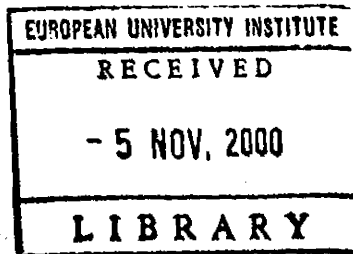




EUROPEAN UNIVERSITY INSTITUTE  
Department of Economics



# Privatized Utilities: Regulatory Reform and Corporate Control

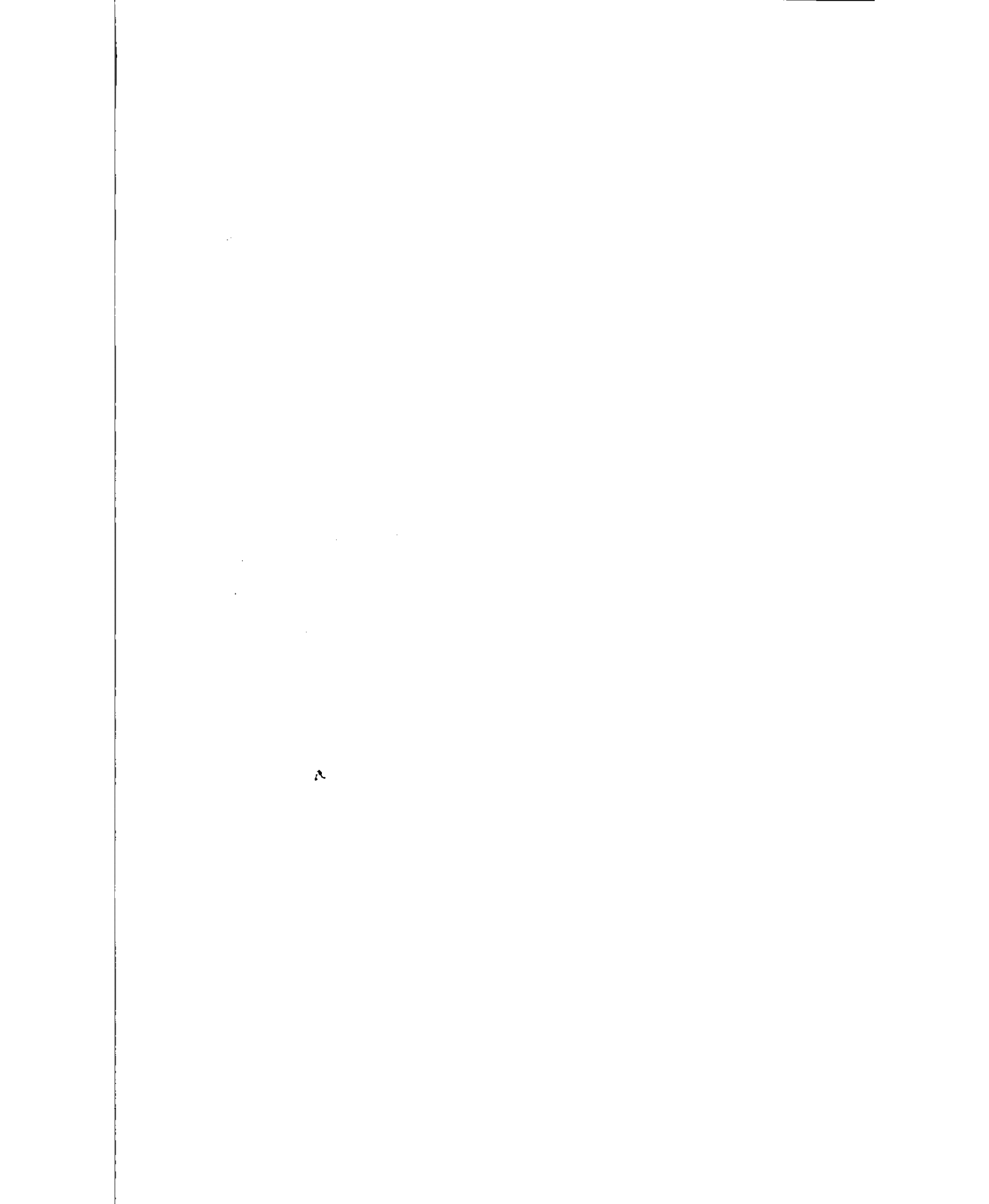
Francesc Trillas

*Thesis submitted for assessment with a view to obtaining  
the degree of Doctor of the European University Institute*

Florence  
November 2000

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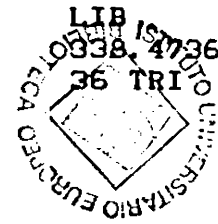


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# Privatized Utilities: Regulatory Reform and Corporate Control

Francesc Trillas

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# Chapter 1

## Introduction

The academic literature has developed a number of "standard prescriptions"<sup>1</sup> for the privatization and regulation of utilities. The main purpose of this thesis is to qualify some of them, and build on the qualifications to find new insights. Although these prescriptions have not been endorsed universally, they permeate most of the theoretical and empirical work done in the recent past. In general, they constitute a benchmark that has enriched our understanding of the many economic issues related to the role and performance of privatized, regulated firms. These standard prescriptions are broadly based on the British experience and some specific strands of economic theory. By and large, progress has been made in reforming countries using these standard prescriptions. But the British experience can today be complemented with the experience of other countries, and with new developments in several fields of economic theory. The evolution itself of the British privatized industries,<sup>2</sup> interacting with the evolution of the political cycle in the U.K., also helps to give a more balanced and complex view of this field.

Motivated by these more recent developments, this thesis addresses some issues related to these standard prescriptions. In particular, in the subsequent chapters first I explore the consequences of the failure to depoliticize regulatory regimes, with an application to the regulation of access prices. By formalizing some insights from the literature on "regulatory takings," it is shown that intense lobbying may drive connection charges (that an entrant pays for the use

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<sup>1</sup>I borrow this phrase from Joskow (1996), who refers by it to one instance of the conventional wisdom elements I develop below: the vertical unbundling of the electricity industry.

<sup>2</sup>See Martin and Parker (1997).

of the incumbent's network) below the optimal ones, under some conditions. Second, I show that partially concentrated ownership and partial privatization of regulated utilities emerge as dominant features in many circumstances, contrary to the conventional idea of fully privatized firms with dispersed ownership. This result is obtained from a model that revisits some ideas behind the empirical literature on regulation and ownership, using insights from the new theory of ownership dispersion. And third, I analyze through a clinical study the specific features of the control market in regulated industries. In particular, managerial problems (inherited from privatization) in bidding firms may drive an inefficient use of the free cash flow. Takeover processes in regulated sectors tend to be protracted due to the mobilization of constituencies, which use the attention that the contest draws to the firm to defend their interests as a political issue. Both regulation and agency relationships derived from privatization constrain the gains that target and bidding shareholders can extract from the control market.

In this introduction, I describe the conventional wisdom and explain how this research is related to it. I briefly discuss what the literature has prescribed for the privatization, regulation and liberalization of utilities. Although subsequent chapters develop in depth analyses of just a selection of these issues, I try to ground my qualifications on a broader context, which is presented in the following sections. The rest of the introductory chapter is organized as follows. In Section 1.1, a description is presented of some characteristics of privatized utilities that make them especially relevant for a number of politico-economic reasons. In Section 1.2, the standard prescriptions are characterized and their theoretical and empirical origins are briefly analyzed. And Section 1.3 summarizes the main contributions of the thesis.

## **1.1 Some Key Characteristics of Privatized Utilities**

It is easy to understate the role of regulated firms in a modern economy. First, there is no such thing as a completely unregulated firm. Second, network industries have natural monopoly elements (which call for price and entry regulation) or come from a tradition where large monopolistic incumbents dominated the industry (which calls for public policy to promote efficient entry if liberalization is undertaken). In many countries, heavily regulated firms that were privatized in the recent past dominate the local stock markets. For example, in December

1998. just the two largest electricity firms in Chile. Endesa Chile and Enersis, accounted for 36% of the market capitalization in the Santiago stock exchange.

It is the interaction of four characteristics that makes the ownership and regulation of industries such as telecommunications, electricity, gas or water especially controversial.<sup>3</sup> First, the political sensitivity of the issues involved. All individuals are consumers of (at least some of) these industries, and will very likely use their leverage in the political system (in democratic societies, through voting and lobbying) to further their interests. Hence, their decision set goes beyond the one assumed by traditional consumer theory, and has to be enlarged with political variables. Second, sunk costs are widespread in these capital-intensive industries. Many investments are specific to single projects and cannot be easily redeployed. Therefore, investors will only contribute funds if they have a reasonable assurance that they will earn a competitive rate of return. Third, network characteristics imply that at least in some segments of these industries, duplication of investments will be wasteful, and to avoid abusive monopolistic prices, regulation will be used by policy-makers to correct this market failure. But, fourth, policy-makers typically lack the ability to commit to particular actions or to restrict the actions of their successors in the future. To summarize the problem in a few words, the political pressure of consumers will make it very difficult for regulators not to expropriate the funds invested to finance the sunk costs. This makes it difficult for private investors to commit the necessary funds in the first place, and explains why public ownership has had such an important role in network industries.

Abstracting for a moment from privatization issues, it may help to clarify the nature of this lack of commitment in a country that has a long tradition of private regulated firms and has well established regulatory procedures. In the U.S., the inability of regulators to make explicit precommitments to prices stems from the fact that historically courts gave regulatory commissions a great deal of leeway in choosing rates. According to the Supreme Court in the landmark Hope Natural Gas case of 1944, a regulatory agency is "not bound to the use of any single formula or combination of formulae in determining rates" (*Federal Power Comm. v. Hope Natural Gas Co.*, 320 U.S. 591, 603, 1944). Moreover, in the United Railways case of 1930, the Supreme Court stated that "What will formulate a fair rate of return in a given

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<sup>3</sup>See Newbery (2000) for a recent overview.

case is not capable of exact mathematical demonstration." (*United Railways & Elec. Co. v. West*, 280 U.S. 234, 249, 251 1930).<sup>4</sup> This lack of commitment is well known, and some of the standard prescriptions explained below have been designed to alleviate these problems.

What is often overlooked by the literature is that the privatized firms in the utilities sectors are very large companies with huge agency and corporate governance issues at stake. In many countries, privatized utilities are the first to pose a large scale problem of separation between ownership and control, and most of the corporate governance controversy has been related to the performance of these privatized utilities.<sup>5</sup> As a consequence, simple two sided principal-agent models involving the regulator and the firm will not capture many relevant issues. The problem has a multi-principal-agent nature, arising both from the complexities of politics and from the complexities of the firms involved.

## 1.2 The Standard Prescriptions for Utilities' Privatization and Regulation

Since the privatization of British Telecom in 1984 the regulatory model of the U.K. has influenced most of the analysis related to privatized utilities. A plausible conjecture is that the British experience has interacted with several strands of economic theory to produce a coherent conventional wisdom. The various elements in this conventional wisdom can be split between privatization, regulation and liberalization issues. The following subsections describe these issues and relate each of them to different parts of the thesis.

### 1.2.1 Privatization

#### •Privatization.

The view that private agents have in general better incentives at running productive units than agents in the public sector is now shared by almost everybody in Economics, and it has

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<sup>4</sup>In the U.K., the agencies that were established to regulate the newly privatized public utilities were given wide discretion in setting rates. For example, the Telecommunications Act of 1984 allows the Director General of Telecommunications to behave "in a manner he considers best calculated." In other countries, the problems are even more acute due to the lack of established and standardized mechanisms of rate setting (prices are just fixed annually using *ad-hoc* methods).

<sup>5</sup>See for instance Yergin and Stanislaw (1997).



gained a special credit after the collapse of communism. Laffont and Tirole. (1993. ch. 17). in the particular case of regulated firms, show that public firms may be better at controlling managers because they avoid a double-principal structure, but they may expropriate managerial non-contractible investment for use in projects not related to the firm, thus deterring this investment. Schmidt (1996) presents privatization as a deliberate commitment device in order not to receive precise information about the firm, which may improve managerial efficiency. The empirical work by Galal et al. (1994), based on a number of quantitative case studies of privatized utilities, finds that the main benefit of privatization consists of relaxing investment constraints. This evidence coexists with the fact that utilities that are kept under public control, such as in France or Germany, have very high levels of investment.

There are discrepancies in the empirical literature about any intrinsic superiority of the private sector, as far as productive efficiency is concerned. Foreman-Peck and Millward (1994) show that the private sector is superior only when it is accompanied by a competitive industry structure. Ehrlich et al. (1994) using a dynamic model tested with panel data of the airlines industry, reach the opposite conclusion, namely that private firms have higher productivity growth regardless of the market structure. Dewenter and Malatesta (1998) present evidence that suggests that governments efficiently restructure at least some firms before selling them, but that the actual change of ownership does not give rise to further efficiency gains.<sup>6</sup> Using cross-country econometric analysis in the specific field of telecommunications, Ros (1999) finds that privatization is positively associated with main lines per employee and growth in main lines per employee, but Wallsten (1999) finds that privatizing an incumbent is negatively correlated with mainline penetration and connection capacity. The latter finds that privatization combined with an independent regulator, however, is positively correlated with connection capacity and substantially mitigates the negative effect on mainline penetration.

History<sup>7</sup> shows spells of private ownership followed by public ownership or viceversa depending on the economic cycle, or the political trends of the time, etc. Many political parties still have an ideological reluctance to dismantling the public sector. Only a small minority of

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<sup>6</sup>For recent surveys on these issues, see Megginson and Netter (2000) and Shirley and Walsh (2000).

<sup>7</sup>The history of any network industry in most countries shows different phases of public, private ownership, deregulation and reregulation. See for example a brief history of the telecommunications industry in Spain in Bel and Trillas (1999). See also Vietor (1994).

countries has undertaken a full process of privatization, transferring firm ownership and control of utilities to the private sector. Governments are still reluctant to transfer control to the private sector and keep varying degrees of power through golden shares, limited (or even absent in many sectors) privatizations, and limits to entry by foreign investors.<sup>8</sup> In some sectors, quality remains a legitimate concern. Hart et al. (1997), for example, show in an incomplete contracts framework that the private owners' incentive to engage in cost reduction is typically too strong because they ignore the adverse effect on non-contractible quality.

Progresses in contracting techniques and theory (see Shleifer, 1998) and the development of capital markets, have expanded the potential of private ownership in today's economies. There are certainly problems of contract incompleteness and political transaction costs (see Dixit, 1996) that sometimes make privatization reforms difficult. Nevertheless, if technology makes competition possible, the case for public ownership becomes weaker, especially if different countries try to create a new single market with an emphasis on competition policy, such as is the case in Western Europe.

Chapter 3 of this thesis analyzes the decision of how to privatize, and in particular the choice of ownership dispersion at privatization and the related issue of partial privatization. Chapter 4 analyzes the privatization experiences of Chilean and Spanish electricity as the background of the takeover of Enersis by Endesa.

#### •Depoliticization.

Privatization has been endorsed as a way to take away business from the influence of politics (see Boycko et al., 1996, and Shleifer and Vishny, 1998). This has been a general theme of public policy reform in transition economics. However, Rodrik (1997) shows through some counterexamples that the usual rules of thumb advocated by the international financial institutions in public policy reform (depoliticization, privatization, transparency) would have failed to achieve the impressive results that some countries have achieved in promoting investment. In fact, he shows through case studies that investment is best promoted, either from the private or the public sector, when it is a political priority. Doyle and Coen (1999) stress that the usual rules

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<sup>8</sup>Bortolotti et al. (1999) analyze a cross section of countries and find no correlation between privatization and level of economic development, reaching the conclusion that "privatizations are an end-of-century trend, not linked to deterministic or necessary elements, but rather influenced by political decisions or financial needs, and, moreover, they are reversible and historically determined."

of thumb to achieve credibility in the regulatory institutions (independence, transparency, best practice) may have a price in terms of flexibility and political sustainability. Most of these rules of thumb are related to the idea of depoliticization through privatization. However, as it has been argued above, there are good reasons why utilities are politically sensitive (everybody is a consumer and firms are usually regulated). These reasons still hold if firms are under private ownership. The experience of privatizing countries shows that privatization has done little to remove utilities from the political spotlight.

Levy and Spiller (1994) present a more subtle view of how to fit utility regulation into a country's political institutions and make privatization feasible. By contrasting the performance of privatized telecommunication companies in five countries (Argentina, Chile, Jamaica, the Philippines, and the U.K.), they argue that the credibility and effectiveness of the regulatory framework depends on the country's political and social institutions. Furthermore, they argue that performance can be satisfactory with a wide range of regulatory procedures, as long as arbitrary administrative action can be restrained. They conclude that the success of a regulatory system depends on how well it fits with a country's prevailing institutions. If a country lacks the requisite institutions or erects a regulatory system that is incompatible with its institutional endowment, efforts at privatization may end in disappointment, recrimination and the resurgence of demands for re-nationalization.

The literature has identified three types of political constraints: the potential for regulatory capture (see Laffont and Tirole, 1993, Part II), the use of regulatory instruments to deal with redistributive issues (see Laffont and Tirole, 2000, ch. 3) and the lingering presence of the public sector in regulated firms (Bortolotti et al., 1999). Although the two first issues have generated a rich theoretical literature, the third one remains unexplored at a formal level, despite its real world importance. Capture and redistributive concerns are revisited in Chapter 2 of this thesis, and the difficulties for the state's withdrawal from ownership are analyzed in Chapter 3. All constraints are present in one way or another in the clinical study presented in Chapter 4.

•Public offers to constrain *ex-post* expropriation.

It has become conventional wisdom that mass privatization creates incentives for future governments not to expropriate the utilities' investors, which more than compensates for the alleged drawbacks that a too dispersed shareholding may have on managerial control (see Corbett and

Mayer, 1991).<sup>9</sup>

However, it remains unclear the extent to which popular capitalism may influence political behaviour, especially when shares are very thinly dispersed (see Grout, 1994) or how in practice the number of shareholders influences the regulatory climate.<sup>10</sup> Moreover, many small shareholders typically sell their shares shortly after buying them, or shortly after the holding period for "bonuses." Even if for any reason direct small share-owners keep their shares for longer periods than institutional investors, it is ambiguous whether this would promote a longer horizon in managerial investment strategies, due to the free-rider problem that dispersed owners face in monitoring management.<sup>11</sup>

Tirole (1991) argues that a precondition for the existence of a dispersed shareholding is the well functioning of the stock market, which cannot be taken for granted in many countries. Without this pre-condition, it is even possible that foreign investors have better commitment properties than national popular capitalism. In countries that do not have good stock market institutions or that operate in too uncertain environments, Tirole advocates the existence of stock holdings by financial intermediaries with shares in a portfolio of companies, in order to avoid the inequality associated with a too concentrated ownership. The role of bank holdings at the beginning of the railways development in the US is shown as an example of this kind of institutions. Dow and Gorton (1997) show that the informative properties of stock markets can be replicated by bank systems.

