after coming to office in 1997. In the first instance, the government enacted reforms mostly through the existing “rules of the game” (i.e. administrative procedures specified in company licenses), and did not initially resort to legislation.⁴⁹ The DG sought to introduce a “market abuse” clause in the generation companies’ licenses – allowing the DG to penalize anti-competitive behavior in the new wholesale market – using the amendment procedure specified in the licenses, rather than relying on the government to achieve a similar end with targeted legislation.⁵⁰ Indeed, two generation companies, after exercising their right to refer the matter for independent determination to the Competition Commission, succeeded in gaining a ruling from the Competition Commission that struck down the DG’s proposal.⁵¹ While the Secretary of State for Trade and Industry could have overridden the Competition Commission, using the powers provided by the Utilities Act 2000 to unilaterally modify existing licenses as part of the provisions for establishing NETA, it elected instead to defer to the agency’s decision.

Reforming the workings of the wholesale market (i.e., the pool), on the other hand, required the government to resort to legislation since under the original system the DG had no administrative authority to initiate changes in the rules governing the pool.

⁴⁸ See also Spiller and Vogelsang (1997).

⁴⁹ Office of Gas and Electricity Markets, *The New Electricity Trading Arrangements*, October 1999, pp. 1

⁵⁰ Competition Commission, *Statement by Callum McCarthy, Director General of Ofgem Addressing the Scope for, and Experience of, the Abuse of Market Power by the Generators Under the Wholesale Electricity Pool in England and Wales*

⁵¹ AES and British Energy challenged the DG’s move at the Competition Commission. Similarly, in the mid 1990s the DG promoted plant divestitures from the main generators under the threat of a reference to the Monopolies and Mergers Commission for a forced license modification (through the Electricity Act) or a structural remedy (through the Competition Act). The ability to make a reference to the MMC requesting a license modification forces the generators to consider to what extent the MMC will side with the DG.

After it became clear that the generation plant divestments that occurred under the Conservative government during the mid 1990s had not effectively reduced the ability of incumbents to manipulate the pool price, the Labor government, elected in mid 1997, quickly initiated a consultation exercise on reform options. Although the government announced its intention to legislate, it placed considerable emphasis on allowing Ofgem, and interested parties, through an extensive consultation process, to shape the design of the New Electricity Trading Arrangements (NETA). The DG published initial proposals for reform in July 1998.⁵² These were accepted by the government in October 1998 in the form of a White paper,⁵³ which commenced a lengthy public review exercise,⁵⁴ and which culminated with the issue by the DG and the Secretary of State for Trade and Industry of the NETA in October 1999.^{55, 56} Implementation of the NETA eventually occurred during mid 2001.⁵⁷ Affected parties, then, had substantial opportunity to organize, to lobby ministers and Ofgem, and in general to make their views known publicly and privately.⁵⁸ As a result of this process, although the NETA implied a drastic reform of the operation of the wholesale market,⁵⁹ it achieved a substantial level of consensus among industry players.

IV.ii Market Power and Regulatory Reform in California

While the new Labour government in the U.K. moved relatively quickly and in a considered manner to mitigate market power issues with a series of significant legislative and administrative reforms, regulatory reform in California proceeded at a slower and more *ad hoc* pace. This was not the result of a more smoothly operating generation market, however. The California Power Exchange (PX) and the Independent System Operator (ISO),⁶⁰ differed from the original U.K. “Pool” in that buyers and sellers – excluding, however, most of the demand that arose from the main investor-owned

⁵² Office of Electricity Regulation, Review of Electricity Trading Arrangements: Proposals, July 1998

⁵³ White Paper on Energy Policy, HMSO Cm 4071

⁵⁴ Office of Electricity Regulation, Review of Electricity Trading Arrangements: Framework Document, November 1998

⁵⁵ See, Ofgem/DTI, “The New Electricity Trading Arrangements: Ofgem/DTI Conclusions Document,” October 1999, available from <http://www.ofgem.gov.uk/elarch/onetadocs.htm>.

⁵⁶ Using the power granted to the Secretary of State for Trade and Industry by the Utilities Act 2000, the Secretary designated new license conditions requiring the licensees to sign the required documents to implement the NETA. These documents include the Balancing and Settlement Code, licensing changes and the implementation schedule. See Ofgem Press Release 8/14/00, PN 89.

⁵⁷ See Ofgem Press Release 10/27/00 PN 114.

⁵⁸ See <http://www.ofgem.gov.uk/elarch/05forums.htm> for a list of industry forums undertaken by Ofgem.

⁵⁹ The NETA will base dispatch on a system of bilateral and multilateral trading coupled with a balancing market in which the buyer is the dispatch operator who buys balancing services from both demand and supply utilizing – so as to discourage the use of the balancing market as a scheduling device - “pay as bid” rather than a single price to all participants. The bilateral trading and balancing mechanism will be accompanied by a series of forward markets to be developed by the industry.

⁶⁰ These institutions were established in late 1996 by the state legislature as the two central institutions to develop and operate a competitive wholesale market.

utilities who had to buy all their requirements from the PX – were able to negotiate bilateral trades, which were then submitted for dispatch to the ISO. The presence of local transmission constraints meant that individual generation plants were sometimes able to charge prices well above long run competitive levels, especially in the market for ancillary services. One study estimated that energy purchase costs in California averaged sixteen percent above competitive levels during 1998 and 1999, with substantially greater multiples during periods of peak demand – including the summer of 2000 (Borenstein, Bushnell & Wolak, 2000).⁶¹ Such discrepancies over long run marginal costs were also reinforced by a lengthy and cumbersome state approval process for new generation projects. Out of 20,000MW of new capacity that reached the planning stages after deregulation (representing a 44 percent increase on the installed capacity base of 45,000MW), only a small fraction had come on-line by 2001 (Oren and Spiller, 2000). Also, new entry by Energy Service Providers (ESPs) was impeded by the original restructuring legislation (Assembly Bill AB 1890) in 1996 that fixed retail rates at a ten percent discount over June 10 1996 levels, reducing the incentives for ESPs to market stable rate plans to consumers. Market structure and impediments to new entry thus both contributed to increased wholesale electricity prices.

Crisis level was initially reached during the summer of 2000 when the combination of high natural gas prices, warm weather and extremely limited spare capacity reserves pushed spot energy prices to unprecedented levels (see Figure 2). In the PX Day-Ahead market, for example, spot prices reached a peak of \$470/mWh during May 2000, more than nine times the peak during the previous May.⁶² For the investor-owned distribution utilities, who had been required to purchase all their supplies through the PX and were subject to retail rate caps, this meant a substantial postponement in the recovery of their uneconomic costs, as increased power purchase costs could not be passed through to consumers.⁶³ When retail caps were released for one utility in the southern parts of the state, as per the original legislative schedule, PX prices were passed straight through to consumers leading to final bill increases of two or three times in magnitude.^{64,65} Naturally, these large and unexpected wealth transfers away from final consumers increased political pressure for regulatory reform.