Probably the clearest counter-example of the commitment properties of popular capitalism

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<sup>9</sup>This is broadly based on Median Voter theorem applications (see Biais and Perotti, 1998, and Schmidt, 1997, for example): by allocating enough shares to the median voter, a privatizing government can determine its or its successors' future preferences and commit not to expropriate investors' rents. See Jones et al. (1999) and Megginson et al. (2000) for empirical research on these issues.

<sup>10</sup>Although the implications of the commitment problem typical of utilities are well known as far as regulatory institutions are concerned (see for instance Levy and Spiller, 1994), the implications for corporate ownership and control are not well understood. Despite early warnings about the economic problems of popular capitalism (see Grout, 1994, and Mayer and Meadowcroft, 1986), to my knowledge this route has not been followed by subsequent research. Bolton (1995) claims that the Chinese emphasis on managerial incentives through appropriate corporate governance and product market competition instead of shock therapy through mass privatization shows the correct way forward for Eastern European countries.

<sup>11</sup>Bortolotti et al. (1999) show that the privatization of utilities through public offers is in most cases accompanied by partial privatization, so that it may well be a defensive tool for governments to keep control while having some of the benefits of a listed firm (accessibility to financial markets, managerial monitoring through stock price information). Shleifer and Treisman (2000) show how the need to co-opt some constituencies (insiders, major banks) for the success of a privatization package creates a coalition that may block improvements in corporate governance.

appeared in the U.K. Just a few months after winning the elections, the New Labour government established a 5 billion Pounds windfall tax on the privatized utilities, although the ownership structure and the regulatory regime were essentially unaffected by political change, at least in the short run.

The issue of ownership dispersion is addressed in Chapter 3 of this thesis, and Chapter 4 relates it to the control market in the case of Chile and Spain.

## 1.2.2 Regulation

### •Independent regulators.

Arms-length regulation has been endorsed as a way both to avoid the capture of regulators by industry and to insulate regulators from the political cycle. The point is related to the issue of depoliticization, and the analysis is based on similar arguments as for Central Bank independence in monetary policy (see Persson and Tabellini, 1998, and Levine, 1999). In just a decade, the number of separate regulators around the world in telecommunications has surged from 12 to 88 (*Financial Times*, 14-3-2000). However, these "regulators" act with a variable degree of independence *vis-à-vis* their respective governments.

According to Stern (1997), the independent regulator model may not be the only or best model in countries that lack regulatory practice and appropriate institutional traditions. When formally independent regulatory agencies have been set up in these countries, it is questionable whether or not their independence is genuine and sustainable. *Informal* independence may be an alternative solution to these difficulties. Transparency and predictability of regulation, with a clear assignment of functions, can be achieved in other ways which may be better than formally independent regulation. An advisory regulator that makes fair and justifiable recommendations, uses fair and acceptable procedures and operates in a transparent and predictable way may be better than a formally independent, decision-making regulator that does not act impartially.<sup>12</sup>

Cowen et al. (2000) point out that the credibility enhancing benefits of rules may require an unrealistic total removal of government discretion. Their main insight is that it is difficult

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<sup>12</sup>A related issue is whether the independent regulator should be a single person as in the U.K., or a board of more persons in charge of deciding on policy. A single regulator can be more operative and build up a reputation of fairness, but a collective regulator may better prevent arbitrariness or blunt mistakes (see Armstrong and Vickers, 1996). For a good analysis of regulatory institutions from a contract theory point of view, see Estache and Martimort (1998).

to discover information about officials bound by rules. Applying this to regulation, if the rule to respect the regulator's independence cannot be everlasting, a regime that allows the government some discretion can be better in terms of credibility, because it may reveal to investors the government's type.

Some parts of this thesis analyze the consequences of the difficulties to reach regulatory independence in the real world. Chapter 2 of this thesis can be interpreted as the analysis of lack of regulatory independence: regulatory outcomes depend on a vote-maximizing government's decisions influenced by interest groups. Chapter 4 analyzes the consequences of lack of regulatory independence in Chile and Spain, and shows how politics constrains the market for corporate control.

#### •Price-Caps.

Littlechild and Beesley<sup>13</sup> were the promoters in Britain of the price cap system RPI-X, by which the regulator commits to a price level equal to the retail price index minus a percentage to take account of expected productivity gains, for a period of five years. This system was supposed to replace the less cost-efficient rate of return regulation of the U.S, and was inspired by the need for regulation to achieve results similar to those of competitive markets, echoing the stress of the Austrian School on the importance of incentives in market economies. A long regulatory lag is supposed to increase the incentives for cost reduction. The move to incentive regulation was also inspired by the new literature on regulation, which emphasized the need to design mechanisms that took into account the asymmetry of information between the regulator and the firm (see Baron and Myerson, 1982, and Laffont and Tirole, 1993). The whole regime was conceived to be less burdensome and have less administrative costs than rate of return regulation.

However, the difference between both systems is more in emphasis than in substance, since both have similar problems when arbitrating between consumers and producers. Averch and Johnson (1962) noted that there is an inherent incentive to substitute capital investment for operating costs in rate of return regulation (where prices are adjusted to allow the firm to earn a rate of return just above the cost of capital). But the same incentive persists if, as is often

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<sup>13</sup>See Beesley (1997), Littlechild (1978) and Beesley and Littlechild (1983), on the economic ideas behind the British regulatory system.

the case, price cap incentives only apply to operating costs and not to capital expenditure. Mayer (1999) stresses the insurmountable difficulties of calculating the cost of capital and the asset base, which is necessary for both regulatory systems. Newbery (1997) stresses that rate of return regulation creates a more stable environment which can reduce the cost of capital due to lower regulatory risk.<sup>14</sup>

Baron and Besanko (1987) point out that if it cannot make commitments to future policies (as is necessary in a price cap regime), the regulator has an incentive to exploit any information the firm reveals. They propose a "fairness" arrangement in which the firm agrees not to quit if in future periods the regulator allows it to earn a nonnegative profit given the type it revealed in earlier periods. They present an example in which both the firm and the regulator prefer a fairness agreement to a policy feasible without commitment. Along similar lines, Schmalensee (1989) shows that best linear regimes depend importantly on the level and form of uncertainty, the regulatory objective function, and the firm profitability constraint. Under uncertainty, regimes in which price depends in part on actual cost generally substantially outperform pure price caps, particularly in terms of consumer surplus. An additional problem of price caps is that they require additional controls on service quality, since otherwise the firm has an incentive to reduce costs by underinvesting in quality. Burns et al. (1998) suggest that sliding scale regulation, under which the regulator sets some base level of prices and profits and requires that profits only depart from that level if prices also adjust, may offer an improvement over pure price caps or rate of return regulation. All these problems with incentive regulation reveal a basic trade-off: while incentive schemes deliver a good cost performance, they are also likely to leave substantial profits (or losses) to the firms' owners.<sup>15</sup> As Laffont and Tirole (2000, p. 41) put it: "There is no magic cure. Those who support or just accept the use of high-powered incentive schemes should be ready to refrain from forcing contract renegotiation when they

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<sup>14</sup>The higher *beta* values of British regulated companies as opposed to their American counterparts may be related to this. Other issues, such as the differences in the political systems (in the U.K. the political majority has more discretion in changing policies) or the different history and tradition of each regulatory system, may also affect the risk differential.

<sup>15</sup>The credibility problems of the price cap were illustrated by the March 1995 breach of the price cap contracts with the U.K. regional electricity companies. Professor Steve Littlechild himself, the designer of the RPI-X system who had become the electricity regulator, had to yield to intense political pressure and reduce the caps substantially ahead of the planned review because the companies were making large profits.

observe large profits.”<sup>16</sup>

A separate but also very important issue regarding price caps is that when applied to a basket of products they give operators more freedom to set their rates in accordance with standard business practices, for example allowing them to price discriminate. This flexibility on the relative price structure leads to Ramsey-oriented prices if the weights of each product on the price constraint are properly chosen. In particular, the weights must equal the future realized quantities. The gains in efficiency depend on whether the unavoidable errors in weight-setting are compensated by the gains derived from the better demand knowledge by the firm. Political constraints also often set limits to the speed of the price rebalancing that can be achieved through such mechanism.

The choice of the power of incentive schemes is not directly addressed in this thesis. However, the political conflict for the rents derived from regulation and the political difficulties to obtain efficient Ramsey pricing, two issues that are closely linked to the debate about price caps, are present in Chapter 2. This conflict is shown in action in Chapter 4 for the case of Spain and Chile, and it is related to the market for corporate control.

### 1.2.3 Liberalization

Privatization and liberalization have taken place approximately at the same time in many countries. Therefore, it is difficult to separate the effects of competition and private ownership. There are three relevant dimensions related to regulated industries: product market competition, competition in the factor markets and competition for the market.<sup>17</sup>

#### •Competition will replace regulation.

There is a consensus that product market competition should be introduced wherever possible in network industries.<sup>18</sup> The goal, as promoted for example by the British regulatory office

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<sup>16</sup>This trade-off is also analyzed from a political economy point of view in Laffont (1996). Levine (1999) shows that delegation to an industry regulator whose preferences are more pro-industry than those of the government can mitigate underinvestment but at the cost of higher rent accruing to the firm.

<sup>17</sup>Competition for the market (auctions, competitive bidding) is not addressed here (see Laffont and Tirole, 1993). In the case of monopolistic large utilities, the firm that serves the market is usually taken as given, and the choice of provider is not really an issue. If entry takes place, the incumbent has to compete with other firms, but that is different from auctioning the service.

<sup>18</sup>For example, Newbery (2000) convincingly argues that a nationalized industry and a regulated monopolistic industry at a mature stage are very similar, and the only way to introduce significant changes is through restructuring and competition.



in telecommunications, OFTEL, is to substitute competition for regulation as time goes by. The empirical literature supports the notion that competition has positive effects not only in allocative efficiency (provided that good competition policy is enforced) but also on productive efficiency (see Nickell, 1996). On the theoretical front, however, arguments can be found that support both a Hicksian view (the main cost of monopolies derives from the quiet life of the monopolist) and the Schumpeterian view (firms innovate more if they anticipate the possibility of obtaining monopolistic rents).<sup>19</sup>

Many theories analyze the effects of product market competition on investment. Three interpretations of "effort" or "investment" should be taken into account: static managerial effort; dynamic innovation or R&D; adjustment of the structure to achieve a good fit with the competitive environment. It is possible that competition does not have the same effect on each of these interpretations. Moreover, the degree of competition is not, in the long run, independent of company behaviour. Thus, for example, successful companies in a competitive environment may eventually gain a position of market power. Although deregulation removes a crucial institutional barrier to entry, there are other very important sources of barriers to entry, such as: 1) absolute cost advantages through economies of scale or scope; 2) strategic advantages through product differentiation and informational asymmetries; 3) first mover advantages as a result of sunk costs, and 4) exclusionary behaviour by the incumbent, for example predatory pricing.

Hence, although creating a sound competitive starting point may be a good policy, competition policy and some aspects of regulation need to remain strong to avoid subsequent abuses of market power.<sup>20</sup> The coexistence of competition policy issues and regulatory problems is most clear in the access pricing problem (see Chapter 2) and policies towards network interconnection.

•Vertical separation.

The idea that competition should be introduced wherever possible is sometimes accompanied by the notion that this is best facilitated by breaking up previously vertically integrated industries prior to privatization (this was the policy followed by the U.K. on the eve of electricity

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<sup>19</sup>Armstrong and Vickers (1996) apply the different arguments to the case of telecommunications.

<sup>20</sup>Some authors (see for example Laffont and Tirole, 2000, p. 279) argue that this may justify the coexistence of specialized regulatory agencies and antitrust authorities.

privatization in 1989). Technological change makes unbundling vertical segments feasible, but the degree of disaggregation is limited by practical considerations of information asymmetries, transaction costs and market power (in the newly separated segments).<sup>21</sup> However, although regulatory reform has been in many cases associated to unbundling, there is not much formal work on the costs and benefits of vertical separation. The benefits of vertical integration are associated to scope economies and a reduction of risk, as the company takes on a more diverse portfolio of income streams. The costs are the potential for foreclosure and the likely reduction in the quantity and quality of information available to the regulator. It has been suggested that the development of contracts between operators may realize some of the benefits while minimizing the costs, although the development of these contracts is limited.

Armstrong et al. (1994) emphasize the benefits of vertical separation as the best way to avoid foreclosure and facilitate regulation of monopolistic segments. However, Sidak and Spulber (1997) emphasize the positive aspects of allowing incumbents to compete in the various segments, as this leads to scale and scope economies. Joskow (1996) argues that the vertical unbundling of the electricity industry is only beneficial if efficient institutions of contracting are set up to keep the benefits of coordination and risk hedging.

In their empirical analysis of the relationship between the regulatory framework and privatization revenues, Bortolotti et al. (1999) find a statistically significant positive correlation between revenues from privatization and vertical divestiture. They present this as implying that sensible regulation prior to privatization enhances the credibility of the regulatory environment and hence decreases regulatory risk. However, they make several mistakes in splitting the countries between those that require vertical unbundling and those that do not.<sup>22</sup>

Both views (vertical integration or separation) are actually grounded on a pessimistic view of conduct regulation (price fixing) as opposed to structural regulation (the outcome is mostly determined by industry structure). They are both vulnerable to the argument that industry structure is a dynamic issue. Current regulation seems however ill-equipped to deal with trends such as convergence, globalization, innovation, consolidation and the proliferation of operators.

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<sup>21</sup>See Yarrow (2000).

<sup>22</sup>In particular, they assert (Bortolotti et al., 1999, p. 101) that the vertical divestiture requirements in Spain and Chile are not dissimilar from those of the English model (where the industry was broken up prior to privatization in 1990). In fact, although there are some requirements for separate accounting, both the Spanish and Chilean systems show high degrees of vertical integration, as will be shown in Chapter 4 of this thesis.

In many cases, industrial structure is a consequence of the governments' privatization policy more than the companies' organic growth, which creates incentives for takeovers in these sectors. The market for corporate control has indeed shown that mergers and acquisitions may become an important trigger of structural changes beyond those required by policy-makers.<sup>23</sup>

Chapter 2 below analyzes the issue of access pricing in a context where the incumbent company is vertically integrated. Chapter 4 analyzes the vertical integration of electricity in Chile and relates it to the market for corporate control.

•**Takeover mechanism.**

The proponents of privatizations through public offers argue that the stock market will deliver productive efficiency through the disciplining role of the market for corporate control. This raises two important issues: first, whether the mechanism *per se* can achieve its claimed efficiency-enhancing properties in the utilities' sectors. And second, whether most countries have the necessary institutions to support a well developed market for corporate control. The second issue is tackled in Chapter 4 of this thesis, in the context of Chilean and Spanish electricity privatizations. Here I focus on the first.

In the late eighties and early nineties, the takeover mechanism was deemed a rare tool for the control of managers in regulated industries. Laffont and Tirole (1993, ch. 17) pointed out that the occurrence of takeover bids in the utilities sector was much lower than in other sectors. McLaughlin and Mehran (1995) analyze the issue of takeovers in the utilities' sector using US data (the only data available prior to the privatization wave in other western countries in the 80s and 90s) and report that regulation significantly constrained takeover activity. In the US, of the twenty-one hostile offers for utilities between 1960 and 1990, only one was successful. However, deregulation has triggered restructuring and since the mid nineties, and especially after the *golden share* on the British Regional Electricity Companies expired in 1995, several takeovers of privatized utilities have modified the previous rather stable landscape.

Hence, it becomes now very relevant to assess whether the takeover mechanism can be an efficient instrument to achieve managerial efficiency and to deliver efficient industry structures.

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<sup>23</sup>Some authors are rather pessimistic about the effects of consolidation in regulated sectors. For example, Dieter Helm (*The Utilities Journal*, October 1999) argues that "the great monopolies of the early decades of the XXI century are being created across the utility markets, at precisely the time when information technology should be breaking down the old economies of scale. The choice is increasingly stark: whether to ensure that competition can be allowed to thrive, or whether to allow market power to reassert its control."

Jensen (1993) supports the traditional view of takeovers as a device to discipline managers and achieve productive efficiency. Along these lines, the market for corporate control can improve the matching of the structure of the firm with its environment. This view has received several general criticisms. Shleifer and Summers (1988) point out that hostile takeovers breach the implicit contracts developed by the target's managerial team, thus creating a hold-up problem that prevents the achievement of these *ex-ante* efficient contracts. Agency problems in the bidding firm may drive acquisitions that destroy value (see Weston et al., 1998). For the particular case of utilities, Mayer (1996) argues that takeovers make the role of regulators more difficult by creating firms operating both in regulated and unregulated markets, thus making accounting and stock price information for regulatory purposes less useful.

Mergers and acquisitions should be welcome if they help to cut costs. But part of their motivation may be to recover some of the market power lost with the ending of official monopolies. They may also be the reflection of agency problems in bidding firms.<sup>24</sup> These issues are studied at length in Chapter 4, illustrated with the takeover of the Chilean holding Enersis by Endesa, the largest Spanish electricity firm.

### 1.3 Contributions of this Thesis: a Summary

The common goal of the subsequent chapters is to explore some of the issues that the standard prescriptions have somehow left aside. I analyze the consequences of a politicized regulatory framework, the optimality of partially concentrated shareholdings in utilities and the properties of the takeover mechanism in regulated sectors. I take as given the importance of the private sector and privatization as important forces in the evolution of these sectors. This reflects my conjecture that there are certainly more benefits than costs to privatizing most utilities in the long run, and the fact that most countries, although with more difficulties than the standard prescriptions would predict, are actually progressing towards a larger role for private ownership. However, in my view societies will not get the benefits of competition and technological change unless some of the difficulties overlooked by the standard prescriptions are addressed. Priva-

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<sup>24</sup>The takeover of privatized firms under price cap regulation (such as British Regional Electricity Companies) by firms under rate of return regulation (such as some American companies) or under state control (such as Electricité de France, which took over London Electricity in 1998) illustrate the importance of this discussion.

tizing and regulating privatized firms in the wrong way may cause long-lasting damage in the market culture of reforming countries. Identifying the weaknesses of the standard prescriptions and addressing them may avoid a swing of the pendulum towards policies that do not capture the benefits of technological change.

The rest of this section summarizes each of the following chapters and presents their results.

Chapter 2 shows the consequences of assuming that depoliticization of utilities regulation is not a feasible prospect. It has two purposes: to analyze the suitability for regulation of a type of model (the common agency theory of lobbying) that had not been explicitly used in the past in this field, and to make predictions on a controversial issue, the access pricing problem, based on game-theoretical political economy. The model presented captures the influence of organized interests and facilitates the analysis of multidimensional issues. The weights of the regulator's objective function are derived as the politico-economic equilibrium of an electoral competition model. In this model, the regulated firms act as lobbies that support the political parties in their efforts to win the elections. The influence of lobbies is proportional to the impact of campaign contributions on electoral outcomes. Applying this framework to a specific case, in a politico-economic equilibrium the access charge for the use of a network monopolized by a vertically integrated incumbent is below the optimal access charge, for a fixed level of final prices. The analysis formalizes the concerns expressed by the literature on regulatory takings (see Sidak and Spulber, 1997). When final prices are chosen simultaneously and subject to similar political pressures, though, these final prices are higher than optimal and may compensate for the decrease in access prices. The solution is equal to the social optimum only under very especial conditions. Producers of intermediate goods such as network access are more vulnerable politically, because the representatives of the consumer's services producers bid vigorously against access prices, whereas opposition to protection on consumer's services is less intense. The endogenous inertia in the use of inefficient instruments is the source of significant political dilemmas in the introduction of liberalization: allowing entry but charging too low access charges may lead to underinvestment and heavy-handed regulation.

Chapter 3 addresses some aspects of the standard prescription that utilities should be privatized through public offers in order to have widespread ownership. A three stage model is presented. First the government chooses the degree of shareholder concentration of a firm that

is privatized, and which will produce a good in a regulated sector. It does so to maximize a weighted sum of privatization proceeds and political objectives (modelled as the expected vote). Second, a manager undertakes a quality improving effort and shareholders exert a level of monitoring to make sure that the manager behaves in their interests. Third, a regulator fixes the price of the product. Dispersed ownership, in some cases, is efficient to encourage managerial initiative. If managerial investment is valuable for shareholders because it increases the regulated price in equilibrium, then dispersion may be a good commitment device to avoid excessive monitoring by blockholders in the firm: by allowing the manager to enjoy some private benefits, she has an incentive to undertake a higher effort level. There is a trade-off between initiative and control: the manager must enjoy some rents, but at the same time direct her efforts to obtain positive profits for the shareholders. The extent to which the commitment not to interfere too much through dispersed ownership is valuable depends on exogenous parameters that are related to the state of deregulation. A tough regulatory climate and an increasing level of firm-specific uncertainty are shown to increase the level of optimal ownership concentration. Political objectives may yield higher (through collusion between managers and politicians) or lower (through collusion between politicians and blockholders) dispersion than the benchmark case where the government maximizes shareholder proceeds. The degree of leniency in the regulatory climate is an important determinant of the political equilibrium. For example, a regulatory climate that is more favourable to producers encourages a lower discrepancy between the level of dispersion when politicians collude with managers and the benchmark where the government maximizes shareholder proceeds. The model presented formalizes and makes more precise the idea that regulation constrains agency relationships inside the firm. This idea has been exploited by the empirical literature, for example in Demsetz and Lehn (1985). It is also shown that governments may find it politically costly to sell an optimal stake to a private blockholder, and partial public ownership may remain the typical form of concentrated ownership.

Chapter 4 focuses on the role of takeovers of privatized utilities as a tool to achieve productive efficiency. A clinical study presents the effects on shareholder value of the Endesa-Enersis control contest. It is an example of the free cash flow theory applied to takeovers. The protracted acquisition of the Chilean electricity holding Enersis (the largest privatized electricity

firm in Chile) by the Spanish firm Endesa (the largest electricity firm in Spain, also privatized) is a unique takeover involving two privatized utilities from two different countries. It presents an excellent opportunity to analyze: first, the privatization and regulation of utilities in Chile and Spain; and second, how privatization and regulation affect the market for corporate control. Agency problems in the bidding firm, as well as target strategies, are related to privatization methods and regulatory regimes. It is shown that in this case the takeover reflects significant agency problems in the bidding firm (Endesa) and that regulation and politicization shape the behavior of the agents involved. The effect of the takeover on shareholder value is quantified and shown to be negative and statistically significant. The last stages of the protracted control contest are an illustration of the existence of competing ideas concerning the future strategies of large privatized utilities. The choice of competing managerial teams that shareholders faced was a choice between a strategy based on a vertically integrated utility and a firm specialized in a broad range of consumer's services. To the extent that takeovers of utilities have become much more frequent with deregulation, the insights on the specific features of the takeover mechanism in the network industries may be of more general interest than the particular case analyzed.

## Chapter 2

# Regulating Utilities With Political Constraints

### 2.1 Introduction

A significant part of what the state at any level does has to do with its role as the owner or regulator of firms in the network industries. Even after utilities are privatized, the government still has the power to make a number of key decisions. The goal of this chapter is to develop a model of policy determination for utility regulation to explore some aspects of the modern regulatory game. The model presented will also shed light on the dilemmas that governments face when they try to liberalize some segments of the network industries.

Several authors, like Hutton (1996) and Yergin and Stanislaw (1997), have pointed out that it is not clear that the pro-market and pro-private sector reforms of the 80s and 90s can be politically sustainable. The current controversies have more to do with regulation than with privatization. *The Economist* (April, 18th., 1998) in commenting on the latter of these books, says:

”rather than arguing about the merits of privatizing state-owned enterprises, political parties are more likely to disagree about exactly how, once privatized, the enterprises should be regulated”.

However, if the hold-up problem of investments in the presence of sunk costs is not solved



by regulation, as the theory of vertical integration suggests, one solution in a sub-game perfect equilibrium is public ownership and control of utilities.

To analyze these issues, I apply to regulation the "common agency" framework of policy determination developed by Grossman and Helpman. This model is shown to do no worse than more traditional voting models in several aspects, and to actually improve upon them by capturing some additional realistic aspects of regulation (interest groups, multidimensionality) without sacrificing on simplicity. In the model, the organized interest groups (in this study, the regulated firms) contribute to the political parties to influence their policies. These contributions should not necessarily be interpreted literally.<sup>1</sup> They are meant to encompass legal contributions; illegal bribes; investing in biased media empires; publicity in party media; "fictitious jobs"; the "revolving doors" phenomenon; or appointing or accepting from pre-private ownership times a sub-optimal manager that owes his/her position to political reasons (the firm is then contributing to an "employment" or "insurance" policy that may be convenient to political parties). It is easy to find examples from specific firms and countries for each of these.<sup>2</sup> All of them imply direct revenues foregone in order to promote the objectives of politicians or political "machines."

In the model presented below, firms support political parties in their effort to win elections, in exchange for policy favours. As a result of the *quid pro quo* relationship between lobbies and parties, the chapter shows: 1) that policies are closer to the interests of the firms the less informed the voters are about regulatory policies, and 2) that incumbent firms that own networks in regulated sectors may not be compensated for their sunk investments and other elements of the "access deficit", such as universal service and other social obligations. The efficient price for recovering this deficit may not hold in a politico-economic equilibrium. This is because incumbents face the additional opposition of entrants in pricing access, which they

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<sup>1</sup>See *The Economist*, 31 July 1999, pp. 31-32, on political parties' finances. Also in *The Economist*, 14 August 1999, p. 32: "28 of Britain's 100 biggest public companies have donated either their Chairman or their Chief Executive as a part-time adviser to the government, in one capacity or another."

<sup>2</sup>Privatization does not seem to have eliminated collusion with politicians. Bortolotti et al. (1999, p.76): "The overall analysis of barriers to effective ownership transfer illustrates the profound political, social and economic difficulty of the state's withdrawal from production. Our analysis even underestimates the real dimensions of statalism, because it does not manage to capture all the more subtle forms of political interference in privatized companies, such as direct or indirect *moral suasion*, the often hidden influence in the appointment of managers, the incestuous relationships between political class and business class."

do not face in final product prices. In this context, phenomena such as the "Tragedy of the Telecommons" (deregulatory takings resulting in network underinvestment) suggested by Sidak and Spulber (1997), as an undesirable but possible outcome, deserves consideration, since it may emerge as a politico-economic equilibrium. Grout (1996) has a similar flavour in that it shows how inefficient access pricing may lead to underinvestment in networks or inefficient bypass. These authors refer to the suboptimal investment in network elements when the users do not internalize the cost of the inputs due to inefficient regulation of access. In this case, a paradoxical solution after privatization and deregulation (allowing entry but not solving the access pricing problem) may be the renationalization of the network. The section presented below on the political economy of the access pricing problem shows under which conditions such predictions may come true.

The structure of the chapter is as follows. Section 2.2 relates it to the existing literature. The drawbacks of the Median Voter theorem as applied to regulation lead me to develop a model with interest groups, which is presented in Section 2.3. Section 2.4 applies this "common agency" framework to the problem of pricing access to a network that is monopolized by a vertically integrated incumbent which faces entry in a downstream market. Section 2.5 presents some extensions. It first analyzes the effects for private investment of anticipating the regulatory policies modelled in the previous sections. It then shows how politicians increase their bargaining power with entry. And finally it presents arguments as to why more efficient instruments are not used so that a lighter burden is placed on access charges. The conclusion summarizes the main arguments and mentions caveats and limitations to the use of the "common agency" framework to regulation and other micro policies.

## **2.2 Regulation and the Literature on Political Economy**

The Chicago School and Virginia School authors made the first attempts to formally model the interaction between politics and economics in regulation, as in other fields of economics.<sup>3</sup> Since then, a substantial body of literature has emerged which has enriched these preliminary efforts with more solid micro-foundations. The general background for this more modern Political

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<sup>3</sup>See Laffont and Tirole (1993) and Persson and Tabellini (1998 and 1999) for references and comments about these schools.

Economy literature can be found in Dixit (1996a) and in the surveys of Persson and Tabellini (1998 and 1999). In the field of Regulation, Laffont and Tirole (1993) develop normative models in which benevolent founding fathers design regulatory constitutions anticipating opportunism or capture at the regulatory stage. Many other possibilities derived from applying positive models of policy implementation remain largely unexplored. In this respect, the literature on Regulation lags behind those in Macroeconomics, Public Economics and Trade Policy.

Some authors have applied the Median Voter theorem to regulatory problems using different approaches.<sup>4</sup> The median voter (the one whose most preferred policy will be chosen in equilibrium, according to this theorem) will likely have a very small number of shares or maybe none at all, and will be mainly worried about consumer surplus. In a static framework, the interests of producers will possibly not be taken into consideration by the policy-makers. However, such an equilibrium is inconsistent with the evidence of many microeconomic policies caring about producers' interests, like protectionist policies, transitional periods, quotas, policy towards declining regions, etc.

In addition to this, the Median Voter theorem assumes perfect information both on the side of policy-makers and voters, and uni-dimensionality of policies. This runs counter to a huge literature both in political economy and in regulation that places information asymmetries at the core of the theory. Moreover, many regulatory policies are multidimensional in nature.

The assumptions of office-oriented (as opposed to policy-oriented) politicians, perfect information and the absence of interest groups are behind the result that both political parties converge presenting the platform that is most valued by the median voter. If both political parties converge, then in a median voter model shocks in the preferences of the median voter are the only source of political risk. However, the cases of countries that have privatized suggest that the main sources of political risk come from the fact that different political parties with different policies can alternate in office and that different social groups have an important weight in policy determination (in a spatial model of politics, two assumptions at least are needed to obtain "partisan" or divergent policies: parties are policy-oriented and they have

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<sup>4</sup>Baron (1988) applies it to the problem of a legislature that has to choose the weight of profits in the objective function of an imperfectly informed regulatory agency. Faulhaber (1997a and 1997b) analyzes the determination of cross-subsidies between different products. Beard and Thomson (1996) study the decision concerning two-part tariffs. Laffont (1996) and Schmidt (1997) also use a similar majority voting approach.

incomplete information about voters' preferences<sup>5</sup>).

Moreover, the Median Voter theorem is probably not the best tool to analyze the role of political parties. If activists anticipate the equilibrium result (convergence), they will probably not be willing to undertake costly actions to create a political party.<sup>6</sup>

However, other branches of the politico-economic literature provide us with a myriad of modeling possibilities that analyze policies where interest groups and political parties play a crucial role (see part II of Persson and Tabellini, 1999). The more recent literature presents a better understanding of the interaction between interest groups and voting behaviour. The following section develops an application to regulation along these lines.

I build on a framework developed by Grossman and Helpman<sup>7</sup> to study the political determinants of a regulatory decision about pricing policy. These authors use a "common agency" framework, based on Bernheim and Whinston (1986), where several principals try to influence the behaviour of an agent.<sup>8</sup> The objective is to show that realistic weights in a regulator's objective function can be derived from a politico-economic equilibrium. This theory, first developed for trade policy, and subsequently applied to other issues in positive public economics (see Persson and Tabellini, 1999) was motivated as a response to the lack of micro-foundations of the Chicago School positive theory of regulation. Interest groups, voters and parties are integrated in a simple model that can handle multidimensional issues without further complication.

The Grossman and Helpman model provides micro-foundations to a political support objective function, relating the weights of the different interest groups to structural variables. Initially they made these weights contingent on the proportion of voters organized in special interest groups and on the weight assigned by the government to social welfare (Grossman and Helpman, 1994). They next endogenized the weight assigned to social welfare as the equilibrium result of a probabilistic voting model with two political parties, where the importance of social welfare basically depends on the ratio of voters that are informed about policies (Grossman and

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<sup>5</sup>See Alesina and Rosenthal (1994).

<sup>6</sup>For the role of activists in the formation of political parties, see Aldrich (1994).

<sup>7</sup>See Grossman and Helpman (1994, 1995a, 1995b, 1996a, 1996b), Dixit (1996b) and Dixit et al. (1997). For comments about these papers, see Rodrik (1995), Faulhaber (1997b), Besley and Coate (1997) and Persson and Tabellini (1999).

<sup>8</sup>Bernheim and Whinston (1985 and 1990) apply this framework to the study of collusion between product firms that use the same marketing agency. Spiller (1990) also applies a multi-principal framework to regulation, but in his model the agent is a regulatory agency and the principals are "the Congress" and "the Industry."

Helpman, 1996a).

## 2.3 Electoral Competition, Lobbying and Regulation

The purpose of this section is to show that realistic weights in a regulator's objective function can be derived from a politico-economic equilibrium. I develop parsimoniously the micro-political foundations for the case where there is only one interest group (the regulated incumbent firm). In the next section I further develop the economic side, and generalize the model to the presence of two interest groups.

The regulatory institution is the simplest possible, i.e. it consists of a political body resulting from an electoral process (government or legislative) that must make a decision about the price of a regulated and vertically integrated monopolist. There are two parties in this society, called  $L$  and  $R$ . The political parties have fixed positions on some issues, for exogenous historical and ideological reasons. On other issues, they may adopt those positions that maximize their probability of winning the elections. I will assume that the regulatory policy about prices belongs to these "pliable" policies. I will also assume that firms do not have *ex-ante* preferences about who they want to win the elections, i.e., they are not positioned in the political spectrum.

The assumption that some of the voters are uninformed is made to motivate the reason why parties accept support from the lobbies. The following assumptions specify the agents' behaviour.

### 2.3.1 The Incumbent

The incumbent regulated company is initially the only organized interest group or lobby in this economy. It may spend resources with the aim of capturing the will of the public decision-makers, although it does not have a prior preference for any of the parties. Let  $\Pi(p)$  denote the *ex-post* profits that the firm derives from price policy  $p$ .

The firm may support political party  $L$  with  $S^L$  and may support political party  $R$  with  $S^R$ , where  $S^j$ ,  $j = L, R$  can be interpreted as any costly action that the firm may undertake to support the electoral campaign of a political party, e.g., monetary contributions, but also generous coverage in the media owned by the company, etc. The firm is risk neutral and

maximizes expected profits net of political contributions. The objective function is given below, at the end of Subsection 2.3.3.

## 2.3.2 The Voters

### Informed Voters

These are the agents who know and understand the parties' positions on regulatory policy. Although how individuals get their information is unmodelled here, different extended models could be used to explain how voters obtain information. Besley and Coate (2000) show that if regulators are directly elected, then voters have more information about regulatory issues than if regulators are appointed and then the regulatory issues are bundled with other policy platform issues.<sup>9</sup> Strömberg (1999) presents a model where the groups that get information do so via the activities of profit maximizing media firms. Finally, the control market can also be behind the salience of regulatory issues at a point in time.

These informed voters are a proportion  $\theta$  of the population. Let  $\alpha^i$ , unknown to the parties, describe the *ex-ante* bias of an informed individual for party  $R$  before the electoral campaign and before the policy announcement. In other words,  $\alpha^i$  reflects the informed voters' preferences for the immutable characteristics and program of the parties. Informed individuals derive utility

$$U^i(p^j) = W(p^j) + \delta(j) \alpha^i, \text{ for } j = L, R \quad (2.1)$$

where  $\delta(L) = 0$  and  $\delta(R) = 1$ . Let  $p^*$  denote the price that maximizes the welfare of informed voters.

The parties cannot observe the *ex ante* proclivities of any particular voter, although they presume these to be drawn from a known distribution  $F(\alpha)$ . In particular, the party bias is distributed according to a uniform distribution in the interval  $[-\frac{1}{2} - f, \frac{1}{2} - f]$ , where  $f$  reflects an *a priori* advantage for party  $L$ .

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<sup>9</sup>More generally, how policy issues become salient in the electoral process is one of the most important determinants of political equilibria. See Riker (1982, 1986).

Any one of these informed voters votes for party  $L$  or  $R$  taking into account the difference in the utility she derives from  $p^L$  and  $p^R$  and taking into account her *a priori* preferences for one of the parties. An informed voter prefers party  $L$  if  $W(p^L) - W(p^R) > \alpha^i$ . This defines the critical value  $\tilde{\alpha}$  as:

$$\tilde{\alpha} = W(p^L) - W(p^R)$$

Then all informed voters with values of  $\alpha^i$  less than  $\tilde{\alpha}$  will vote for party  $L$ , and all the rest for party  $R$ . Thus the distribution function of  $\alpha$  can be used as an explicit functional form for the proportion of voters that prefer party  $L$ .

In particular, from the parties' point of view there is a probability

$$F [W(p^L) - W(p^R)]$$

that the informed individual  $i$  will vote for party  $L$ . Then

$$F [W(p^L) - W(p^R)] = \int_{-\frac{1}{2}-f}^{W(p^L)-W(p^R)} 1 di = \frac{1}{2} + f + [W(p^L) - W(p^R)]$$

Thus the expected proportion of the electorate that is informed and that votes for party  $L$  is  $\theta [f + \frac{1}{2} + W(p^L) - W(p^R)]$ .