⁶¹ See also Joskow (2000), pp. 79-107, and California ISO Market Surveillance Committee Report, October 1999, for discussions of the California electricity wholesale market.

⁶² At one point, ISO prices for replacement reserves reached just shy of \$10,000 per megawatt hour until the ISO requested FERC authority to cap prices at \$250 per megawatt hour.

⁶³ Distributors subject to the price cap regulation started charging their customers *negative* Competition Transmission Charges, which meant that the CTC became an instrument to subsidize customers, rather than for customers to pay for stranded assets, as originally intended. As a consequence, their recovery of the uneconomic generation costs –as defined in the Electricity Restructuring Act of 1996 (AB 1890)- was postponed further into the future, which increased their risk of ever not recovering such amounts, driving them closer to bankruptcy.

⁶⁴ The CPUC Decision of May 27 1999 limited price increases for the summer of 1999, but completely liberated prices thereafter.

⁶⁵ San Diego Gas & Electric ended its “transition period” during mid 1999 and hence was allowed to start passing through the energy costs to its – so far – captive customers. See CPUC Decision 99-05-051 of May 27, 1999, which approved the end of the transition period, implying that SDG&E had recovered all its

By December 2000 the crisis had intensified rather than abated. Sustained high spot prices throughout the latter half of 2000 had substantially depleted utilities' cash reserves and generated accumulated operating losses of \$12bn, leading to concerns about their ability to finance fuel supply and non-utility energy purchases. Independent power producers, who in early 2000 had been willing to sign long-term contracts with the utilities but were prohibited from doing so by the California Public Utilities Commission (CPUC), were now unwilling to sell electricity on any credit terms, demanding immediate payment upfront.⁶⁶ When the utilities defaulted on nearly \$1bn in short-term debt in early February 2001, by which time credit agencies had already downgraded their bond ratings, fuel supplies were assured only by a FERC emergency ruling ordering natural gas suppliers to continue sales to the Californian utilities. The rapid deterioration in the utilities' financial position, as well as that of the ISO, eventually led to a precipitous fall in the stock prices of Pacific Gas and Electric and Southern California Edison, the two major Californian utilities, and PG & E's bankruptcy filing in early 2001.

In addition to the financial stresses in the electricity sector, increasing strain was being placed on the physical infrastructure as available generation capacity, both within and outside the state, proved insufficient during peak demand periods. Although Stage 1 and Stage 2 network emergencies had occasionally been declared in previous months, January was the first time that Stage 3 emergencies were declared and, in addition, for successive days and weeks, with large sections of the customer base experiencing rolling blackouts.^{67, 68} Thus, for the first time, large numbers of voter-consumers were feeling the real and financial effects of what was commonly referred to as the "energy crisis,"⁶⁹ ultimately forcing the state governor, Gray Davis, to declare a state of emergency on January 17, 2001.

Compared to the U.K., implementing regulatory reforms at legislative and administrative levels in California, and in the U.S. more generally, is frequently a more difficult and lengthy exercise, lending considerable weight to status quo policies. First, as a result of the nation's federal structure, as well as of its separation of political powers,

uneconomic generation costs subject to AB 1890 provisions. The decision can be found in http://www.cpuc.ca.gov/static/electric/electric_restructuring/decisions.htm.

⁶⁶ *San Francisco Chronicle*, "PG&E Bargains with Wary Gas Suppliers", February 3, 2001

⁶⁷ A Stage 1 Emergency Notice is declared by the ISO any time it is clear that an Operating Reserve shortfall is unavoidable or, when in real-time operations, the Operating Reserve is forecast to be less than the minimum after utilizing available resources. A Stage 2 Emergency Notice occurs when the Operating Reserve is forecast to be less than 5% after dispatching all resources available. During 1999 there were four Stage 1 and one Stage 2 Emergency Notices.

⁶⁸ A Stage 3 Emergency Notice is declared when the Operating Reserve is forecast to be less than 1.5% after dispatching all resources available. No Stage 3 Emergencies occurred during 1998 or 1999 and only one occurred in 2000 (see ISO Event Log)

⁶⁹ Although, some have emphasized that the crisis of Winter 2001 was more a liquidity than an energy crisis.

legislative policy changes require the agreement of multiple institutions, all of which are subject to judicial review. Thus, in the presence of divergent interests it can be difficult to find mutually preferable new proposals that also survive judicial review.⁷⁰ Consequently, drastic changes in regulatory policy – those that entail a redistribution of wealth among competing interest groups – are difficult to implement as the losing coalition will lobby against adoption. Thus, when political interests are fragmented, dramatic legislative proposals tend to be watered down with compromises reflecting political rather than economic logic.

Second, while the U.S. system of political checks and balances insulates interest groups against unfavorable *legislative* reforms, the logic of political delegation also ensures that regulatory agencies do not rapidly implement substantial policy changes against the wishes of their political principals through *administrative* means. A variety of governance mechanisms are used to safeguard against rapid administrative decision making which may distort legislators' preferences. Legislators undertake committee hearings, appointments of officials are reviewed, and agencies are subject to administrative procedures and due process requirements that provide interest groups with a role in decision-making procedures. Thus, even if the threat of legislative override is not credible, agency decisions cannot drift too far too fast from the status quo.⁷¹

The combination of multiple legislative veto points, administrative controls and independent judicial review tend to insulate status quo public policies and the interests of stakeholder groups from dramatic reform. This is especially apparent in the political acrobatics undertaken by the California legislature and governor in their attempts to reform the wholesale market and at the same time to protect ratepayer interests.⁷²

⁷⁰ In the case at hand, judicial review of legislative acts would be based on their constitutionality, while judicial review of administrative acts would be based both on their legality (i.e., whether they follow the various statutes) and their constitutionality.

⁷¹ On the relationship between regulatory agencies and legislatures, and on the role of administrative procedures, see Epstein and O'Halloran (1994, 1996), Holburn and Vanden Bergh (2000), McCubbins and Schwartz (1984), McCubbins, Noll and Weingast (1987, 1989), Tiller (1998), Tiller and Spiller (1996)

⁷² The need for political compromise is also evident in the 1996 bill that restructured the Californian electricity industry, which was enacted by a Republican governor and Democrat-controlled legislature who held differing positions on a wide range of policy issues including electricity reform. While incumbent utilities were allowed to recover their stranded assets through a Competition Transition Charge (CTC) levy on all bills, consumers were guaranteed retail rates fixed at ten percent below their historic levels during a pre-specified transition period. This approach was politically expedient - it gave consumers a rapid benefit from restructuring - but a major consequence was the elimination of retail competition in the supply market. At the same time, it generated the presumption of price stability even in the presence of substantial wholesale energy cost changes, reducing large users' incentives to enter into demand-side management programs. Once the transition period in southern California finished in July 1999 and retail price caps were removed, retail customers were confronted with volatile prices but with no options to buy alternative rate plans offering price stability, triggering substantial calls for regulatory reform. As discussed above, the retail price cap also generated a negative CTC when wholesale prices skyrocketed, bringing the major utilities close to bankruptcy. To a large extent, therefore, the foundations of the Californian energy crisis were struck in the political logic that shaped the initial restructuring legislation of 1996.