### Uninformed Voters

These constitute a proportion  $(1 - \theta)$  of the population. They do not know about the policy platforms of any of the parties. Let  $\alpha^{un}$ , unknown to the parties, describe the *ex-ante* preferences of an uninformed voter for party  $R$  before the electoral campaign. These individuals decide their votes according to the impression that they get from the intensity or quality of the electoral campaigns. In this sense, the electoral campaigns are not informative. The intensity/quality  $h^L$  of party  $L$ 's campaign depends on the firm's support to this party in the following form:  $h^L(S^L) = S^L$ . Similarly for party  $R$ . A typical uninformed voter derives utility

$$U^{un}(h^j) = u^{un}(h^j) + \delta(j) \alpha^{un} \text{ for } j = L, R \quad (2.2)$$

where  $\delta(L) = 0$  and  $\delta(R) = 1$ . Like the informed voters, they vote for party  $L$  if  $u^{un}(h^L) -$

$u^{un}(h^R) > \alpha^{un}$ . Assuming  $\alpha^{un}$  has the same distribution as  $\alpha^i$ :

$$F[u^{un}(h^L) - u^{un}(h^R)] = \frac{1}{2} + f + (S^L - S^R).$$

Then the expected proportion of the voters that are uninformed and that vote for party  $L$  depends on the difference in the parties campaigns, which is determined by the difference in the support that the firm gives to the two parties. This proportion is  $(1 - \theta) [\frac{1}{2} + f + (S^L - S^R)]$ .

### 2.3.3 The Parties and the Government

The Parliament is elected with proportional representation. Each party seeks to maximize its vote share, or equivalently its representation in the parliament, which with the maintained assumptions for party  $L$  is

$$v^L = f + \frac{1}{2} + \theta [W(p^L) - W(p^R)] + (1 - \theta) (S^L - S^R) \quad (2.3)$$

and for party  $R$  is  $1 - v^L = v^R$ , given the nature of the two-party system.<sup>10</sup>

One consequence of the linearity assumptions embedded in the voters' behaviour is that the objective function for each party becomes additively separable in the variables describing its own policy platform and the support it gets from the firm and those of its rival. With separability, each party can make its decisions about what support to accept and what platforms to adopt independently of its knowledge or beliefs about the incentives facing the other.

The firm anticipates that the legislature adopts the regulatory policy  $p^L$  with probability  $\vartheta(v^L)$  and the regulatory policy  $p^R$  with probability  $1 - \vartheta(v^L)$ . I make the following assumptions about  $\vartheta(v^L)$ :

- 1)  $\vartheta' > 0$
- 2)  $\vartheta(\frac{1}{2}) = \frac{1}{2}$
- 3)  $\vartheta'' > 0$  and  $\vartheta(v^L) \rightarrow 0$  for all  $v^L < \frac{1}{2}$

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<sup>10</sup>Readers may still feel uncomfortable with the idea of exogenously uninformed voters. However, the objective function of the party is also equal to (2.3) if there are only informed citizens whose decision to vote for one or the other party depends to some extent on the electoral campaign (for example, if the campaign has an influence on the party bias). See Persson and Tabellini (1999, p.81).



4)  $\vartheta'' < 0$  and  $\vartheta(v^L) \rightarrow 1$  for all  $v^L > \frac{1}{2}$ .<sup>11</sup>

As a result of this, the *ex-ante* objective function of the firm becomes

$$\Xi = \vartheta(v^L)\Pi(p^L) + [1 - \vartheta(v^L)]\Pi(p^R) - S^L - S^R \quad (2.4)$$

### 2.3.4 Timing and Equilibrium Concept

In the **first stage**, the firm decides on the support that it will give to each of the parties: it offers a contract  $(S^j, p^j)$  to each of the political parties. In the **second stage**, the parties decide whether to accept the offer, or refuse it and adopt  $p^*$ , the policy that maximizes the welfare of the informed voters. Finally, the elections take place, and policy and supports are implemented according to the **subgame perfect equilibrium** of these two stages.

### 2.3.5 Equilibrium

Given the two-stage nature of the game, the equilibrium will be calculated by backward induction. Proposition 1 is derived from the solution of the second stage. The result of this is that the firm must face a participation constraint in the first stage. Proposition 2 deals with the solution of the first stage taking into account this constraint. I focus on interior solutions, assuming that  $S^j = 0$  is never optimal for the firm.

**Proposition 1** *The solution of the firm's problem must satisfy*

$$S^j \geq \frac{\theta}{1-\theta} [W(p^*) - W(p^j)] \quad j = L, R \quad (2.5)$$

**Proof.** Given the linearity and separability assumptions, the decisions of each party are independent of those of the other party. So in a Nash Equilibrium between parties at the second stage of the game each party takes its decision independently of the decision of the other party.

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<sup>11</sup> $\vartheta$  introduces some noise in the implementation process of the policy platform. It could alternatively be assumed that  $\vartheta = 1$  if  $v^L > v^R$ , without any noise. The qualitative results would not change, as shown in an appendix of Grossman and Helpman (1996a).

Party  $L$  always has the option of refusing the lobby's offer. In this case, it would support  $p^*$ , the optimal price for informed voters, since it would not have any resources to appeal to uninformed voters. From (2.3), if the party rejects the offer and endorses  $p^*$ , it will capture the following number of seats:

$$v^* = f + \frac{1}{2} + \theta [W(p^*) - W(p^R)] + (1 - \theta)(0 - S^R).$$

It follows that if the firm wants to affect the policy outcome it needs to offer a contribution that induces a policy change and provides the policymaker with at least  $v^*$ , i.e.,  $S^L$  must be such that  $v^L \geq v^*$ . This implies:

$$(1 - \theta)S^L \geq (f + \frac{1}{2} + \theta [W(p^*) - W(p^R)] - S^R(1 - \theta))$$

$-(f + \frac{1}{2} + \theta [W(p^L) - W(p^R)] - S^R(1 - \theta))$ , from which (2.5) is derived. Similarly for party  $R$ . ■

The firm would have a motivation to give more than what is needed to satisfy constraint (2.5) in order to boost the chances of one of the parties to win, if the expected marginal benefit (as derived from (2.4) using (2.3)) from the first dollar of "extra" contribution was higher than the marginal cost. It is assumed that this is not the case, e.g., if  $L$  is the more popular party ( $f > 0$ ) then  $\vartheta'(v^L)(1 - \theta) [\Pi(p^L) - \Pi(p^R)] < 1$  (since the marginal benefit of the extra contribution to the less popular party is lower than the marginal benefit of the extra contribution to the more popular party, if the condition holds for the latter, then it must hold for the former too).

**Proposition 2** *The equilibrium policy platforms satisfy*

$$p^j = \arg \max_p \left[ \vartheta^j \Pi(p) + \frac{\theta}{1 - \theta} W(p) \right], \quad j = L, R \quad (2.6)$$

where  $\vartheta^L = \vartheta(f + \frac{1}{2})$  and  $\vartheta^R = 1 - \vartheta(f + \frac{1}{2})$ .

**Proof.** By substituting the participation constraint (2.5) with equality into (2.3), party  $L$  captures a fraction  $\frac{1}{2} + f$  of the seats while party  $R$  captures  $\frac{1}{2} - f$ , no matter what  $p^L$  and  $p^R$  happen to be. Substituting (2.5) with equality into (2.4), the firm's expected utility is

$$\begin{aligned} \Xi &= \vartheta(v^L) \Pi(p^L) + [1 - \vartheta(v^L)] \Pi(p^R) \\ &\quad - \frac{\theta}{1 - \theta} [W(p^*) - W(p^L)] - \frac{\theta}{1 - \theta} [W(p^*) - W(p^R)] \end{aligned}$$

from which I obtain the  $p^L$  and  $p^R$  specified in Proposition 2. ■

From proposition 2, the decision about pricing policy will maximize a weighted sum of the firm's profit and social welfare, and hence may differ from what would be chosen by a fully benevolent regulator. It shows the determinants of the weights given to producer and consumer surplus. Although in most applications it is probably not necessary to specify them, it is useful to bear in mind that these determinants have to do with the characteristics of the distribution of the party bias (represented by parameter  $f$ ) and with the extent to which voters are responsive to electoral campaigns (represented by parameter  $\theta$ ).

### 2.3.6 Regulating Prices

I present here an application based on a classical regulation model. The firm produces a quantity  $q$  of an homogeneous good or service (for instance, domestic electricity) at cost  $C = k + cq$ , where  $k$  is a fixed cost and  $c$  is the marginal cost. The inverse demand function is  $p = \psi(q)$ . Assume that the quantity produced by the firm causes gross consumer surplus  $\xi(q)$  and that there is a constitutional break-even constraint that prevents the regulated firm from having losses. By  $G$  I index the solution obtained in the political context described in the two previous propositions. I also assume that the welfare of informed voters coincides with social welfare<sup>12</sup>. In addition, I index by  $M$  and  $B$  respectively the solutions obtained by an unregulated monopolist and by a fully benevolent regulator that maximizes social welfare. I assume that the regulator has perfect information about the firm.

**Proposition 3** *The equilibrium solution obtained by a politically constrained government is such that*

$$\left[ \frac{p^G - c}{p^G} \right] = \frac{1}{\eta} \frac{\vartheta(f + 1/2) + \varrho}{(\theta/(1 - \theta)) + \vartheta(f + 1/2) + \varrho} \quad (2.7)$$

where  $\varrho$  is the Lagrangean multiplier associated to the firm's participation constraint ( $\varrho = 0$  if the constraint is not binding) and

$$\eta \equiv - (dq/dp) / (q/p).$$

<sup>12</sup>Following Mueller (1989), this is the case if the distribution of informed voters is representative of the overall population. This would not be the case if, as in Strömberg (1999), the activities of profit maximizing media firms produced a biased distribution of information. Then policies in equilibrium would favour those groups that are most valuable for these firms.

**Proof.** A parliament constrained by the political framework described in the propositions 1 and 2 would choose  $q$  to maximize

$$\vartheta \left( f + \frac{1}{2} \right) [\psi(q)q - cq - k] + \frac{\theta}{1-\theta} W$$

subject to  $\psi(q)q - cq - k \geq 0$ ,

where  $W = \xi(q) - cq - k$ .

The corresponding Lagrangean is:

$$\mathcal{L}(q, \lambda) = \vartheta \left( f + \frac{1}{2} \right) [\psi(q)q - cq - k] + \frac{\theta}{1-\theta} (\xi(q) - cq - k) + \lambda(\psi(q)q - cq - k)$$

And the solution is obtained from

$$\frac{\partial \mathcal{L}(q, \lambda)}{\partial q} = 0$$

using the fact that  $\xi'(q) = \psi(q)$ . ■

It is useful to compare the politically constrained solution with the monopolist's solution and the benevolent regulator's solution.

An unregulated monopolist would choose  $q$  to maximize  $\{\psi(q)q - (cq + k)\}$ , and the optimal solution implies

$$\left[ \frac{p^M - c}{p^M} \right] = \frac{1}{\eta} \quad (2.8)$$

A fully benevolent regulator would choose  $q$  to maximize

$$W = \{\xi(q) - [cq + k]\} \quad (2.9)$$

subject to  $\Pi(q) \geq 0$ .

and the solution implies

$$\left[ \frac{p^B - c}{p^B} \right] = \frac{\varrho}{1 + \varrho \eta} \quad (2.10)$$

The political equilibrium coincides with monopoly pricing when  $\frac{\theta}{1-\theta} = 0$ , i.e. when nobody is informed. The margin between price and marginal cost decreases as the proportion of informed voters increases. Since consumers will be more informed about price policies because they affect them more directly, price policies will in general be closer to the consumers' interests than structure policies. For example, policies related to the vertical or horizontal integration of the firms involved (less well understood and affecting consumers more indirectly), will in general be closer to profit-maximizing policies than price policies.

However, bear in mind that the problem analyzed is static and that the fixed costs are given. If a previous stage were introduced in the model, where the firm had to make an investment decision, then in the absence of full regulatory commitment, the social optimum would not be achieved with all the voters being informed (see Section 2.5).

The role of regulatory agencies may be relevant even if they do not have many decision powers, because they can contribute to information and transparency, and at the same time can improve the commitment possibilities of decision making. Even if the last decision is taken by politicians, they will face voters that are informed thanks to the role of the specialized agency, which will constrain the degree to which these voters are sensitive to the firm's pressure.

The model presented so far implicitly assumes that the firm has a negligible number of owners in terms of the proportion of voters/consumers (this assumption is dropped in the next section). If the members of the interest group form a non-negligible part of the population (which in the case of a regulated firm being the only lobby means dispersed shareholding), they also internalize in their lobbying activity the cost of higher prices in terms of consumer surplus.

## 2.4 Two Interest Groups: Entry and the Politics of Access

This section extends the previous model to the case of two interest groups and a policy vector with two arguments, and applies it to the access pricing problem. This is one of the most controversial issues<sup>13</sup> in regulation. It deals with the price that a competitor in a downstream market should be charged by the owner of a bottleneck input (for instance, access to a network), when this owner also participates in the downstream market. It is a key issue for the

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<sup>13</sup>For example, Laffont and Tirole (2000, p.99) write: "the high stakes attached to the interconnection policy in most countries generate intense lobbying by incumbents and entrants as well as political intervention."

liberalization of network industries.

This problem is faced, for example, by those countries (such as the UK, Spain, France, Germany, Italy, etc.) that keep a former telecoms monopolist as a vertically integrated firm. This firm's local loop has to be used by itself and by competitors to provide long-distance calls, advanced telecommunications services, etc. Other examples are the use of the transmission network in electricity or the use of gas pipelines.

The Efficient Component Pricing Rule (ECPR) has arisen in this context as a proposal to create a level playing field between incumbents and entrants.<sup>14</sup> This proposal consists of setting the price with the following formula:

$$\begin{aligned} \text{optimal access charge} &= \text{direct cost of providing access} \\ &+ \text{opportunity cost of providing access} \end{aligned}$$

This proposal is appealing because it guarantees that only efficient competitors will enter the downstream market, and because the vertically integrated firm has no incentives to prevent entry. However, the ECPR is optimal only under a very restrictive set of circumstances (see Laffont and Tirole, 1996). It has also generated political opposition, the determinants of which have not been analyzed by the literature.<sup>15</sup>

The reason for the proponents including the opportunity cost is that the final prices charged by the incumbent's output are used to pay for fixed costs and universal service obligations or stranded costs that the incumbent has to afford as a result of the regulatory contract that, implicitly or explicitly, the incumbent and the regulator agreed upon in the past.<sup>16</sup> Each time an entrant captures part of the final product demand, the incumbent loses an opportunity to

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<sup>14</sup>See Sidak and Spulber (1997). In particular (p.1), they consider "the selection of access prices such that, in the new competitive environment, a public utility will have an opportunity to achieve for its investors the expected earnings associated with the former regulatory regime under which the utility made (and regulators approved as prudent) enormous investments in long-lived facilities and other specialized assets to serve its costumers."

<sup>15</sup>For an informal assessment of the political difficulties of the ECPR in telecommunications in the UK, see Armstrong and Doyle (1995).

<sup>16</sup>Whether the deficit can be eradicated by using high, distortion-free line rental charges is an empirical question. Such rental charges face constraints derived from the elasticity of demand, the public good features of connection and also political constraints on the choice of instruments. See Laffont and Tirole (2000, p. 15) and Section 2.5 below.

cover its universal service obligations or its stranded costs. Hence the need to charge for the opportunity cost of letting competitors use the network. The risk is that if these opportunity costs are not taken into account properly, inefficient investment levels will follow, and the physical infrastructure will be inadequate to capture the benefits of the information society, the liberalization of electricity, services based on new technology, etc.<sup>17</sup>

The basic model of the previous section can provide useful tools to analyze this problem because, as opposed to other political economy models such as Median Voter applications, it is suitable to the analysis of multidimensional issues. This is important for the access pricing problem, as will be shown below, since it is better to analyze it in the context of a package of regulatory decisions (the choice of final and access prices). Also, the access pricing problem typically involves the participation of several interest groups, most notably the incumbent and the entrant. Hence, the political economy of the access pricing problem has independent interest as an application and an extension of the "common agency" framework, insofar as it involves the participation of at least two interest groups with opposed interests in at least some arguments of the policy vector. The model presented in Section 2.3 had one interest group and one policy dimension. Here, I generalize it to analyze a regulatory problem that involves two interest groups and two policy dimensions. I also introduce as variables the proportion of the population represented by each interest group. The next Subsection introduces the necessary additional structure on the economic side of the model.

#### 2.4.1 The Economics of Access

The economic side follows the normative model of Armstrong et al. (1996, Section 2). The supply of a vital input, called access, is assumed to be monopolized by the incumbent firm, denoted  $I$ . Let  $C(q, z)$  be the cost incurred by  $I$  when it supplies  $q$  units of final product to consumers and  $z$  units of access to the entrant,  $E$ .  $C_1$  is  $I$ 's marginal cost of providing the final product to consumers and  $C_2$  is  $I$ 's (direct) marginal cost of providing access to  $E$ . The entrant requires one unit of access from  $I$  for each unit of final product it supplies itself. Suppose that if  $E$  has  $\sigma$  units of access it incurs an additional cost of  $c(\sigma)$  to supply  $\sigma$  units of final product, with  $c(0) = 0$  (no fixed costs). Uniform access pricing is assumed, and the "access charge" per

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<sup>17</sup>See Grout (1996, p. 128).

unit for this input is denoted by  $a$ . The entrant is assumed to take the incumbent's prices as given.

The incumbent's price for the final product is  $P$ , and the firm must supply all residual consumer demand at this price and all of the entrant's demand for access. If the access charge is  $a$ , in order to supply quantity  $\sigma$  for final output the entrant will incur a total cost  $a\sigma + c(\sigma)$ . Since the entrant is a price-taker, its maximum possible profit given the available margin  $m = P - a$  is

$$\pi(m) \equiv \max_{\sigma \geq 0} m\sigma - c(\sigma).$$

If  $\sigma(m)$  is the profit-maximizing supply of final product by the entrant then  $\pi'(m) = \sigma(m)$ . Conditions in the industry are such that  $\sigma(m) < X(P)$ , where  $X(P)$  is the consumer demand function for the final product, for all reasonable choices of prices. Consumer surplus is  $\nu(P)$ , where  $\nu'(P) \equiv -X(P)$ . The incumbent's profit with the final price  $P$  and margin  $m = P - a$  is

$$\Pi(p, m) \equiv PX(P) - m\sigma(m) - C(X(P) - \sigma(m), \sigma(m)).$$

#### 2.4.2 Regulation with Two Interest Groups

The political side extends Section 2.3 to the case of two lobbies. There are two organized interest groups, the owners of the incumbent firm, and the owners of the entrant. Each of them are a proportion  $\alpha_l$  of the total population, where  $l = I, E$ . The welfare of each lobby is  $W_l$ . Each citizen has shares in one of the two firms at most. If  $\alpha_l = 0$  because of concentrated ownership, then the lobby does not take into consideration consumer surplus.<sup>18</sup>

As in Section 2.3, the government/regulator maximizes a weighted sum of lobbies contributions and social welfare (I maintain the assumption that informed voters are a representative sample of the whole population), and the lobbies choose contribution schedules to maximize their own welfare  $W_l$  net of the money spent on contributions. Now the support that the two lobbies give to the political parties must satisfy the following constraint (the argument being

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<sup>18</sup>When the consumer surplus is not taken into account in the lobbies' objective function, it may be because of concentrated ownership, or because voters who own shares are myopic with respect to their investment interests and to their control of the firm.



analogous to the proof of Proposition 1):

$$S_l^j \geq \underset{P,a}{Max} \left[ \frac{\theta}{1-\theta} W(P,a) + S_{-l}^j(P,a) \right] - \left[ \frac{\theta}{1-\theta} W(P_l^j, a_l^j) + S_{-l}^j(P_l^j, a_l^j) \right] \quad (2.11)$$

for  $j = L, R$  and  $l = I, E$ , where  $S_{-l}^j$  is the contribution made by the other lobby to party  $j$ .

It is assumed that these constraints are satisfied with equality. Using the analogues of (2.3) and (2.4), the condition for this in case that  $f > 0$  is that  $\vartheta'(v^L)(1-\theta) [W_l(P^L, a^L) - W_l(P^R, a^R)] < 1$ .

The constraints (2.11) mean that the lobbies must compensate each party for what they forego when they choose the equilibrium policy instead of the policy they would choose in case they reject the support offered by lobby  $j$ . The argument is exactly the same as for Proposition 1 of Section 2.3, with the only difference that now each lobby has to take into account the offers of the other lobby.

Let  $v^0$  denote the anticipated vote share for party  $L$ . The following lemma will simplify the computation of access and final prices in the politico-economic equilibrium.

**Lemma 4** *Each party's equilibrium platform  $(P^j, a^j)$  satisfies the necessary conditions for maximizing a weighted sum of the aggregate welfare of all interest group members and the average welfare of informed voters, i.e.:*

$$\vartheta^j \Sigma_l \nabla W_l(P^j, a^j) + \frac{\theta}{1-\theta} \nabla W(P^j, a^j) = 0 \quad (2.12)$$

for  $j = L, R$ , where  $\vartheta^L = \vartheta(v^0)$  and  $\vartheta^R = 1 - \vartheta(v^0)$ .

**Proof.** The lobby  $l$  chooses  $(P_l^L, a_l^L)$ ,  $(P_l^R, a_l^R)$ ,  $S_l^L$ ,  $S_l^R$  to maximize

$$\Xi_l = \vartheta(v^L) W_l(P_l^L, a_l^L) + [1 - \vartheta(v^L)] W_l(P_l^R, a_l^R) - S_l^L - S_l^R \quad (2.13)$$

subject to the constraints that

$$S_l^j = \text{Max}_{P,a} \left[ \frac{\theta}{1-\theta} W(P,a) + S_{-l}^j(P,a) \right] - \left[ \frac{\theta}{1-\theta} W(P_l^j, a_l^j) + S_{-l}^j(P_l^j, a_l^j) \right] \quad (2.14)$$

for  $j = L, R$  and  $l = I, E$ , where  $S_{-l}^j$  is the contribution made by the other lobby to party  $j$ .

Let  $(P_{-l}^j, a_{-l}^j)$  denote the policy vector that maximizes  $\frac{\theta}{1-\theta} W(P,a) + S_{-l}^j(P,a)$ , i.e., the best that party  $j$  could do if it were to ignore the offer from lobby  $l$ .

When lobby  $l$  gives the minimally acceptable support, it anticipates that party  $L$  will capture the following fraction (which is a constant from the lobby's point of view)

$$\bar{v}_l = \frac{1}{2} + f + \theta [W(P_{-l}^L, a_{-l}^L) - W(P_{-l}^R, a_{-l}^R)] + (1 - \theta) [S_{-l}^L(P_{-l}^L, a_{-l}^L) - S_{-l}^R(P_{-l}^R, a_{-l}^R)]$$

of the seats.

Substituting (2.14) into (2.13) and using the first order conditions, the platforms that maximize the group's expected welfare satisfy

$$\vartheta^j \nabla W_l(P_l^j, a_l^j) + \frac{\theta}{1-\theta} \nabla W(P_l^j, a_l^j) + \nabla S_{-l}^j(P_l^j, a_l^j) = 0 \quad (2.15)$$

for  $j = L, R$ , where  $\vartheta^L = \vartheta(\bar{v}_l)$  and  $\vartheta^R = 1 - \vartheta(\bar{v}_l)$ .

The political parties set their platforms to maximize their share of the vote (which is the same expression as in (2.3), but just replacing  $(p^j)$  by  $(P^j, a^j)$ , and  $S^j$  by  $\Sigma_l S_l^j$ ). The first order conditions for this maximization imply

$$\theta \nabla W(P^j, a^j) + (1 - \theta) \nabla S^j(P^j, a^j) = 0 \quad (2.16)$$

for  $j = L, R$ , where  $S^j(P^j, a^j) = \Sigma_l S_l^j(P_l^j, a_l^j)$ .

In the equilibrium, the platforms anticipated by each lobby must be the same as those actually announced by the parties; i.e.

$$(P_l^j, a_l^j) = (P^j, a^j), \text{ for } l = I, E \text{ and } j = L, R.$$

For the case of party  $L$  the first order condition (2.16) implies:

$$\theta \nabla W(P^L, a^L) = -(1 - \theta) \nabla S_I^L(P^L, a^L) - (1 - \theta) \nabla S_{-I}^L(P^L, a^L)$$

This can be combined with the first order conditions (2.15) of the interest groups:

$$\vartheta^L \nabla W_l(P_l^L, a_l^L) - \nabla S_I^L(P^L, a^L) - \nabla S_{-I}^L(P^L, a^L) + \nabla S_{-I}^L(P^L, a^L) = 0$$

Hence, in equilibrium,

$$\vartheta^L \nabla W_l(P_l^L, a_l^L) = \nabla S_I^L(P^L, a^L)$$

and similarly for party  $R$ .

In a subgame perfect equilibrium, both lobbies must anticipate the same election outcome. So  $\bar{v}_l = v^0$  for  $l = I, E$ .

Hence, the conditions that the equilibrium platforms must satisfy are the ones stated in the Lemma. ■

It is crucial for the Lemma that support schedules must be locally truthful, i.e.  $\vartheta^L \nabla W_l(P_l^L, a_l^L) = \nabla S_I^L(P^L, a^L)$ . This means that the lobbies propose support functions that offer the parties an amount of marginal support for a change in policy that is equal to the marginal change in the lobby's welfare experienced by the same marginal change in policy. An equilibrium in truthful strategies<sup>19</sup> was proved by Bernheim and Whinston (1986) to be jointly Pareto optimal for the principals (the lobbies) and the agent (the government) involved.

Note that the result of the Lemma is not changed if a constraint is introduced in the government's problem, as long as  $\nabla W(P^j, a^j)$  is replaced by the derivatives of the corresponding Lagrangean.

The weight that decision makers attach to social welfare relative to the lobbies' support increases with the proportion of voters that are informed about policies, or (equivalently), with the extent to which they are unmotivated by electoral campaigns.

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<sup>19</sup>See Grossman and Helpman (1994) and Dixit et al. (1997) for discussions of the restriction to truthful strategies in common agency games, and the implications of generalizing to globally truthful strategies.

### 2.4.3 Regulation of Access in the Politico-Economic Equilibrium

We solve the problem for one of the political parties (the other party's solution is equivalent, with the only difference that the probability of implementing its preferred policy is the complementary one). To simplify the notation, I use  $\gamma = \frac{\theta}{1-\theta}$  in what follows. I focus on the optimal platform chosen by party  $L$ , and hence use  $\vartheta^L = \vartheta$ . According to the lemma, final prices and access prices chosen in equilibrium must satisfy the necessary conditions for the following maximization:

$$\underset{P,a}{Max} \vartheta W_I(P,a) + \vartheta W_E(P,a) + \gamma W(P,a) \quad (2.17)$$

subject to the constitutional constraint that the incumbent has to break even.

**Proposition 5** *In the politico-economic equilibrium, the output price and the access price are chosen according to the following modified Ramsey rules:*

$$\frac{P^G - C_1}{P^G} = \frac{1}{\eta_X} \left[ \frac{\vartheta [1 - \Sigma \alpha_i] + \varrho}{\vartheta + \gamma + \varrho} \right]$$

where  $\eta_X = -(P/X)dX/dP > 0$  is the elasticity of demand, and

$$\frac{m^G - (C_1 - C_2)}{m^G} = -\frac{1}{\eta_S} \frac{\varrho}{\vartheta + \gamma + \varrho}$$

where  $\eta_S = (m/s)(dS/dm)$  is the elasticity of the entrant's supply, and  $\varrho$  is the Lagrangean multiplier associated with the participation constraint.

**Proof.** The relevant welfare levels are as follows:

$$W_I(P, m) = \Pi(P, m) + \alpha_I \nu(P)$$

is the welfare of the owners of the incumbent firm;

$$W_E(P, m) = \pi(m) + \alpha_E \nu(P)$$

is the welfare of the owners of the entrant; and

$$W(P, m) = \nu(P) + \pi(m) + \Pi(P, m)$$

is social welfare.

From the Lemma, the equilibrium results from finding the necessary conditions for the solution of the following maximization problem:

$$\underset{P, a}{Max} [\Pi(P, m)(\vartheta + \gamma) + \pi(m)(\vartheta + \gamma) + \nu(P)(\vartheta\alpha_I + \vartheta\alpha_E + \gamma)]$$

subject to

$$\Pi(P, m) \geq 0$$

■

Solving for the access price,

$$a^G = P^G - m^G = P^G - \frac{\eta_S(\vartheta + \gamma + \varrho)}{\eta_S(\vartheta + \gamma + \varrho) + \varrho}(C_1 - C_2)$$

It is useful to compare the solution in the Proposition with the result obtained by a benevolent regulator (see Armstrong et al., 1996):

$$\frac{P^B - C_1}{P^B} = \frac{\varrho}{1 + \varrho\eta_X}$$

$$\frac{m^B - [C_1 - C_2]}{m^B} = \frac{-\varrho}{1 + \varrho\eta'_S}$$

Since  $m^B = P^B - a^B$ ,

$$a^B = P^B - \frac{\eta_S(1 + \varrho)}{\varrho + (1 + \varrho)\eta_S}(C_1 - C_2) \tag{2.18}$$

where  $\varrho > 0$ .

The ECPR holds if the constraint is not binding, otherwise it has to be corrected by a Ramsey term.

Recall that  $\vartheta(v^L) \rightarrow 1$  for all  $v^L > \frac{1}{2}$ . Then, it can be seen that the expected access price will be equal or below the optimal one for a fixed level of final prices. Then excess demand and overconsumption of the network will follow, and negative externalities should be expected from too high levels of network usage. However, expected final prices can also be higher than the optimal ones. For a fixed level of final prices, the politically constrained access price will be lower than the optimal one if  $\gamma > 0$ . In other words, it suffices that a minimal proportion of the electorate is informed for the access prices to be lower than optimal. This is because the pressure of both lobbies cancel each other out, but the balance is resolved by the informed voters, that are interested in a lower access price than the one that would result from the pressure of the incumbent.

The politically constrained expected prices are equivalent to the optimal only in the case that  $\gamma = 0$  and  $\Sigma\alpha_L = 1$ , i.e. when the weight attached to social welfare is zero and when the owners of both the incumbent and the entrant encompass the whole population (then the costly joint actions of both lobbies internalize social welfare). However, the welfare of the lobbies is lower in the political equilibrium, because they have to pay the political contributions to reach the same outcome policies than the optimum.

The result that the final price is above the optimal one and hence the incumbent can compensate with it for the lower access price depends on it being regulated and being subject to the same political procedure as the access price. However, there are two important reasons to believe that this is not the case:

A) If it were the case that  $P$  and  $a$  were chosen in different administrative decisions,<sup>20</sup> it can be conjectured that the weight attached by the government/regulator to social welfare in the choice of  $a$  would be lower than in the choice of  $P$ . Recall that the weight  $\gamma$  increases with the fraction of the voters that are informed about the policy being analyzed. Since access price is something not directly perceived by voters/consumers, the proportion of them that are informed about it is lower than the proportion informed about final prices. The latter are perceived much

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<sup>20</sup>Armstrong et al. (1996) probably have intuitively this distinction in mind when they mention that it is "of some practical importance to consider optimal access pricing assuming some fixed, and perhaps somewhat *ad hoc*, retail tariff which is imposed on the incumbent."

more directly by consumers/voters. In this context, a welfare improving constitutional decision would be to introduce global price-caps, by which the provision of access is incorporated in a basket of capped services. In this case, if the weights are appropriately chosen, the constrained profit maximizing choice of price structure by the firm implements Ramsey prices. Society would benefit from the superior knowledge of demand and technology by the firm, and this flexibility is highly valuable in changing industries such as telecommunications. Indeed, the choice of the cap level would also be vulnerable to politico-economic considerations, but the regulator's discretion would be much reduced. Whether policy makers are willing to give up such discretion is however an open question.

B) In reality, the objective of introducing entry is precisely to substitute competition for regulation, and hence the final price should decrease.<sup>21</sup> Since the incumbent monopolizes the network, however, the access price will typically still be regulated after entry. And that is the main policy dilemma with liberalization: with entry, access prices should substitute for final prices as a source of funding for social obligations; however, the political process for access prices is very different from the political process before entry (which only affected final prices), pushing them to a level that makes social obligations (such as cheap local calls, universal service, etc.) difficult to sustain. If politicians want to keep social obligations alive, and at the same time introduce competition, this will put the incumbent's finances under heavy difficulty. This is the logic behind Sidak and Spulber (1997).

There are three additional considerations to be made about the politico-economic equilibrium.

First, it is interesting to observe that the politico-economic equilibrium depends on the overall proportion of the population involved in the ownership of regulated companies (two companies in this case). Changing the proportions among the two firms does not change the equilibrium. The intuition for this is that what really matters is the proportion of the overall population that internalizes the consumer surplus through their lobbying actions.

Second, there is an important difference between the political economy outcome of final

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<sup>21</sup>As Laffont and Tirole (1996, p.230) argue, one of the reasons why the ECPR is no panacea is that "it is a partial rule as it does not specify how to determine the telephone operator's prices on the competitive segments (which form the basis for the computation of the access prices)." Additionally, they insist that "it makes limited sense to propose a general access pricing rule without consideration of the environment in which access is provided."

products and the political economy outcome of intermediate products (such as network access). On the one hand, with the two firms acting as interest groups, the best that the incumbent can achieve is the social welfare maximizing level of access price. Paradoxically, that is obtained precisely when the weight  $\gamma$  that the regulator attaches to social welfare is zero. But the competition between the two lobbies for policies of opposite sign cancels each other out. As  $\gamma$  increases,  $m$  increases and, consequently,  $a$  decreases. On the other hand, with the two firms acting as interest groups, the incumbent can do better than the social welfare maximizing level of final price,  $P$ . That is because the entrant, in its role as a lobby, is interested in a lower  $P$  only to the extent that the owners represent a fraction of consumers, but the entrant has much less interest in fighting for a lower  $P$  than it has for fighting for a lower  $a$ .

Third, the simultaneous choice of  $P$  and  $a$  shows that although politics and lobbying push for a lower access price, the incumbent can compensate that with a higher final price, in the same political environment. This supports the criticisms of Williamson (1996) to the proponents of the Efficient Component Pricing Rule, in the sense that this rule assumes a benevolent regulatory framework, but once capture in the setting of final prices is taken into consideration, the ECPR will be unlikely to emerge as an efficient policy.

The fact that it is a politico-economic equilibrium that may result in too low access prices may not be reflected in the rhetoric of the participants in regulatory procedures. Indeed, they may find more appealing to use arguments such as the defence of forward looking cost based prices, such as Total Long Run Incremental Costs (TLRIC). It must be clear, though, that cost based prices are not optimal, since they do not take into account the welfare distortions due to differences in elasticities. In addition to this, incremental costs fail to recover any of the incumbent network owner's shared costs or common costs. Because of this, it interferes with the incumbent's opportunity to earn a fair rate of return on its investment or even to recover its investment. Although any actual policy will arbitrate imperfectly between the objectives of static efficiency and dynamic investment incentives, a rhetoric of fair and non-discriminatory access prices as opposed to Ramsey prices (probably more difficult to understand for the general public) is probably a convenient way to hide the lobbying game.



## 2.5 Extensions

### 2.5.1 Private Ownership and Investment

The model presented in the previous sections may shed light on issues related to the role of private investment in regulated companies operating in network sectors. Some lines of future research that are related to this are suggested here.

Sidak and Spulber (1997, p.1) point out that failure to provide investment incentives due to breach of the "regulatory contract" may make private ownership of networks not sustainable: "As regulators dismantle barriers to entry and other regulatory restrictions, they must honor their past commitments and avoid actions that threaten to confiscate or destroy the property of utility investors on an unprecedented scale." Incumbent telecommunications operators, for example, would not build local infrastructure if they expected not to be able to enjoy some markups when reselling or exploiting the local loops themselves. The argument is similar to the one made by Levy and Spiller (1996), where they point out that unless regulation is credible enough to overcome the hold-up problem of investment, private utilities are not a Pareto improvement relative to public sector ones.<sup>22</sup>

If there is no entry, a certain proportion of uninformed voters may sustain the first-best level of investment in the absence of regulatory commitment. This insight builds on the idea (put forward among others by Laffont and Tirole, 1993, chapter 11, and Armstrong and Vickers, 1996) that some degree of capture may be necessary to alleviate underinvestment. To see this,<sup>23</sup> assume that there are two periods,  $t = 1, 2$ . Costs have a fixed component  $k$  and a variable component  $c$ , and  $\psi^{-1}(P_i)$  is the inverse demand function. Let  $\delta$  be a discount factor. The firm operates with exogenous profits in a first period and reaches an agreement with party  $L$  over a support schedule that tries to influence the decision this party has to make over the regulated prices in the second period. In this second period there are two stages. In the first stage the firm can make an investment  $i$  that reduces fixed costs in the second stage according to the function  $f(i)$ . Then investment is chosen to maximize

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<sup>22</sup>Waverman and Sirel (1997) show that European countries with public sector monopolies in telecommunications did not have acute investment problems on the eve of deregulation. The motive for privatization and liberalization had more to do with operating inefficiency, lack of innovation and pricing imbalances.