Due to potentially adverse electoral consequences, the government, which consisted of the first Democrat legislative and executive coalition in several decades, was unwilling to make consumers directly feel the pressure of high wholesale prices. Although higher retail prices were needed to both promote conservation and to bring the utilities back to credit-worthiness, the legislature instead enacted a bill, AB 1X, that made the state the main intermediate energy purchaser, by-passing almost completely the wholesale PX market. In early February the state commenced negotiations for up to \$10bn in long-term supply contracts with generation companies within and outside California, which would then be sold on to the distribution utilities, eliminating the credit risk inherent in the poor financial situation of the utilities. This had two politically beneficial effects. First, by effectively disbanding the PX in favor of negotiated contracts, the governor claimed to have eliminated the exercise of market power by generation companies during times of peak demand, thereby substantially lowering average energy prices. The operating losses of the utilities would therefore be staunch and consumers would be protected against future additional rate increases. Secondly, by controlling the price at which the distribution utilities purchased their power, the government gained the option to not pass on the full costs of energy purchases to final consumers. Thus, although consumers would ultimately pay for this arrangement indirectly through higher state taxes and/or through partially increased rates, the impact would be less visible than in the case of full rate increases, and the government retained greater flexibility to spread the tax burden away from voter-consumers and over future tax-paying generations. This would limit the immediate political damage of the crisis but also postpone the resolution of the problem.

While ratepayers found a natural ally in the governing Democrat political coalition, institutional structures afforded a strong degree of protection for the generation companies and their shareholders, in this case from the intense adverse political pressure within California. The original governance arrangements of the California ISO, which was responsible for the operation of the transmission network, reflect the principle of incorporating multiple interest groups in administrative structures. The enabling statute specified that the governing board consist of representatives of “investor-owned utility transmission owners, publicly owned utility transmission owners, nonutility electricity sellers, public buyers and sellers, private buyers and sellers, industrial end-users, commercial end-users, residential end-users, agricultural end-users, public interest groups and nonmarket participant[s].”⁷³ Since ISO decisions required a majority vote, the diversity of interests represented on the board ensured that radical proposals would likely be vetoed.⁷⁴ The generation companies could thus organize against, and potentially veto, reforms proposed by competing stakeholder groups that would threaten their interests, for example regarding price cap levels or sanctions for facility operation or maintenance transgressions.

73 AB1890 Section 337

74 FERC disbanded the existing ISO Board on December 15, 2000 and ordered its reconstitution with new members who were not stakeholders or participants in ISO operations.

Further protection for the generation companies stemmed from the fact that most major policy decisions concerning the operation of the power markets still required the agreement of the Federal Energy Regulatory Commission (FERC) which had jurisdiction over transmission pricing issues. Proposals for changes in ISO price cap levels, for example, had to acquire FERC approval before being implemented. Similarly, ISO decisions to impose sanctions on transmission facility owners for inadequate operation or maintenance practices were also subject to FERC approval. Although dramatic proposals for regulatory reform were unlikely to emanate from the ISO, FERC had the authority to implement changes at the ISO that reduced incumbent generation companies' market power. However, as a federal agency, FERC had little incentive to make changes that simply gained political capital within California. Although it could "punish" generation companies and appropriate past financial gains without demonstrating abuse of market power, as a Federal agency the implications for investments throughout the nation would overcome any rush to expropriate rents within the California market.

In sum, the plurality of interests embedded within the administrative structure of the wholesale markets implied that agencies could not drastically swing regulatory policies to consumers' short-term advantage - tightening wholesale price caps or otherwise recouping windfall profits - in response to external political pressure. The generation companies and shareholders that profited from relatively high wholesale energy prices were therefore fairly secure from having their gains directly or indirectly expropriated.

While political and institutional factors insulated the interests of two major stakeholder groups, ratepayers and generators, in the reform process, the experience of the distribution utilities was more mixed. The utilities' profits were highly exposed to wholesale price fluctuations since the 1996 restructuring legislation originally froze retail rates at a specified level until either the utilities' stranded generation costs had been recovered or until January 2002 at the latest. Without the fulfilment of either of these conditions, the utilities were unable to automatically pass on higher purchased energy costs to consumers in the form of higher rates, resulting in substantial accumulated financial losses by early 2001.

The utilities' financial distress need not have been the default outcome, however, since the California Public Utilities Commission had some discretion to revalue the utilities' generation assets during 2000 and hence to relax the fixed retail rate constraint. According to the original 1996 restructuring legislation, AB 1890, the CPUC was required to value the utilities' generation assets, in order to estimate their stranded assets, by the end of December 2001 at the latest.⁷⁵ Despite repeated requests by the utilities to revalue their assets during 2001, the CPUC refused to do so. Given the high wholesale energy prices at the time and thereafter, a revaluation would have resulted in a large downward revision of the magnitude of the utilities' stranded costs, thereby triggering the removal of the retail price caps. Exposing consumers to the full cost of wholesale energy purchases, however, could have created a political backlash similar to that which took

⁷⁵ Article 367, AB 1890

place in San Diego. The Governor, and the CPUC, however, did not seem interested in releasing retail rates. Instead, the CPUC utilised its discretion to avoid having to evaluate PG&E's stranded assets, and thus, force it to finance the rate freeze. This is the type of opportunistic behaviour which by not following the intent of the 1996 legislation – to provide a fair valuation of the utilities' stranded assets – effectively expropriated much of the utilities' sunk investments.

Despite the apparent opportunism of the CPUC in this instance, the U.S. regulatory governance system provides measures that can reverse such outcomes or else restrict their frequency of occurrence. Specifically, the courts provide an additional check in the determination of regulatory policy. Agency decisions are subject to judicial review and federal legal precedent stipulates that utilities are entitled to a fair rate of return on their investments.⁷⁶ Furthermore, agency decision-making procedures are governed by a well-developed body of administrative law, limiting their ability for making rulings, and agencies and legislatures cannot penalize utilities without first demonstrating managerial imprudence or malfeasance. The role of the courts in the broader public policy process was evident in California where the utilities turned to the state and federal courts in an attempt to shift regulatory policy in their favor. PG&E filed a case in the California Supreme court concerning the losses it sustained in the PX during 2000 and also a case in a federal court requesting an injunction against the CPUC to raise consumer bills by more than \$3.4bn.^{77,78} Although PG&E ultimately filed for bankruptcy, its timing may be interpreted as a strategic move to seek judicial resolution in the absence of political resolution to its inability to pay creditors. Southern California Edison also adopted a judicial strategy, using a previously-filed lawsuit against the CPUC to gain leverage in negotiating a settlement with the agency in October 2001.

Litigation thus provides utilities with an additional avenue to protect their interests, though the emphasis on due process in the judicial system guarantees that in complex cases with multiple intervenors, ultimate resolutions are reached only after a substantial time interval.