<sup>23</sup>This subsection is based on joint work with Paul Levine.

$$(P_1 - c)\psi^{-1}(P_1) - k - i - s^L + \delta\vartheta(v^L) [(P_2^L - c)\psi^{-1}(P_2^L) - k + f(i)]$$

the first order condition for this optimization can be written

$$1 = \delta\vartheta(v^L)f'(i)$$

The politically constrained solution for the final prices can be written as

$$L(q(i)) = \frac{P(i) - c}{P(i)} = \frac{1}{\eta_X} \left[ \frac{\vartheta[1 - \Sigma\alpha_l] + \varrho}{\vartheta + \gamma + \varrho} \right]$$

It follows that  $\varrho > 0$  and the firm's participation constraint binds ( $\Pi = 0$ ) iff

$$L(q^*(i)) \geq \frac{1}{\eta_X} \left[ \frac{\vartheta[1 - \Sigma\alpha_l]}{\vartheta + \gamma} \right] \quad (2.19)$$

where  $q^*(i) = \psi^{-1}(P^*(i))$  and  $P^*(i)$  is the solution to  $\Pi(P, i) = 0$ .

It can be now investigated what happens as the proportion of informed voters falls. If  $\theta = 1$ , the case of no uninformed voters, clearly the inequality holds, since  $L > 0$ . But as  $\theta$  decreases (and so does  $\gamma$ ), eventually the condition fails at some threshold value  $\theta = \hat{\theta}$  and by the Kuhn-Tucker conditions  $\varrho = 0$  and  $\Pi > 0$ . Then output is given by the first order condition of the politically constrained problem, with  $\varrho = 0$ , from which  $\Pi(q) > 0$  can be calculated. Then investment is given by  $1 = \delta\vartheta(v^L)f'(i)$  provided that  $i^L \leq \delta\vartheta(v^L)[\Pi_2(p^L(i), i) - \Pi_2(p^L(0), 0)]$ , a condition that guarantees that the local optimum is also a global optimum.

However, the same argument cannot be made if the final prices are fixed and the only policy decision concerns access prices. It has been shown that for a fixed level of final prices, as the proportion of informed voter decreases ( $\gamma$  decreases), access prices increase when the constraint is binding, i.e., when  $\Pi = 0$ . Hence, in this case the change in the degree of information of the electorate has no impact on profits and hence does not alter the incentives of the incumbent to invest. When the constraint is not binding, the access price is equivalent to the ECPR, independently of  $\gamma$ . And the ECPR has the property that it keeps the profits of the incumbent

constant. Hence a change in the degree of information among the electorate does not change the incentives to undertake sunk investments. This means that the idea that some regulatory capture alleviates the underinvestment problem (made for example in Laffont and Tirole, 1993, chapter 11, and Armstrong and Vickers, 1996) does not hold when the only instrument is the regulation of access.

Hence, other devices that may alleviate the underinvestment problem must be used, and become more relevant if access price is the main regulatory instrument, in case of lack of regulatory commitment. One such device is the appointment of an independent regulator. The fact that separate telecommunications regulatory agencies have been created in 80 countries in the last ten years coinciding with deregulation is consistent with this argument (see Financial Times, 14-3-2000).

### 2.5.2 Equilibrium Contributions, Gains from Trade and Choice of Instruments

There are two related additional differences between the political economy of final prices and that of access prices. First, in the former case, the lobby (the firm's owners) captures all the gains from its relationship with the government. In the second case, it is the government that captures all the gains from its relationship with the two lobbies (the incumbent's and the entrant's investors). Second, for this reason, it can be conjectured that both lobbies prefer the use of more inefficient instruments (which is not the case with only one interest group). Next I examine each of these issues in turn.

#### The gains from the relationship between firms and government

From the binding constraint about the support schedule, conclusions can be derived on which party will capture the gains from the relationship between firms and government. Let  $(P_{-l}^j, a_{-l}^j)$  denote the best that the party can do if it rejects the support from lobby  $l$ . Let  $(P^j, a^j)$  be the platform in the political equilibrium. And let  $(\hat{P}, \hat{a})$  be the socially optimal platform, i.e., the one that would be chosen by a benevolent and omniscient regulator. In equilibrium,

$$S_l^j(P^j, a^j) = \left[ \frac{\theta}{1-\theta} W(P_{-l}^j, a_{-l}^j) + S_{-l}^j(P_{-l}^j, a_{-l}^j) \right] - \left[ \frac{\theta}{1-\theta} W(P^j, a^j) + S_{-l}^j(P^j, a^j) \right]$$

It can be seen from this that in case there is only the incumbent as interest group (because there is no entry), then  $(P_{-l}^j, a_{-l}^j) = (\hat{P}, \hat{a})$ . That is because if the party rejects the offer from the incumbent, it can appeal only to the representative informed voters and hence it maximizes social welfare. Then,  $S_l^j(P^j, a^j) = \left[ \frac{\theta}{1-\theta} W(\hat{P}, \hat{a}) \right] - \left[ \frac{\theta}{1-\theta} W(P^j, a^j) \right]$ . The incumbent compensates the party for the political costs of deviating from the socially optimal policy, and these costs logically increase with the proportion of informed voters. Since the party remains with the same utility as with the socially optimal policy, all the gains from the relationship between the firm and the party (which leads them to deviate from the socially optimal policy) accrue to the firm.

However, if there is entry and the policy upon which the party makes a decision is access price, then  $(P^j, a^j) = (\hat{P}, \hat{a})$ , in the case that nobody is informed about regulatory policy. Then the two firms have to make positive contributions to achieve what they would achieve if both of them were to refrain from giving contributions. But the prisoner's dilemma between the two firms makes this difficult to sustain, although they would both clearly prefer *ex-ante* to cooperate and avoid lobbying.

#### **The choice of instruments**

The binding constraint on the support schedule can also be used to conjecture how the firms would prefer to impose the use of inefficient instruments on the regulator. If there is only one lobby because of lack of entry, the contribution to the party is larger, the larger the difference between the socially optimal outcome and the political outcome, i.e., the larger the deadweight loss. Hence the incumbent is interested in minimizing the deadweight loss, which is done with more efficient policies. However, once there is entry and the fight is for access prices, the contribution depends on what the rival lobby and the government can jointly achieve on their own. And the rival lobby and the government can jointly attain greater welfare in a policy regime that allows more efficient policies than in one that does not. It follows that the lobbies' contributions may be higher and their net welfare lower if the political regime allows for more efficient instruments.

In some cases, consumer and other groups may join the firms in a powerful coalition against more efficient instruments. Think of a society that is divided in several groups (e.g. different types of consumers, each of which faces a different telephone tariff), each of them characterized

by a different political characteristic, e.g. the distribution of swing voters. Then it can be shown (Persson and Tabellini, 1999, pp. 80-85) that equilibrium regulated prices are influenced by *both* the lobbying activity and the voters' attributes: organized groups, and groups with e.g. more swing voters, are overrepresented in the political process.<sup>24</sup>

Departing from the swing voter example, regulatory policies depend on the political characteristics of the groups affected by these policies, not on their economic characteristics or on considerations of economic efficiency.<sup>25</sup> This may contribute to explaining the dramatic differences between countries in relative prices across products and in absolute price levels (Grout, 1996, p. 121). Then, a change in policy instruments may imply a change in the relevant political characteristics of the individuals, and hence a change in the size and composition of groups (for example, an individual may be in one group when the instrument is income taxation and in another group when the instrument is universal service in local telephony).

Removing cross subsidies or dealing with the stranded costs problem by more efficient instruments may become politically costly because of a time inconsistency problem in the political process. Individuals will oppose changes of instruments that leave them in disadvantaged groups.

## 2.6 Conclusions

This chapter has presented a model for the analysis of regulatory policy based on the "common agency" framework. It is a contribution to the analysis of the forces playing the modern regulatory game. It builds on the politicized nature of regulation, where firms exchange support to political parties for policy favours. First, it has shown that regulatory decisions in equilibrium are biased in favour of groups that are organized, and that this is so to an extent that depends

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<sup>24</sup>The swing-voters case can be used to explain some aspects of the timing and design of privatization programs. For example, Saunders and Harris (1994), in an empirical study based on survey data about the determinants of voting in the UK election of 1992, find that a small number of swing voters that owned shares in the recently privatized water and electricity companies were crucial in the unexpected Conservative victory. This suggests that Tory privatization policy and the regulatory package that accompanied it may have been targeted at this important, although small, set of swing voters.

<sup>25</sup>For example, if political parties have a transaction cost advantage in delivering favours to some specific groups (because they have developed over time a skill that reduces the cost of caring for them), then these groups become a "core" of supporters that counterbalance the weight of the swing voters. This effect may be reinforced in countries with political systems based on patronage and may explain the difficulties of removing the advantages faced by certain groups of consumers, investors, managers or employers.

on the role that electoral campaigns play in an election's outcome. Second, it has shown that network access charges in a politico-economic equilibrium may be lower than optimal ones, but that final prices may be higher. The determinants of the degree of departure from optimal policies have to do with the proportion of the population that is organized in interest groups and with the weight that governments attach to social welfare.<sup>26</sup> If other instruments besides access prices are not used (and the chapter has provided endogenous reasons for why this may be the case), then deregulation may substantially change the political economy of utilities and former incumbents may be disadvantaged. This is especially true if the only segment that is regulated after liberalization is the access to the network. The outcome of the politico-economic game shows that the effects of liberalization on the funding and sustainability of social obligations cannot be neglected. With liberalization, it is not only the economics of regulated industries that changes, but also the politics.

However, the model still has some limitations. The firms' ownership structure is taken as given, whereas an important issue in modern economies is how it evolves over time. Relatedly, the number of organized lobbies is taken as given, whereas it would be interesting to endogenize it. I have mentioned as examples the role played by organized interests like incumbent and entrant firms. The role of other groups, such as rural, poor, industrial or commercial consumers, could be added to the analysis. However, most of these limitations are also shared by other politico-economic models, such as applications of the Median Voter theorem. These models have other problems that the "common agency" framework may improve upon, such as the attention to the role of special interests and the potential multidimensionality of policies. The chapter has confirmed the insight by Grossman and Helpman (1994, p. 849), that "producers of intermediates are more vulnerable politically, because the representatives of the final-goods producers bid vigorously against tariffs on intermediates, whereas opposition to protection on consumers goods is much less intense." This must be traded off against other characteristics of the usual producers of intermediate goods in regulated industries that make them powerful: former incumbent monopolists, public sector firms, recognized brands. The next chapter shows

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<sup>26</sup>The "common agency" model applied to trade policies has been empirically tested by Goldberg and Maggi (1997). They find that the pattern of protection in the U.S. in 1983 is consistent with the basic predictions of the model. The weight of welfare in the government's objective function is estimated to be between 50 and 88 times the weight of contributions. Their estimate of the fraction of the population represented in lobbies is above 90%.

that one of these remaining advantages is the persistence of partial public ownership. However, as time goes by, and incumbent advantages diminish after privatization and deregulation, the emphasis will probably shift to the effect stressed by this chapter.

In some industries, such as telecommunications, technological forces are strong enough so that competition delivers its promised benefits in the long run. In the short run, however, and especially in industries where technological change is less intense, political constraints are significant obstacles for regulatory reform. This chapter has just hinted at the main forces behind these political constraints. More work needs to be done to explore the consequences of varying the assumptions on the composition of social groups and lobbies, on market structure and on the choice of instruments.

## Chapter 3

# The Structure of Corporate Ownership in Privatized Utilities

### 3.1 Introduction

The purpose of this chapter is to study the concentration of ownership in a privatized, regulated utility. The discussion illustrates some aspects of the costs and benefits of different corporate systems. Privatized utilities are large firms with professional management: there is a separation between ownership and control. The agency costs<sup>1</sup> of this separation interact with the regulation of the product market. Although the empirical literature has already addressed this issue, this has not been explicitly the case in the theoretical literature.

In the model I present, a government privatizes a regulated firm and decides the proportion of the ownership that is allocated to a blockholder. The privatizing government has both political and economic objectives in mind. It anticipates that, in order for the firm to create value and thus increase privatization proceeds, the manager must enjoy some rents as an incentive, but at the same time direct her efforts to obtain positive profits for the shareholders. The exact terms of this trade-off between initiative and control depend on exogenous parameters that are

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<sup>1</sup>Privatization decisions determine to a large extent the agency relationships inside the firm. Puzzling differences in regimes can often be observed in privatization techniques across countries, inside countries and over time. For example, UK regional electricity companies were floated in the stock market, whereas some rail operating segments in the same country were sold to private firms. Mexico sold its telecommunications incumbent both to a hard core dominated by national investors and to the stock market, whereas Brazil sold different parts of the telephone system to a number of bidders in an international tender offer.



related to regulation or deregulation. Political objectives may yield more or less shareholder dispersion than the benchmark where the government maximizes shareholder proceeds. Such objectives are the reason for partial privatization in many countries. They are also behind the fact that collusion between managers and politicians emerges as an important cause of high dispersion. The regulatory climate is an important determinant of the political equilibrium in all these cases.

It may be argued that the way a company is privatized depends on the conditions of the financial markets of the country in which it operates.<sup>2</sup> But it can also be argued that the form of financial markets is shaped by the way large firms are privatized. Public offers in the form of share issue privatizations (SIPs) aim at involving small shareholders and tenders or asset sales aim at involving large shareholders, although many privatizations combine different techniques.<sup>3</sup> The patterns that can be observed in the real world are undoubtedly a combination of both of these effects, as shown in Megginson et al. (2000). I will focus here on the second one: how privatization shapes financial markets and control systems.

The empirical work on the interaction between regulation and the relationship between shareholders and managers shows that regulated firms have significantly different corporate governance than firms in other sectors. More information from the regulatory agency has the effect of subsidizing monitoring. This creates scope for more dispersed shareholding and/or causes less need for performance related compensation for managers.<sup>4</sup> According to Demsetz and Lehn (1985) whether a firm does or does not belong to a regulated industry is a significant determinant of its control structure.<sup>5</sup> In their empirical work based on American firms, they

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<sup>2</sup>However, there is a wide variability in the percentage change in the number of listed domestic firms across countries between 1981 and 1994 according to Jenkinson and Ljungqvist (1996, p.18). The changes range from an increase of almost 100% in Switzerland to a reduction in Spain, which makes it difficult to have an accurate picture of each country's "inherited" system.

<sup>3</sup>Different techniques can be used for the privatization of different tranches of the same company: British Petroleum used an offer for sale at a fixed price in the first tranche in 1979 and a tender in the second tranche in 1981. See Jenkinson and Ljungqvist (1996, p.144). Yeaple and Moskowitz (1995) also say that most methods of privatization are derivatives of either public or private offers.

<sup>4</sup>In particular, Joskow et al. (1993) write: "intervention in the compensation process by well-informed and influential outsiders may affect the contracts between shareholders and top executives." Geddes (1997) shows, using data from the American electricity industry, that a significant reason for managerial turnover in that sector is consumer's, and not necessarily shareholder's, disutility.

<sup>5</sup>Cabral and Riordan (1989) analyze the different implications of rate-of-return and price-cap regulation for cost reducing investment, although they do not address the agency problems inside the regulated firm. They conclude that investment in cost reduction is higher under an optimal price-cap regime. However, while expected cost is lower under price cap regulation, the same is not necessarily true for expected price, which makes the

show that regulated firms have more dispersed ownership structures than firms in other sectors. They also argue that a better "regulatory climate," i.e. an attitude by regulators favourable to producers, improves the control potential for blockholders and hence derives into more concentrated ownership structures. This second argument (which I challenge below), however, once empirically tested, is not robust to different specifications of the econometric model.<sup>6</sup>

The empirical work emphasizes the benefits of ownership concentration, whereas more recent theoretical work focuses as well on its costs, beyond those derived from inefficient risk allocation. One of these costs is that higher concentration reduces the room of manoeuvre for the manager and hence her initiative. Burkart et al. (1997) build on the difference between formal and real authority suggested by Aghion and Tirole (1997), to show that ownership dispersion may be a commitment device that encourages management to take initiatives.<sup>7</sup> The optimal ownership structure trades off this "initiative effect" with the "control effect" of making sure that managers select projects that produce positive cash flows for shareholders. The incidence of the initiative effect on regulated firms remains unexplored, but one may conjecture that as well as regulation determines the "control potential", it also determines the "initiative potential."

The literature on the implications of a diffuse ownership of equity goes back to Berle and Means (1933). The trade-offs of a dispersed ownership based on the stock market<sup>8</sup> and a large shareholders system have been well studied both from economic<sup>9</sup> and political perspectives.<sup>10</sup> I focus here on the trade-off between initiative and control and how privatization and regulation affect it. The model presented shows how deregulation may increase the optimal stake of the largest shareholder of a firm that is being privatized. It reflects some features of large firms in regulated sectors.<sup>11</sup>

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welfare effect ambiguous.

<sup>6</sup>More recent work by Kole and Lehn (1997) shows that deregulation in the airline industry has been accompanied by increased ownership concentration and a more active market for corporate control, and predicts that the same developments will take place in the telecommunications and electricity sectors as deregulation progresses.

<sup>7</sup>See also Rajan (1992), Myers (1998), Cremer (1995), Acemoglu (1994) and Böss and Harms (1995).

<sup>8</sup>Some authors have argued that, by making investor's "exit" easier (Jensen, 1993), such a system may lead to breaching of implicit contracts (both those internal to the firm and those between the firm and the regulators), potentially leading to underinvestment, and to political opposition from losing groups.

<sup>9</sup>Burkart et al. (1997) summarize the literature on the costs and benefits of shareholder concentration. See also Salas (1992), Holmstrom and Tirole (1993), Allen (1993), Shleifer and Vishny (1997), Dow and Gorton (1997), Maug (1998), Bolton and Von Thadden (1998) and Pagano et al. (1998)

<sup>10</sup>For politico-economic perspectives, see Roe (1994), Cantillo (1998), Viator (1994).

<sup>11</sup>Roemer (1997) and Faulhaber (1997b) also address the interaction between regulation and corporate governance, but without focusing on managerial incentives. Spiegel (1994) and Spiegel and Spulber (1994) analyze

In the setting presented below there are three stages. First, at privatization, the government decides the stake of the largest shareholder. It does so to constrain the future actions of the firm and the regulator,<sup>12</sup> anticipating their equilibrium behaviour. Following the recent empirical literature on privatization (see Jones et al., 1999), the government chooses the terms of the sale of public firms taking into account both political and economic ends.<sup>13</sup> In particular, governments trade off privatization proceeds with the achievement of various goals related to politicians' or their parties self-interest (modelled as the expected vote). For example, in the case of the privatization programme of the Thatcher government in the UK, Newbery (2000) argues:

"The fiscal constraints facing the new government were severe in the extreme -heavy deficits, a world recession, and manifesto commitments to increase spending on defense, pensions, the police, and not to cut spending in the NHS. At this point privatization emerged as an appealing solution from the fiscal as well as the ideological perspective."