While market events in the Californian electricity industry eventually catalyzed political pressure for regulatory reform, the complex set of checks and balances

⁷⁶ The Hope Natural Gas and Bluefield cases set the precedent of “just and reasonable” profits as the norm for regulated industries (see Bonbright, 1961)

⁷⁷ *San Francisco Chronicle*, November 9, 2000, “New Angle to PG&E Bid to Raise Rates: Utility files complaint in federal court”

⁷⁸ Although a federal court decision in early February 2001 cast some doubt on whether the utilities would be allowed to raise final rates in order to gain full compensation for their distribution business losses, the determination of this issue is made by a disinterested party (i.e. the courts) on the merits of the case (while the distribution operations of the utilities made large financial losses during 2000, their generation businesses naturally benefited from high PX prices, leading some to argue that full compensation is not required). The courts therefore provide an important check against the risk that the state government, seeking political favor with its constituents, may prevent the utilities from recovering their sunk costs. (see *Southern California Edison v.s. Lynch* (California Public Utilities Commission), U.S. District Court, Central District of California, Case No. 00-12056-RSWL (Mcx).

characteristic of the U.S. policy-making environment suggests that the market power issue would be unlikely to trigger policy changes that drastically disadvantaged the major interest groups involved. Although one of the California utilities was driven towards bankruptcy, and another lost half of its market value, the political acrobatics undertaken by the governor and the legislature were intended to avoid both judicial review and a political backlash. Thus, the web of judicial protection and multiple layers of authority in a fragmented polity assure investors, to a large extent, that their quasi rents will not be easily taken away by administrative fiat. Although the unexpected shock associated with the increase in wholesale market prices generated a serious financial crisis for the utilities and substantial political heat, the basic governance provides for multiple checks on arbitrary decision making, such that a resolution of the crisis could be in sight without affecting the long term investment incentives of the various players.⁷⁹

IV.iii Market Power and Regulatory Reform in El Salvador

El Salvador started to consider the reform of its electricity market in 1991 when the government created the Executive Committee for the Energy Project as an inter-ministerial committee to participate in a World Bank funded project whose purpose was to promote competition in the sector. In 1995 a private generation company started operating a 127MW thermal plant in the form of a Build-Operate-Own (BOO) project with CEL, the public generation and transmission company.⁸⁰ In 1996 the Salvadorean Assembly passed the 1996 General Electricity Act. Among other things, the 1996 Act created a wholesale market with programmed dispatch based on bilateral or multilateral contracts coupled with a balancing market, eliminated franchise monopolies in the distribution and transmission sector, created an independent dispatch operator (composed, as the California ISO, of stakeholders), instituted open access to transmission and distribution facilities, regulated charges for the use of both types of networks, and required the publicly owned generation and transmission company to create a separate transmission company.

The wholesale market started operating in January 1998 following the privatization of four distribution companies. The initial effect of the creation of the wholesale market was a slight drop in wholesale prices. While prior to the start of the wholesale market in 1998 prices to distributors were around eight U.S. cents per kWh, from January 1998 onwards, prices tended to move in the six to eight cents range (see Figure 3). In August 1999, CEL sold its thermal park composed of three thermal plants to Duke Energy International. As Figure 3 shows, prices started to increase shortly thereafter, reaching a peak of seventeen U.S. cents per kWh in April 2000, and falling then to more normal levels in May 2000 following the signature of a long term contract between CEL and Duke for approximately fifty percent of Duke's capacity.

⁷⁹ More than anything, the California example shows the political risk of placing all the weight in spot markets, and the need for promoting long term contracts between load serving companies and generators.

⁸⁰ CEL, which stands for Comisión Ejecutiva Hidroeléctrica del Río Lema, was also the owner of various distribution companies.

The drastic price increase in early 2000 generated substantial political problems. The 1996 Act required the indexation of the retail tariffs to the evolution of wholesale market prices. An Executive Decree interpreted the indexation to have two components: a quarterly indexation and an annual indexation. Once a year tariffs would be “reset” so that the average increase in the previous year will be translated into the new tariff structure. Within the year, tariffs were adjusted quarterly if the price increase during the quarter exceeded ten percent. In July 2000 the quarterly indexation would have implied a substantial increase in prices, as wholesale prices in the first quarter of 2000 were more than 50 percent above prices in the prior quarter. This, on top of an important increase in the retail tariffs for the first quarter,⁸¹ triggered substantial political concerns. Although a careful analysis of the situation shows that Duke and CEL were essentially keeping prices high during the last quarter of 1999 and the 1st quarter of 2000,⁸² the government and the press placed the emphasis on imports from Guatemala and on the presumed high profits of the private distribution companies. Pressure grew to reverse the 1996 Electricity Act to regulate wholesale prices and to further regulate the profits of the distribution companies.

The government responded to the political pressure in three fundamental ways: first, it amended its interpretation of the 1996 Act, second it instituted direct subsidies to the residential users, and third, CEL entered into a contract with Duke Energy for a substantial portion of Duke’s capacity. The impact of these three acts was, first, to expropriate a substantial part of the distribution companies quasi-rents: the change in the Executive Decree interpreting the 1996 Act was undertaken in August 2000, just prior to when the third quarter indexation was to take place. It essentially eliminated the adjustment that would have compensated the distributing companies for the losses they had incurred when the wholesale price was above the retail tariff. By modifying the interpretation of the law just prior to the introduction of the compensating adjustment, the intertemporal compensation was eliminated. The second effect was to expropriate a substantial portion of the public generation company’s quasi-rents: during 1999 the subsidies that the government required CEL to provide to the distribution companies were approximately equal to all of its pre-tax operating profits.⁸³ Finally, via the contract with Duke, the government monopolized the operation of the wholesale market in the hands of CEL.⁸⁴

Although these three actions had a direct impact on retail tariffs, thus alleviating an important short-term political problem, they may have a major impact on the viability

⁸¹ See, Cargo de Energía sube 52%, El Diario de Hoy, Thursday April 6 2000, San Salvador and Energía: el alza no tocará los hogares, El Diario de Hoy, Tuesday April 4 2000, San Salvador.

⁸² See Spiller, P.T., “An Analysis of the Wholesale Market and the General Electricity Act of El Salvador,” LECCG, September 2000.

⁸³ See Memoria de Labores, CEL 1999.

⁸⁴ Prior to signing the contract with Duke, CEL had control over approximately 70% of the domestic generation, and Duke of the remaining 30%. Since the contract transfers to CEL control more than half of Duke’s generation capacity, it essentially granted CEL control almost completely over the wholesale market.

of the competitive framework, creating a long-term problem for the country. On the one hand the contract with Duke eliminated the incentive that Duke may have had to limit supply into the market.⁸⁵ Since the CEL/Duke contract price is based on Duke's operating costs, Duke will not benefit from limiting the availability of its remaining 15% of the generation capacity.⁸⁶ Thus, the fall that took place in prices in May 2000 can be directly related to the CEL/Duke contract. On the other hand, the subsidies granted by CEL⁸⁷ and the reform of the interpretation of the 1996 Act softened the impact of the price spike on consumers.⁸⁸ Indeed, following the reduction in the spot price, the Government substantially reduced the subsidies.⁸⁹

The speed with which the government, and government entities like CEL, moved, and the redistributive character of the reforms, raises substantial questions about the nature of the governance structure of the sector. Indeed, a close examination shows that the regulatory governance of the sector is very weak, raising questions about its ability to sustain private investment in the long run.