Second, the largest shareholder and the firm's manager choose simultaneously a monitoring<sup>14</sup> and an effort level, respectively. The modelling of this stage is based on Burkart et al. (1997), although here managerial effort is an action that may improve the quality of the regulated product, whereas in their setting managerial effort is a search effort to find the real pay-offs of a sequence of possible projects. The optimal stake of the largest shareholder is rationalized here as a privatization decision, whilst in Burkart et al. (1997) it is unclear how the optimal stake of the largest shareholder is obtained. And, third, a regulator sets the price of the product or service provided by the firm. It does so taking into account the interests of investors and

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how the design of financial structure can reduce regulatory risk, following the empirical work of Taggart (1985). For the interaction between corporate finance and industrial organization, see Bolton and Scharfstein (1990) and Maksimovic (1995).

<sup>12</sup>The regulator may be the same government at a future point in time, an independent regulator, a future government in the same country with a different ideology, or a supranational authority. In the European Union, while the national governments decide on privatization, many regulatory issues depend on policies promoted by the European Commission. This is the case, for example, of liberalization policies in telecommunications and electricity.

<sup>13</sup>See Vickers (1993). Scarpa (1994) mentions as potential privatization objectives the development of the stock market and the promotion of popular capitalism. The literature is not conclusive, however, as to whether mass privatization can achieve neither of these objectives.

<sup>14</sup>There are certainly other mechanisms to discipline managers beyond monitoring, such as monetary incentives, takeovers, product market competition or the managerial labour market. See Nickell (1995). These other mechanisms are not explicitly addressed here.

consumers, in a proportion that depends on the regulatory climate.<sup>15</sup>

In the benchmark case where the government maximizes privatization proceeds, it is shown that the optimal level of concentration increases with parameters that may be associated with deregulation. When political objectives are added to the analysis, it is shown that ideological motivations, consumer surplus considerations and lobbying with managers induce levels of shareholder dispersion that are higher than in the benchmark case. Collusion with large shareholders, however, may yield higher concentration levels than in the benchmark. The leniency of the regulatory climate may still have a negative impact on the equilibrium stake of the blockholder, and has a negative impact on the difference between the political and the benchmark outcomes.

The remainder of the chapter is organized as follows. In Section 3.2 I present the model. Section 3.3 solves the subgame where regulators and the firm's agents interact. Section 3.4 presents a benchmark, where the government maximizes privatization proceeds. Section 3.5 adds political considerations to the analysis of the equilibrium, and derives implications related to the role of the consumer surplus in the median class and the role of manager's or blockholder's lobbying. Section 3.6 presents a simple extension of the model. It shows that partial privatization may be the result of a combination of the need to have a large shareholder and political considerations. The related empirical evidence is discussed in Section 3.7 and Section 3.8 concludes.

## 3.2 The Model

### 3.2.1 The Firm

#### Assumptions

A firm in the public sector is to be sold to private owners. This firm produces a good with inelastic unit demand. Let  $e \geq 0$  denote an effort level that is decided by the firm's manager, and  $p \geq 0$  denote the regulated price of the good produced by the firm. Consumers obtain the

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<sup>15</sup>The assumption that regulated prices are fixed after the firm has already chosen its actions reflects the fact that adjustments of regulated prices are typically made on a much more frequent basis than firm's strategic choices. This illustrates the lack of commitment as stressed in the introduction of this thesis.

following surplus:

$$CS(p, e) = U(e) - p \quad (3.1)$$

where  $U' > 0$ .

The effort is not verifiable.

The relevant profits at the regulatory stage (the *ex-post* profits) that the firm's shareholders may capture are:

$$\Pi(p) = p - c \quad (3.2)$$

where  $c$  are the operating costs.

It is assumed that  $U(e) \geq c$  for all  $e \geq 0$ .

### Comments

Both quality enhancing or cost reducing specific investment play an important role in the literature on regulation (see for example Laffont and Tirole, 1993, or Spiegel, 1994). Here  $e$  is an effort that is undertaken by the manager. The shareholders benefit from this effort with a probability that depends on their monitoring effort, and on exogenous factors, as it is shown below.

Since the specific effort is not verifiable, its optimal level cannot be enforced neither by the regulator nor by the shareholders. A particularly relevant example might be idiosyncratic skills, possibly embodied in human capital (see Scarpa, 1994, p. 361, footnote 10). The manager makes a costly effort to learn on new technologies that improve service quality. Another possible example is that managers spend time and resources to know about complementary markets that improve quality through scale or scope economies. Executives develop relationships in industries such as broadcasting or information technology, or in distant geographic markets, in order to analyze potential alliances or acquisitions.

### 3.2.2 Privatization

#### Assumptions

The government decides the terms of the privatization.<sup>16</sup> It captures a fraction  $(1 - z)$  of the surplus that private owners expect to extract from the firm. The expected benefits for all shareholders,  $V$ , are equal to the expected profits of the firm,  $E(\Pi(p))$ , minus the private costs of monitoring,  $\psi(a)$ ,  $\psi(a)' > 0$ , where  $a$  is the monitoring effort. The expected profits will depend on the parameters of the interaction between shareholders and managers, in a manner that will be specified below.

The exact measure of dispersion or concentration used here is the stake of the largest shareholder,  $\sigma$ ,  $0 \leq \sigma \leq 1$ .<sup>17</sup>

The firm once privatized has two types of shareholders. One large shareholder who holds a proportion  $\sigma$  of the firm's shares, and a continuum of infinitesimal shareholders who hold a proportion  $(1 - \sigma)$ . The expected value of investing in the firm for the large shareholder is  $V_L = \sigma E(\Pi(p)) - \psi(a)$ . And the expected value of investing in the firm for the small shareholders is  $V_s = (1 - \sigma)E(\Pi(p))$ . The value of the firm for the whole shareholders is denoted by:

$$V = V_L + V_s \quad (3.3)$$

The government chooses the stake of the largest shareholder to maximize a weighted sum of the expected vote for the party in government in the next elections and privatization proceeds. Let  $\Sigma(\cdot)$  denote the expected vote that the party in the government will obtain in the next election.

Formally, the government chooses  $\sigma$  to maximize

$$\eta \Sigma(\cdot) + (1 - z)V(\cdot)$$

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<sup>16</sup>Yeaple and Moskowitz (1995), Schmidt (1996), Boycko et al. (1996), Megginson and Netter (2000) and Shirley and Walsh (2000) present some of the main issues in privatization.

<sup>17</sup>Grout and Laisney (1987), Habib (1993) and Boss and Harms (1996) use the number of shareholders as a measure of ownership dispersion in different contexts. The empirical measures of ownership concentration used by Demsetz and Lehn (1985) are: 1) the percentage of a firm's outstanding common equity owned by the five largest shareholders; 2) the percentage of shares owned by the twenty largest shareholders, and 3) an approximation of a Herfindahl measure of ownership concentration.

The relationship between shareholder concentration, measured by the stake of the largest shareholder, and the expected vote, is modelled as follows.

There are two political parties. Assume that the privatizing government belongs to party  $R$  and the opposition belongs to party  $L$ . There are three classes of citizens: the rich, the median class, and the poor. The total number of citizens is  $N$  and the total number of citizens in the middle class is  $N^m$ . The rich always vote for party  $R$ , the poor always vote for party  $L$ , and there are the same number of citizens in the rich class and in the poor class. All the small shares are bought by the median class. There is no abstention, and hence the elections are decided by the median class. At privatization, the incumbent party takes the position of the other party as given.

Let  $\theta^m$  denote an ex-ante bias of a median class citizen for party  $L$ . This bias, which is *ex-ante* unknown to the parties, determines the voting behaviour of the median class citizens. This party bias is distributed according to a uniform distribution in the interval

$$\left[ -\frac{1}{2} - y(\sigma, C_l), \frac{1}{2} - y(\sigma, C_l) \right]$$

The function  $y(\sigma, C_l)$  reflects an a priori "ideological" advantage for party  $R$ , where  $\sigma$ , the stake of the largest shareholder in the privatization, gives a quantitative measure of shareholder concentration, and  $C_l$  is a contribution from a lobby that has a stake in the privatization policy (lobbying will be further developed below, in Section 3.5). It is assumed that  $\frac{\partial y}{\partial \sigma} < 0$  and  $\frac{\partial y}{\partial C_l} > 0$ .

The "direct" utility that a median class voter derives from the privatization policy of party  $R$  is:

$$W_R^m(\sigma) = \frac{N^m}{N} CS(\sigma) + (1 - \sigma)zV_s(\sigma)$$

Let  $W_L^m$  denote the "direct" utility that a median class voter derives from the privatization policy of party  $L$ , which is fixed when party  $R$  adopts its privatization platform.

The overall utility of a median class voter is defined as

$$U^m = k [W_R^m(\sigma) - W_L^m] + \delta(j)\theta^m, \delta(j) = 1 \text{ if } j = L \text{ and } \delta(j) = 0 \text{ if } j = R.,$$

where  $k$  is a parameter that measures the importance given to the policy issues relative to ideology.

Then a median class citizen  $i$  prefers party  $R$  if  $k[W_R^m(\sigma) - W_L^m] > \theta^m$ , i.e., if the difference in favour of party  $R$  in the utilities derived from the policy of interest is higher than the ideological bias. This defines a critical value  $\widetilde{\theta}^m$  as:

$$\widetilde{\theta}^m = k[W_R^m(\sigma) - W_L^m]$$

Then all median class citizens with values of  $\theta^m$  less than the critical value will vote for party  $R$ , and all the rest for party  $L$ .

Thus, from the parties point of view there is a probability  $F(k(W_R^m(\sigma) - W_L^m))$  that a median class citizen votes for party  $R$ , where  $F(\cdot)$  is the cumulative distribution function of  $\theta^m$ . Thus, the expected proportion of the median class that votes for party  $R$  is  $F(k(W_R^m(\sigma) - W_L^m)) = y(\sigma, C_l) + \frac{1}{2} + k(W_R^m(\sigma) - W_L^m)$ .<sup>18</sup>

Hence, the privatizing government chooses the optimal stake of the largest shareholder to maximize

$$\eta \left[ y(\sigma, C_l) + \frac{1}{2} + k(W_R^m(\sigma) - W_L^m) \right] + (1 - z)V(\sigma) \quad (3.4)$$

### Comments

The stake of the largest shareholder can be chosen directly for large stakes, if the privatization method is a tender offer or a direct sale. Or it can be determined by rationing or appropriately designing the institutional tranche in a public offer for smaller stakes. Burkart et al. (1997) set up the value maximizing ownership structure of a firm but do not model how society may reach this level. Introducing a privatization process as a first stage does just that. It is obviously important that the government or the investment bankers working on behalf of the government be able to identify the appropriate large shareholder.<sup>19</sup>

Monitoring has the characteristics of a public good among shareholders. Once supplied, all

<sup>18</sup>For an overview of this type of probabilistic voting models, see Persson and Tabellini (1999).

<sup>19</sup>In Stoughton and Zechner (1998), for example, it is critical that the investment banker be able to differentiate between large and small investors and to enforce agreements whether they are explicit or implicit.



of them can benefit from it: there is a free-rider problem, and therefore the large shareholder is the only one that monitors the manager.

The parameter  $\eta$  can be interpreted as the weight on electoral concerns relative to privatization proceeds. For example,  $\eta$  would be lower the higher the pressure to reduce fiscal deficit (for example, for those countries that were privatizing at the same time as meeting the Maastricht criteria for the EMU). Also, it can be conjectured that it will be higher at the earlier stages of the privatization programme, when voters can be more easily impressed by the effects of "popular capitalism." The parameter  $z$ , the bargaining power of private shareholders at privatization, is exogenous, and it is implemented through the privatization price.

The function  $y(\cdot)$  can be further rationalized as follows. Having shares makes it cheaper, and at the same time more profitable, to pay attention to shareholding society issues as opposed to other issues. Shareholder concentration would play a similar role to a price in the demand for these issues as opposed to other political issues. Lower concentration increases the attention on ownership and shareholding issues. A median class that is more focussed on these issues makes it cheaper for a right wing party to "sell" its ideological package. See Riker (1986) for the role of issues and cleavages in politics. Another way to make it cheaper to campaign for the party is just to have contributions from lobby groups.

### 3.2.3 Manager and Shareholders

#### Assumptions

In the regulated firm, there is a separation between ownership and control. I assume that the manager of the firm chooses the effort level  $e$ , which has a different effect on consumer surplus, on the private control benefits of the manager and on the shareholders' profits.

Precisely, if the interests of manager and shareholders are congruent, which happens with probability  $\lambda$ , then the manager gets a payoff of  $b(e)$ , with  $b' > 0$ , from the investment and the shareholders get a payoff of  $\Pi(p)$ . However, with probability  $(1 - \lambda)$  the manager and the shareholders have opposed interests, and then their payoffs depend on the monitoring activities of the large shareholder. This large shareholder invests  $a$ ,  $0 < a < 1$ , in monitoring activities. Then, with probability  $a$  the effort results in a payoff of  $\Pi(p)$  for the shareholders and 0 for the manager, and with probability  $(1 - a)$ , the effort results in a payoff of  $b(e)$  for the manager and

0 for the shareholders.

The manager and the large shareholder decide simultaneously.

The following table summarizes the payoffs in each case:

	Probability	Manager's payoff	Shareholders' payoff
Congruence	$\lambda$	$b(e)$	$\Pi(p)$
Monitoring Unsuccessful	$(1 - \lambda)(1 - a)$	$b(e)$	0
Monitoring Successful	$(1 - \lambda)a$	0	$\Pi(p)$

Through product quality, the effort affects price (as it will be shown in the solution of the regulatory stage), and hence it potentially affects profits, with a probability  $\lambda + (1 - \lambda)a$ . The probability that the surplus is captured by the shareholders has an exogenous component, namely  $\lambda$ , and an endogenous one, namely  $a$ .

With probability  $(1 - \lambda)(1 - a)$  the profits obtained thanks to the price fixed by the regulator get wasted, nobody captures them and nevertheless the manager enjoys  $b(e)$ .

The large shareholder's objective function is

$$V_L = ((1 - \lambda)a + \lambda)\sigma\Pi(p) - \alpha\frac{a^2}{2} \quad (3.5)$$

where  $\psi(a) = \alpha\frac{a^2}{2}$  is the private cost of monitoring, and  $\alpha > 0$  is a parameter that reflects the exogenous cost of monitoring.

The manager's objective function is

$$V_m = ((1 - \lambda)(1 - a) + \lambda)b(e) - \beta\frac{e^2}{2} \quad (3.6)$$

where  $\beta\frac{e^2}{2}$  is the private cost of the investment for the manager, and  $\beta > 0$  is a parameter that denotes exogenous factors related to this cost, reflecting the manager's background, his skills or technological development. Manager and shareholders are risk neutral.<sup>20</sup>

<sup>20</sup>Other studies emphasize the costs of concentration derived from inefficient risk allocation. For example, it is implicit in Demsetz and Lehn (1985), as formalized by Salas (1992), that in the absence of risk sharing problems, ownership concentration would be as high as possible and hence one shareholder would have 100% of shares. In my model, optimal concentration is lower than 100% in the absence of risk sharing concerns.

## Comments

The separation between ownership and control is meant to capture the fact that privatized firms in sectors such as telecommunications or electricity are very large firms. These firms are complex organizations with professional management. To capture the potential incongruence of interests between manager and shareholders, I use a variation of the models developed by Burkart et al. (1997). There are two main differences between the modelling of this stage and the structure of their model. First, here the profits that the shareholders may obtain are determined by the regulation of the product market, whereas in Burkart et al. (1997) they are exogenous. Second, here managerial effort is an action that may improve the quality of the regulated product, whereas in their setting managerial effort is a search effort to find the real pay-offs of a sequence of possible projects.

The manager decides on effort and the shareholder decides on monitoring before knowing whether their interests are congruent or not. This reflects a situation where there is uncertainty about the future corporate governance regime or the protection of property rights in the economy. It may also reflect uncertainty about the technology or the final market structure of the industry.<sup>21</sup> However, the firm makes its decisions before these issues are settled.<sup>22</sup>

A possible interpretation of  $b(e)$  is that in this case the Courts and the law prevent the managers from appropriating a vast amount of money such as the profits of the company, but cannot prevent them from enjoying the private control benefits. In Boss and Harms (1996) managers capture the whole profits if monitoring is unsuccessful. I find this unrealistic, at least in the case of large privatized utilities.

The exogenous cost of monitoring may depend on the legal environment, e.g. through the legal protection of shareholders' rights, disclosure requirements, accountancy standards, etc. It may also depend on the industry's environment. Supply shocks, technological change or entry may make monitoring harder. Firm-specific uncertainty makes it more difficult to disentangle the relationship between output and managerial effort from the relationship between output

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<sup>21</sup>One may be tempted to think that this situation only holds for transition or developing economies, but the corporate governance regimes of Western Europe are far from settled at the beginning of the year 2000 (see *The Economist*, 11/2/2000).

<sup>22</sup>It is also assumed that the uncertainty is resolved before the regulatory stage. The equilibrium price, however, is unchanged if the uncertainty is resolved after prices are set.

and other factors. The parameter  $\alpha$  may also be related to the exogenous efficiency of the large shareholder as a monitor.

### 3.2.4 Regulation

#### Assumptions

The regulator chooses  $p$  to maximize

$$W(p, e) = [CS(p, e)]^{1-\gamma} [\Pi(p)]^\gamma \quad (3.7)$$

where  $\gamma$ ,  $0 \leq \gamma \leq 1$ , is an exogenous weight that reflects the regulatory climate.<sup>23</sup> Following Spiegel (1989), this specification is consistent with a bargaining game. The parameter  $\gamma$  measures the degree to which the regulator cares about the *ex post* profits of the firm relative to consumer surplus. The resulting regulated price allocates the expected social surplus according to the asymmetric Nash bargaining solution for the regulatory process. The disagreement payoffs of both consumers and investors are set to zero.

#### Comments

As in Spiegel (1994),  $U(e)$  can be viewed as consumers' willingness to pay for the firm's output, over and above their next best alternative. Similarly, the firm's disagreement payoff can be set equal to zero since monitoring costs or managerial investment costs are completely sunk and claimholders are protected by limited liability (then their disagreement payoff cannot be negative).<sup>24</sup>

This functional form is appealing because the price that maximizes the regulator's objective function is a convex combination of the monopoly price and the zero-profit price, where  $\gamma$  is

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<sup>23</sup>Demsetz and Lehn (1985) and Joskow et al. (1993) mention that investment firms systematically rate the regulatory climate in which US utilities operate. The ranking is based on how much consumer or producer friendly regulators are in each state.