El Salvador is a Presidential republic with a single chamber Legislative Assembly.⁹⁰ The Salvadorean Supreme Court justices do not have life tenure, and the legislature renews the justices' appointments. As a consequence, the judiciary is highly sensitive to political issues and is subject to substantial legislative control. The lack of judicial independence is particularly problematic given the ability of the president to interpret legislation via Executive Decrees.⁹¹ Since attempts to overturn Executive Decrees that have support in the legislature are unlikely to be supported by the courts, it is not surprising that, differing from the distribution companies in California, the Salvadorean utilities have not filed suits against the government for a change in its interpretation of the 1996 Act which has cost them several million dollars.

The regulatory governance regime, then, provides for a high level of regulatory flexibility, and hence may generate credibility problems which, in the long run, will tend to discourage private investment. The 1996 Act, however, provides no further instruments to limit the government discretion. Although the Act could have been

⁸⁵ Spiller (2000) claims that such restrictions were what triggered the increase in price during the 4th quarter of 1999 and the first of 2000.

⁸⁶ See *Costosa energía no generada*, El Diario de Hoy, El Salvador, October 18, 2000.

⁸⁷ See *La fuerza de la Generación, Más!*, El Salvador, October 3, 2000.

⁸⁸ See *Subsidio cuesta a CEL c1,470 millones*, La Prensa Gráfica, October 17, 2000.

⁸⁹ See *CEL invierte más de mil millones en generación*, La Prensa Gráfica, El Salvador, October 17, 2000.

⁹⁰ The nature and timing of presidential and legislative elections imply that the President does not necessarily have a majority in the assembly.

⁹¹ Indeed, a simple reading of the original executive decree interpreting the 1996 Act would suggest that such an interpretation violates the Act. The Act says in its Art 79 that retail prices should be adjusted based on "the average price of the energy in the wholesale market in the respective node during the year prior to the filing of the tariffs". The Executive Decree introduced a 10% adjustment clause and a quarterly adjustment.

substantially more specific and, in particular, it could have not granted the government the ability to regulate retail prices, it did. Granting the government the ability to regulate final tariffs, the legislature opened a Pandora's box, where the executive, via decrees, can modify more or less at its pleasure the nature of such regulation. Had the 1996 Act not granted the government the right to set retail prices, the government could have still expropriated CEL's quasi rents and entered into a contract with Duke,⁹² but it would not have been able to affect the profitability of the distribution companies.

This case shows, then, that in institutional environments with few checks and balances, regulatory frameworks have to place particular emphasis on limiting the discretion of the government, rather than in granting flexibility. The 1996 Act failed to do so, and thus created a serious credibility crisis.

V. Final Comments

Electricity reforms are being undertaken throughout the world. Much emphasis is being placed on industry-structure issues. This paper emphasizes that although industrial structure is important – affecting market power and efficiency considerations – a more fundamental issue is the regulatory governance of the sector. By looking at how three countries reacted to alleged instances of exploitation of market power in wholesale energy markets, we show how governance structures determine the degree to which regulatory policies respond to partisan political pressures. The case of El Salvador illustrates how weak governance regimes, characterized here by a paucity of legislative checks and balances, a politicized judiciary and considerable executive discretion, can lead to policy reforms in the presence of economic shocks that effectively expropriate certain interest groups. Here, the government insulated final consumers from the full impact of increased wholesale prices by implementing substantial subsidies. It did so at the expense of the private distribution companies by ex post manipulating the pricing mechanism such that the distribution companies could not fully adjust final rates to compensate for higher wholesale prices in the recent past, thereby expropriating some of their quasi rents. The government also appropriated the profits of the state generating company to further subsidize final consumers.

On the other hand, countries such as the U.K. with stronger regulatory governance structures can weather the political storms associated with spiking wholesale prices without engendering credibility crises in the industry. In the U.S., the presence of multiple checks and balances, at legislative, administrative and judicial levels, limits the scope for implementing policy changes that drastically redistribute rents between interest groups. The generation companies, being regulated primarily by *federal* agencies, were insulated from direct *state-level* political pressures to appropriate some of their financial gains previously earned in the power market. The distributors, however, were exposed to opportunistic behavior by the CPUC. However, the option of independent judicial review, including bankruptcy proceedings, provides an opportunity for the distribution companies to recoup some of their losses by challenging agency and legislature policy

⁹² Since the contract with Duke is voluntary, it is reasonable to expect that Duke receives from CEL at least what it could obtain from the wholesale market.

decisions. In the U.K., strong norms of judicial and agency independence, and a complex system of administrative checks and balances, also provided reassurance for investors while simultaneously allowing the government to implement policy reforms.

In the U.K, and to some extent in California, strong regulatory governance structures protected regulatory policy, and investors' interests, from the immediate political pressures to implement industry reforms that would directly or indirectly expropriate their assets or revenue streams.

Finally, for policy-makers, our paper argues that governments should emphasize the appropriate match of the sectoral regulatory governance framework to the nature of their political, judicial and administrative institutions. In instances where institutions do not provide for a system of substantial checks and balances, the regulatory governance regime should be substantially rigid, so that unexpected shocks, which will always come, do not reverse the progress already undertaken in reform programs.

Table 1: ORGANIZATIONAL AND OWNERSHIP STRUCTURE OF COMPETITIVE WHOLESALE ELECTRICITY MARKETS

COUNTRY	OWNERSHIP			INSTALLED CAPACITY (MW) ⁹³	VERTICAL INTEGRATION ALLOWED ⁹⁴	# FIRMS	
	GENERATION	DISTRIBUTION	TRANSMISSION			TRANSMISSION	DISTRIBUTION
ARGENTINA	PRIVATE	PRIVATE	PRIVATE	22000	NO	7	25+
AUSTRALIA (Victoria)	PRIVATE	PRIVATE	PRIVATE	6700	NO	1	5
CHILE	PRIVATE	PRIVATE	PRIVATE	8000	YES	4	20
U.K.	PRIVATE	PRIVATE	PRIVATE	70000	NO	1	12
PERU	MOSTLY PRIVATE	MOSTLY PUBLIC	PUBLIC	5000	NO	2	7
BOLIVIA	MOSTLY PRIVATE	MOSTLY PRIVATE	PRIVATE	950	NO	1	24
COLOMBIA	MOSTLY PRIVATE	MOSTLY PUBLIC	PUBLIC	15000	YES	1	25+
SPAIN	MOSTLY PRIVATE	MOSTLY PRIVATE	MOSTLY PRIVATE	43000	NO	1	17
U.S.A.	MOSTLY PRIVATE	MOSTLY PRIVATE	PRIVATE	779000	YES	200+	3000+
GUATEMALA	MOSTLY PUBLIC	MOSTLY PRIVATE	PUBLIC	1300	YES	1	15
EL SALVADOR	MOSTLY PUBLIC	MOSTLY PRIVATE	PUBLIC	850	YES	1	5
FINLAND	MOSTLY PUBLIC	MOSTLY PUBLIC	MOSTLY PRIVATE	16000	NO	2	130
NEW ZEALAND	MOSTLY PUBLIC	MOSTLY PUBLIC	PUBLIC	8000	YES	1	42
NORWAY	MOSTLY PUBLIC	MOSTLY PUBLIC	MOSTLY PUBLIC	27000	NO	1	240
PORTUGAL	MOSTLY PUBLIC	MOSTLY PUBLIC	MOSTLY PUBLIC	9000	YES	1	4
SWEDEN	MOSTLY PUBLIC	MOSTLY PUBLIC	MOSTLY PUBLIC	34000	NO	1	270
UKRAINE	PUBLIC	PUBLIC	PUBLIC	55000	NO	1	27

⁹³ Source: Energy Information Administration, U.S. Department of Energy.

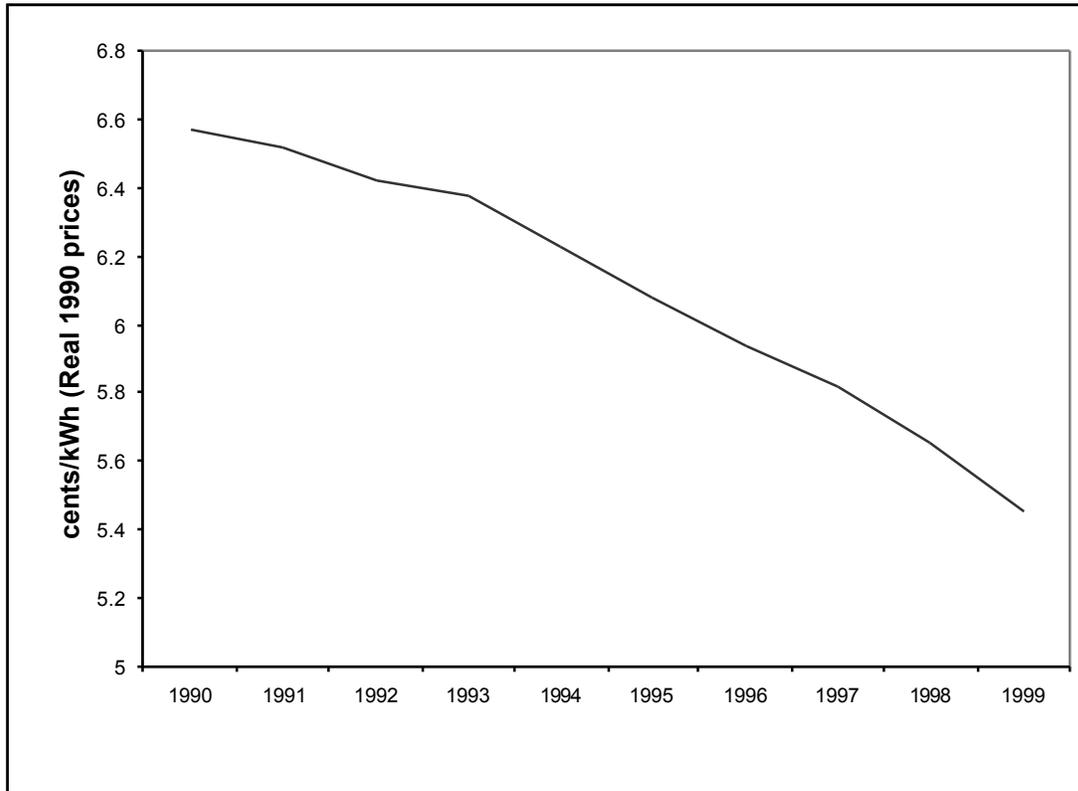
⁹⁴ Vertical integration between transmission and generation functions.

Table 2: REGULATORY GOVERNANCE, MARKET POWER ALLEGATIONS AND REGULATORY REFORM IN CALIFORNIA, EL SALVADOR AND THE U.K.

	U.K.	EL SALVADOR	CALIFORNIA
Market Power Origins	<ul style="list-style-type: none"> • Generation duopoly created at privatization (National Power and PowerGen) • Buyers and sellers required to make all trades through the Pool; limited scope for negotiating contracts independently of the Pool price 	<ul style="list-style-type: none"> • High concentration of generation assets in public company CEL • Privatization of thermal units to a single company, Duke Energy International. 	<ul style="list-style-type: none"> • Investor-owned utilities required to make energy trades through PX spot market; limited scope for long-term bilateral contracts • Limited transmission capacity in some regions • Designation of many generation units as "must run" for network reliability purposes •
Regulatory Reforms	<ul style="list-style-type: none"> • Negotiated adjustment of generator licenses – addition of "market abuse" clause • Statutory revision of Pool trading system; new regime, NETA, based on bilateral trading with short-term, forward and futures markets • Required divestment of generation assets by PowerGen and National Power duopoly 	<ul style="list-style-type: none"> • Modified indexation rules for retail tariffs to avoid pass-through of temporary price spikes • Introduction of massive subsidies from CEL to final users – via a distribution companies. • CEL entered into contract for 50% of Duke's generation capacity, increasing CEL's market share to 85% 	<ul style="list-style-type: none"> • State entry into power market as monopsony purchaser, using long-term contracts, of energy for resale to distribution utilities; effectively marginalized PX and ISO • Proposed takeover of transmission system as way to "bailout" major utilities.
Regulatory Instruments / Tools	<ul style="list-style-type: none"> • Licenses awarded to firms; define rights and obligations of parties, including firm and regulatory agency 	<ul style="list-style-type: none"> • 1996 General Electricity Act and Executive Decrees implementing the Act 	<ul style="list-style-type: none"> • Licenses permit firms to operate in PX
Regulatory Governance	<ul style="list-style-type: none"> • License amendment process specified in license and governed by contract law • Judiciary has strong tradition of independence and upholding contracts • Regulatory agency, Ofgem, operates as statutory body with independent staff and budget • Process of appealing Ofgem decisions is complex, including referrals to Competition Commission, statutory anti-trust agency, and Secretary of State • Single chamber parliamentary 	<ul style="list-style-type: none"> • Legislation delegates substantial discretion to the executive • Politicized judiciary may not limit ability of executive to modify interpretation of statutes • Regulatory agency highly influenced by politics and main operator, CEL • No independent antitrust agency • Single chamber presidential system, provides few checks and balances 	<ul style="list-style-type: none"> • Generation market (PX) and system operator (ISO) established by Californian legislature but primarily regulated by FERC • Agency decision-making procedures governed by administrative procedure legislation and agency decisions further subject to judicial review • Federal and state legal precedent entitles utilities to a fair rate of return on reasonable investments • Separation of legislative powers between executive and two legislative chambers insulates regulatory policy against direct political manipulation

	government has broad ability to over-rule agencies with legislative acts, though informal norms of civil service independence limit direct political interference		
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Figure 1: U.S. RETAIL ELECTRICITY RATES, 1990-1999⁹⁵



⁹⁵ Source: U.S. Energy Information Administration. Price is calculated as average revenue per kilowatt hour for all customer sectors.

Figure 2: UNIT SPOT PRICE IN CALIFORNIA WHOLESALE MARKET

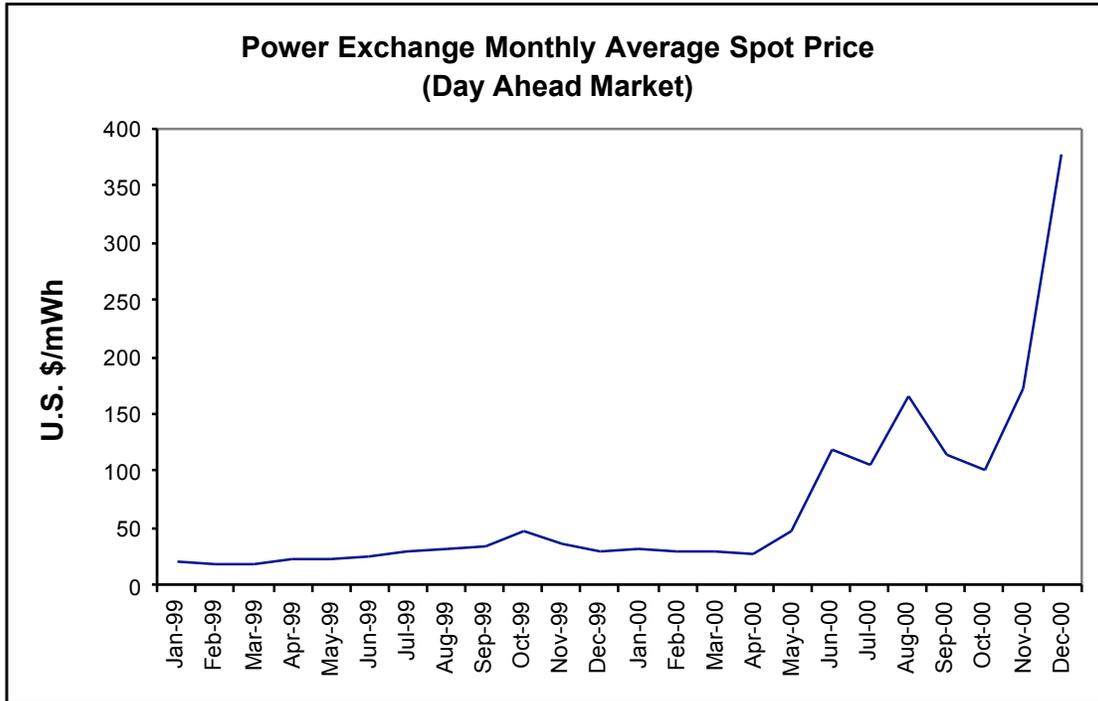
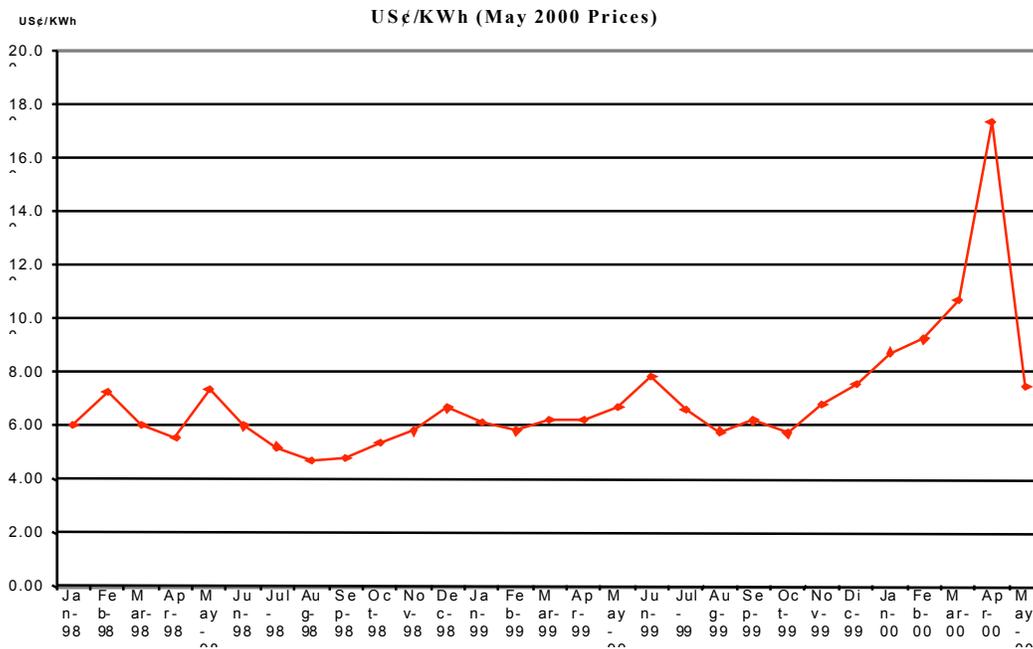


Figure 3: UNIT SPOT PRICE IN EL SALVADOR WHOLESALE MARKET



References

- Baldwin, R. and C. McCrudden, (1987). *Regulation and Public Law*. London: Weidenfeld & Nicholson
- Barzel, Y. (1989). *Economic Analysis of Property Rights*. Cambridge: Cambridge University Press
- Bonbright, J. C. (1961). *Principles of public utility rates*. New York: Columbia University Press
- Borenstein, S. and J. Bushnell (2000). "Electricity Restructuring: Deregulation or Reregulation?" *Regulation*, 23(2)
- Borenstein, S. , J. Bushnell and F. A. Wolak (2000). "Diagnosing Market Power in California's Deregulated Wholesale Electricity Market". University of California Energy Institute *POWER Working Paper PWP-064r*
- Cain, B. E., J. Ferejohn and M. Fiorina (1987). *The Personal Vote: Constituency Service And Electoral Independence*. Cambridge, Mass.: Harvard University Press
- Cox, G. W. (1987). *The Efficient Secret: The Cabinet And The Development Of Political Parties In Victorian England*. Cambridge: Cambridge University Press
- Epstein, D. and S. O'Halloran (1996). "Divided Government and the Design of Administrative Procedures: A Formal Model and Empirical Test". *The Journal of Politics*, 58:373-397
- Epstein, D. and S. O'Halloran (1994). "Administrative Procedures, Information, and Agency Discretion". *American Journal of Political Science*, 38:697-722
- Gely, R. and P. T. Spiller (1990). "A Rational Choice Theory Of Supreme Court Statutory Decisions With Applications To The State Farm And Grove City Cases." *Journal of Law, Economics and Organization*, 6(2): 263-300
- Green, R. J. and D. M. Newbery, (1992) "Competition in the British Electricity Spot Market". *Journal of Political Economy*, 100(5): 929-953.
- Gilbert, R. J. and E. P. Kahn, eds., (1996). *International Comparisons of Electricity Regulation*. Cambridge: Cambridge University Press
- Goldberg, V. (1976). "Regulation and Administered Contracts". *Bell Journal of Economics*, 7: 426-2
- Hill, A. and M. A. Abdala (1996). "Argentina: The Sequencing Of Privatization And Regulation" in Levy, B. and P. T. Spiller, eds., *Regulation, Institutions and Commitment: Comparative Studies of Telecommunications*. Cambridge: Cambridge University Press

- Holburn, G. L. F. and R. Vanden Bergh (2000). "Political Instability and Policy Insulation: The Diffusion of Utility Consumer Advocacy Legislation in the United States". Mimeo, University of California, Berkeley
- International Energy Agency, (2000). "Energy Prices and Taxes – Quarterly Statistics". OECD: Paris
- Jacobson, G. (1990). *The Electoral origins of divided government*. Boulder, Colorado: Westview Press
- Joskow, P. L. (2000). "Deregulation and Regulatory Reform in the U.S. Electric Power Sector". Mimeo, MIT
- Levy, B. and P. T. Spiller (1993). "Regulation, Institutions, And Commitment In Telecommunications - A Comparative Analysis Of 5 Country Studies." *World Bank Economic Review*
- Levy, B. and P. T. Spiller (1994). "The Institutional Foundations of Regulatory Commitment: A Comparative Analysis of Telecommunications Regulation". *Journal of Law, Economics and Organization*, 10(2): 201-246
- McCubbins, M. D., R. G. Noll, B. R. Weingast (1989). "Structure and Process, Politics and Policy: Administrative Arrangements and the Political Control of Agencies". *Virginia Law Review*, 75(2): 431-508.
- McCubbins, M. D., R. G. Noll, B. R. Weingast (1987). "Administrative Procedures as Instruments of Political Control". *Journal of Law, Economics and Organization*, 3: 243-277.
- McCubbins, M. D. and Schwartz (1984). "Congressional Oversight Overlooked: Police Patrols vs. Fire Alarms". *American Journal of Political Science*.
- Newbery, D. M. (1999). "Issues and Options for Restructuring the ESI". Mimeo, Department of Applied Economics, Cambridge University
- Newbery, D. M. and R. J. Green (1996). "Regulation, Public Ownership and Privatisation of the English Electricity Industry" in R. J. Gilbert and E. P. Kahn, eds., *International Comparisons of Electricity Regulation*. Cambridge: Cambridge University Press
- Newbery, D. M. and M. G. Pollitt, (1997). "The restructuring and privatisation of Britain's CEGB--was it worth it?". *Journal of Industrial Economics*, 45(3): 269-303
- North, D. C. (1990). *Institutions, Institutional Change, and Economic Performance*. Cambridge: Cambridge University Press

- Office of Gas and Electricity Markets, U.K. (1999). "The New Electricity Trading Arrangements"
- Office of Gas and Electricity Markets, U.K. (2000). "Statement by Callum McCarthy, Director General of Ofgem Addressing the Scope for, and Experience of, the Abuse of Market Power by the Generators Under the Wholesale Electricity Pool in England and Wales"
- Oren, S., (2000). "Capacity Payments and Supply Adequacy in Competitive Electricity Markets," Mimeo, University of California, Berkeley.
- Oren S., and P.T. Spiller (2000). "Wild Prices Out West: What Can be Done?" *Public Utilities Fortnightly*, 138 (20): 58-61.
- Rose, J. (2000). "Price Spike Reality: Debunking the Myth of Failed Markets." *Public Utilities Fortnightly*, 138 (20): 52-57.
- Schwartz, E. P., P. T. Spiller and S. Urbitzondo (1994). "A Positive Theory of Legislative Intent." *Law and Contemporary Problems*, 57(1-2): 51-74
- Shugart, M. S. and J. M. Carey (1992). *Presidents and Assemblies: Constitutional Design and Electoral Dynamics*. Cambridge: Cambridge University Press
- Spiller, P. T. (1996). "Institutions and Commitment". *Industrial and Corporate Change*
- Spiller, P. T. (1999). "Restructuring Myths: On the Possibility of Competition in Small Power Sectors" Mimeo, University of California, Berkeley.
- Spiller, P.T. and W. Savedoff (2000). "Government Opportunism and the Performance of Public Enterprise," in Spiller, P.T. and W. Savedoff, eds., *Spilled Water: Institutional Commitment in the Provision of Water Services*, InterAmerican Development Bank Series
- Spiller, P.T. and R. Vanden Bergh (1997). "Towards a Positive Theory of State Supreme Court Decision Making." Mimeo, University of California, Berkeley
- Spiller, P. T. and I. Vogelsang (1993). "Notes on Public Utility Regulation in the UK: 1850-1950." Mimeo, University of California, Berkeley.
- Spiller, P. T. and I. Vogelsang (1997). "Regulation without Commitment: Price Regulation of U.K. Utilities (with special emphasis on telecommunications)". *Journal of Institutional and Theoretical Economics*
- Taagepera, R and M. S. Shugart (1993). "Predicting The Number Of Parties - A Quantitative Model Of Duverger Mechanical Effect." *American Political Science Review*,

87(2): 455-464.

Tiller, E. H. (1998). "Controlling Policy by Controlling Process: Judicial influence on Regulatory Decision Making". *Journal of Law, Economics and Organization*, 14(1): 114-135.

Tiller, E. H. and P. T. Spiller (1996). "Strategic Instruments: Politics and Decision Costs in Administrative and Judicial Process". Center for Legal and Regulatory Studies, Graduate School of Business, University of Texas at Austin.

Vanden Bergh, R. (1998). "Institutions, Political Heterogeneity, and the Strategic Design of State-Level Administrative Procedures". Unpublished dissertation, University of California, Berkeley

Weingast, B. R. (1995). "The Economic Role Of Political Institutions - Market-Preserving Federalism And Economic Development." *Journal Of Law, Economics and Organization*, 11(1):1-31.

Williamson, O. E. (1976). "Franchise Bidding for Natural Monopolies – In General and with Respect to CATV." *Bell Journal of Economics*, 7: 73-104

Williamson, O. E. (1985). *The Economic Institutions of Capitalism*. New York: Free Press

Williamson, O. E. (1988). "The Logic of Economic Organization." *Journal of Law, Economics and Organization*, 4: 65-93

Williamson, O. E. and S. E. Masten, eds., (1995). *Transaction Cost Economics*. Aldershot, England: Edward Elgar

Wolfram, C. (1999). "Measuring Duopoly Power in the British Electricity Spot Market". *American Economic Review*, 89: 805