<sup>24</sup>Sutton (1986) draws the attention to the different implications that different assumptions on the disagreement payoffs have. In particular, the breakdown point (the option of the parties outside the negotiation) will not be used unless it yields a higher utility than the outcome of bargaining. Then the impasse point (or deadlock point, the result of delaying a resolution of the bargaining game indefinitely, which is usually normalized to zero) becomes the relevant disagreement payoff. See also Binmore (1998, pp. 80-82). In my model both are equivalent and equal to zero.

the weight on the monopoly price.

This approach follows models of the rate-setting process as a bargaining problem between consumers and investors (Spulber, 1989; Besanko and Spulber, 1992), where the regulator acts as an arbitrator.<sup>25</sup> It can also be interpreted as the regulator maximizing her own Cobb-Douglas utility function, which would be consistent with Peltzman's (1976) political economy model of rate regulation.<sup>26</sup>

### 3.2.5 Time Sequence

To summarize the sequence of events, first the government announces the stake of the largest shareholder in a privatization scheme designed to maximize a weighted sum of the expected vote and privatization proceeds. Elections are held and if the incumbent party wins again the policy is implemented. Second, the manager of the firm and the largest shareholder simultaneously choose a quality improving effort and a monitoring level. And, finally, after the uncertainty concerning the congruence between managers and shareholders is resolved, the regulator sets the price of the regulated product or service, with the objective of maximizing an objective function that is the result of the regulatory climate, as captured by the parameter  $\gamma$ .

## 3.3 The Interaction between Regulation and the Firm

This section starts the analysis of the model's equilibrium. The game is solved as usual by backwards induction. First, the solution of the regulatory stage is presented. Second, the sub-game at the firm's level is analyzed, anticipating the regulatory outcome.

### 3.3.1 The Regulated Price

Maximizing the objective function of the regulator is equivalent to maximizing

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<sup>25</sup>In Scarpa (1994) the agents in the bargaining game are the regulator herself (instead of the consumers) and the firm.

<sup>26</sup>It can be argued that it is the managers and not the shareholders who bargain at the regulatory stage. Then, the postulated regulator's objective function is a strong assumption. Nevertheless, it considerably simplifies the analysis and makes it easier to focus on the role of managers as agents in charge of undertaking quality enhancing effort. And it sticks to the more traditional view that regulators take into account investors' interests. Future research may focus on the delegation of regulatory bargaining to managers. See Spulber (1999) on the importance of delegation in bargaining.

$$(1 - \gamma) \ln(U(e) - p) + \gamma \ln(p - c)$$

The first order condition is

$$-\frac{(1 - \gamma)}{U(e) - p} + \frac{\gamma}{p - c} = 0$$

Hence, since the objective function is concave in  $p$ , the optimal price as a function of the investment level is

$$p(e) = \gamma U(e) + (1 - \gamma)c \quad (3.8)$$

The price fixed by the regulator raises with the effort level, to an extent that depends on the marginal effect of effort on consumer surplus. The intuition for this is that the regulator does not compensate the firm for past effort costs, but only for the effects of effort at the regulatory stage. If the effort does not play any role on consumer utility then it does not have any influence on the regulator. The price fixed by the regulator also increases with marginal costs. The intuition for this is that the regulator wants to make sure that the firm can fund its current expenditures.

Since  $\frac{dP}{d\gamma} = [U(e) - c]$ , if the utility that consumers derive from the effort is high enough, and marginal costs low enough, as has been assumed at the outset, then the effect of the producers' weight at regulation on price is positive. Again, it is the value that consumers derive from managerial effort that makes it valuable for the regulator to compensate for the actions undertaken at the firm's stage. Also, the lower the current expenditures of the firm, the cheaper it is to satisfy investors.

### 3.3.2 Effort and Monitoring

The large shareholder and the manager choose simultaneously a monitoring level and an investment level that determine the performance of the firm.

The large shareholder's first order condition is:

$$\sigma(1 - \lambda)\Pi(p) - \alpha a = 0 \quad (3.9)$$

The second order condition holds because, by assumption,  $\alpha > 0$ .

Thus the optimal value of  $a$  is

$$a = \frac{\sigma(1 - \lambda)\Pi(p)}{\alpha} \quad (3.10)$$

Substituting the solution of the regulatory stage yields the reaction function of the large shareholder:

$$a = \frac{\sigma(1 - \lambda)[\gamma(U(e) - c)]}{\alpha} \quad (3.11)$$

Hence, the monitoring level by the large shareholder increases with her stake in the firm, with the degree of incongruence in the interests of shareholders and manager, and it increases as well with the weight of investors in the regulatory process. Conversely, the monitoring level by the large shareholder decreases with unit cost and with the costs of monitoring.

The first order condition of the manager's problem is

$$(1 - (1 - \lambda)a)b'(e) - \beta e = 0 \quad (3.12)$$

The second order condition holds if  $(1 - (1 - \lambda)a)b''(e) - \beta < 0$ . This is the case, for example if, as will be assumed below,  $b(e)$  is linear.

Hence, the reaction function is

$$e = \frac{(1 - (1 - \lambda)a)b'(e)}{\beta} \quad (3.13)$$

From this expression, it can be seen that the higher the monitoring by the large shareholder, the lower the managerial effort. However, the large shareholder has to monitor, because otherwise he may find himself in a situation where he does not capture any profit, which would happen with probability  $(1 - \lambda)$ . Hence there exists a trade-off between initiative and control.

The following proposition derives conclusions from the equilibrium in the firm's sub-game.

**Proposition 6** *In the equilibrium of the sub-game between manager and shareholders, managerial effort decreases with the stake of the large shareholder if*

$$b''(e) [\alpha - \sigma(1 - \lambda)^2 \gamma (U(e) - c)] < b'(e) \sigma(1 - \lambda)^2 \gamma U'(e) + \alpha \beta \quad (3.14)$$

**Proof.** Substituting the reaction function of the large shareholder into the first order condition of the manager's problem yields:

$$\left(1 - \frac{\sigma(1 - \lambda)^2 [\gamma(U(e) - c)]}{\alpha}\right) b'(e) - \beta e = 0$$

Using the Implicit Function Theorem,

$$\begin{aligned} \frac{de^*}{d\sigma} &= - \frac{-b'(e)(1 - \lambda)^2 [\gamma(U(e) - c)]}{\alpha \left[ b''(e) - \left\{ b''(e) \frac{\sigma(1 - \lambda)^2 [\gamma(U(e) - c)]}{\alpha} + \frac{b'(e) \sigma(1 - \lambda)^2 \gamma U'(e)}{\alpha} \right\} - \beta \right]} \\ &= \frac{b'(e)(1 - \lambda)^2 [\gamma(U(e) - c)]}{\alpha b''(e) - \sigma(1 - \lambda)^2 \gamma \{ b''(e)(U(e) - c) + b'(e)U'(e) \} - \alpha \beta} \end{aligned}$$

Then,  $\frac{de^*}{d\sigma} < 0$  if  $b''(e) [\alpha - \sigma(1 - \lambda)^2 \gamma (U(e) - c)] < \sigma(1 - \lambda)^2 \gamma b'(e) U'(e) + \alpha \beta$  ■

Although inequality (3.14) seems complex, it holds in a straightforward way when  $b(e)$  is linear. In this case, the larger the stake of the large shareholder, the lower the managerial effort. However, this does not mean that the optimal level of concentration is zero, because this would imply no monitoring at all, and hence the shareholders would capture no profits if  $\lambda > 0$ . It can be shown that the same condition for  $\frac{de^*}{d\sigma} < 0$  holds for  $\frac{da^*}{d\sigma} > 0$ , and hence the optimal level of  $\sigma$  will strike a compromise between these two effects.

The analysis suggests that the equilibrium level of managerial effort could be increased if it were possible to manipulate some of the parameters that determine the outcome of the firm's game. The government's privatization decision allows the government to choose one of these parameters: the stake of the largest shareholder. By appropriately designing the privatization process,  $\sigma$  can be chosen to give the managers just the level of initiative that maximizes shareholders' value.



### 3.4 A Benchmark: Optimal Ownership Concentration when the Government Maximizes Privatization Proceeds

In this section, it is assumed that  $\eta = z = 0$ . The government places no weight on reelection considerations when it chooses the privatization policy, and captures all shareholders' value through the privatization price. The privatizing government chooses the stake of the largest shareholder to maximize  $V$ :

$$V = (\lambda + (1 - \lambda)a(\sigma)) [\gamma(U(e(\sigma)) - c)] - \psi(a(\sigma))$$

The first order condition of this problem is:

$$\begin{aligned} \frac{\partial V}{\partial \sigma} &= \frac{\partial e}{\partial \sigma} [\lambda \gamma U' + (1 - \lambda) \gamma U' a(\sigma)] \\ &+ \frac{\partial a}{\partial \sigma} [(1 - \lambda) \gamma (U(e(\sigma)) - c) - \psi'] = 0 \end{aligned}$$

The first term of this expression depends on the effect of the stake of the largest shareholder on managerial effort. The second term depends on the effect of the stake of the largest shareholder on monitoring. A necessary condition for an interior optimal stake of the large shareholder is that these two effects compensate each other in a way that depends on the parameters of the model.

As it can be seen in the previous first order condition, the regulatory climate, as captured by  $\gamma$ , plays a crucial role in the determination of the optimal level of shareholder's concentration. The general expression of the effect of  $\gamma$  on the optimal stake of the large shareholder can be obtained using the Implicit Function Theorem:

$$\frac{d\sigma^*}{d\gamma} = \frac{-[e_{\sigma} \lambda U' + (1 - \lambda) U' a(\sigma) + a_{\sigma} (1 - \lambda) U(e(\sigma))]}{e_{\sigma\sigma} [\lambda \gamma U' + (1 - \lambda) \gamma U' a(\sigma)] + a_{\sigma\sigma} [(1 - \lambda) \gamma (U(e(\sigma)) - c) - \psi'] + 2a_{\sigma} e_{\sigma} [(1 - \lambda) \gamma U']}$$

where

$$e_{\sigma} = \frac{\partial I}{\partial \sigma}, a_{\sigma} = \frac{\partial a}{\partial \sigma}, e_{\sigma\sigma} = \frac{\partial e_{\sigma}}{\partial \sigma}, a_{\sigma\sigma} = \frac{\partial a_{\sigma}}{\partial \sigma},$$

The effects of regulatory climate on the optimal stake of the largest shareholder could have either sign, depending on whether the parameter values make it more valuable the control effect or the initiative effect. A particular case shows, however, sufficient conditions for a negative relationship, which is contrary to the predictions made by Demsetz and Lehn (1985), which took into account only the effects of regulation on the control effect. This particular case, also, makes it possible to analyze the privatization choice with closed-form solutions.

Hence, to make further progress, the following additional assumptions are made.

**Assumptions**

$$c = 0 \tag{3.15}$$

$$b(e) = \xi e \tag{3.16}$$

$$U(e) = e \tag{3.17}$$

$$\xi\gamma < \frac{\beta\alpha}{\lambda(1-\lambda)} \tag{3.18}$$

The assumption of zero marginal costs makes it possible to focus all the attention on the effort and monitoring costs. The function relating effort to private control benefits is linear. The direct utility that consumers derive from the firm's product or service depends only on the effort undertaken by the firm's manager. This simplifies the analysis in a way that is standard in the literature. See for example Chakravorti and Spiegel (1995). The last assumption is necessary to obtain interior solutions.

**Proposition 7** *If the government maximizes privatization proceeds and under assumptions (3.5)-(3.7) and (3.15)-(3.18), the equilibrium is characterized by*

$$\sigma^* = \frac{(1-\lambda)\beta\alpha}{\xi\gamma J + \beta\alpha} \tag{3.19}$$

$$a^* = \frac{\xi\gamma(\lambda-1)^2}{H} \quad (3.20)$$

$$e^* = \frac{K}{\beta H} \quad (3.21)$$

$$p^* = \gamma \frac{K}{\beta H} \quad (3.22)$$

where  $J = (\lambda + 1)(\lambda - 1)^2$ ,  $H = 2\xi\gamma(\lambda - 1)^2 + \beta\alpha$  and  $K = \xi\gamma J + \beta\alpha$

**Proof.** From (3.2) and (3.8),  $\Pi = \gamma e$ , and

$$V_L = a\sigma\gamma e(1 - \lambda) + \lambda\gamma e - \alpha \frac{a^2}{2} \quad (3.23)$$

Using the First Order Condition, the reaction function is

$$a = \frac{\sigma\gamma e(1 - \lambda)}{\alpha} \quad (3.24)$$

The manager maximizes

$$V_m = (1 - (1 - \lambda)a)\xi e - \beta \frac{e^2}{2} \quad (3.25)$$

Using the First Order Condition, the reaction function is

$$e = \frac{(1 - (1 - \lambda)a)\xi}{\beta} \quad (3.26)$$

In the Nash Equilibrium, the large shareholder's optimal monitoring level and the manager's optimal effort are as follows:

$$a(\sigma) = \frac{\xi\sigma\gamma(1 - \lambda)}{\beta\alpha + \sigma\gamma\xi - 2\sigma\gamma\xi\lambda + \sigma\gamma\xi\lambda^2} = \frac{\xi\sigma\gamma(1 - \lambda)}{\beta\alpha + \sigma\gamma\xi(1 - \lambda)^2} \quad (3.27)$$

$$e(\sigma) = \frac{\xi\alpha}{\beta\alpha + \sigma\gamma\xi - 2\sigma\gamma\xi\lambda + \sigma\gamma\xi\lambda^2} = \frac{\xi\alpha}{\beta\alpha + \sigma\gamma\xi(1 - \lambda)^2} \quad (3.28)$$

Note that the optimal monitoring level increases with the stake of the large shareholder and the optimal managerial effort level decreases with the stake of the large shareholder:

$$\frac{da}{d\sigma} = \left[ \xi\gamma(1-\lambda)\beta \frac{\alpha}{(\beta\alpha + \sigma\gamma\xi - 2\sigma\gamma\xi\lambda + \sigma\gamma\xi\lambda^2)^2} \right] > 0$$

$$\frac{de}{d\sigma} = \left[ -\xi^2\alpha\gamma \frac{(-1+\lambda)^2}{(\beta\alpha + \sigma\gamma\xi - 2\sigma\gamma\xi\lambda + \sigma\gamma\xi\lambda^2)^2} \right] < 0$$

The government chooses the stake of the largest shareholder with the objective of maximizing  $V$ . At this stage, all shareholders will pay as much as they will get from their future cash-flow rights in the firm, and, among them, the large shareholder anticipates the private monitoring cost of controlling the manager. Hence, the government chooses  $\sigma$  to maximize

$$V = (a(\sigma)(1-\lambda) + \lambda)\gamma e(\sigma) - \alpha \frac{a(\sigma)^2}{2} \quad (3.29)$$

The following is obtained by replacing  $e$  in  $V$  by its expression in  $a$  given by the FOC,

$$V = (a(1-\lambda) + \lambda)\gamma \frac{(1 - (1-\lambda)a)\xi}{\beta} - \alpha \frac{a^2}{2}.$$

This expression is maximized for the following value of  $a$ :

$$a^* = \xi\gamma \frac{1 - 2\lambda + \lambda^2}{2\xi\gamma - 4\xi\gamma\lambda + 2\xi\gamma\lambda^2 + \beta\alpha}.$$

Assumption (3.18) ensures that  $0 < a^* < 1$ .

Finally,  $\sigma^*$  is obtained by equating  $a^* = a(\sigma)$ , and isolating  $\sigma$ .

The equilibrium expressions for price and effort are obtained by substituting the equilibrium value of  $\sigma$  in (3.28) and (3.8), taking into account the assumptions made. ■

The equilibrium level of shareholder concentration is derived from the optimal level of monitoring, which strikes a balance between managerial initiative and shareholder control. This is the concentration that would be chosen by a government that maximizes privatization

revenues.<sup>27</sup>

The following corollary derives the effects of changes in the parameters of the model on the optimal level of shareholder concentration:

**Corollary 8** *The optimal stake of the large shareholder is*

*i) decreasing in the weight of producers in regulation,  $\gamma$ .*

*ii) increasing with monitoring costs,  $\alpha$ , and with the exogenous private costs of effort for the manager,  $\beta$ .*

*iii) decreasing with the effect of effort on the manager's private control benefits,  $\xi$ .*

*iv) increasing with the congruence of interests between manager and shareholders,  $\lambda$ , if*

$$2\gamma\lambda(\lambda - 1)^2 > \beta\alpha$$

**Proof.** To simplify, the following notation is used:  $L = \left[ \xi\gamma(\lambda + 1)(\lambda - 1)^2 + \beta\alpha \right]^2$ ,  $M = (\lambda + 1)(\lambda - 1)^3$

$$\text{i) } \frac{d\sigma^*}{d\gamma} = \frac{\beta\alpha\xi M}{L} < 0$$

$$\text{ii) } \frac{d\sigma^*}{d\alpha} = \frac{-\beta\xi\gamma M}{L} > 0;$$

$$\frac{d\sigma^*}{d\beta} = \frac{-\alpha\xi\gamma M}{L} > 0$$

$$\text{iii) } \frac{d\sigma^*}{d\xi} = \frac{\beta\alpha\gamma M}{L} < 0$$

$$\text{iv) follows from } \frac{d\sigma^*}{d\lambda} = \frac{\beta\alpha[2\gamma\lambda(\lambda-1)^2 - \beta\alpha]}{L} \quad \blacksquare$$

Hence, the more lenient the regulatory process, the lower the optimal level of ownership concentration. This is contrary to Demsetz and Lehn's predictions. The reason is that they only take into account the control effect, and their discussion deals exclusively with the (exogenous) costs and benefits of control. A better regulatory climate just increases the control potential. They do not attach any value-enhancing properties to dispersion in their informal presentation of the hypotheses, and hence the "initiative effect" stressed in this chapter is not addressed in their study. In my model, a better regulatory climate increases the commitment value of dispersion.

The intuition behind this result is as follows. Given a high level of concentration, the large shareholder obtains a very high payoff if he can extract a high level of effort from the manager.

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<sup>27</sup>An important question is whether the shareholders have any incentives to change the ownership concentration, once the firm has been privatized. Burkart et al. (1997, p. 707) show that the value maximizing ownership structure is robust to retrading. It can be shown that this insight is also valid with the modifications introduced here, i.e., the role of the regulatory climate and the different nature of managerial effort.

However, managerial effort is not contractible, and the manager anticipates that with high concentration, monitoring is also high and his payoff from making effort is low. The large shareholder cannot commit not to monitor at this stage of the game, because with a high stake the gains from a marginal increase in the monitoring effort are high. Hence, in equilibrium the manager settles for a low effort level. With low levels of concentration, however, since the gains from monitoring for the large shareholder are lower, the manager settles for a higher effort level because he anticipates a lower level of monitoring. Therefore, if the shareholders are very keen on high effort levels from the manager, they may be interested *ex-ante* in committing to a low level of concentration, which can be done through an appropriate privatization scheme designed by a government interested in maximizing privatization revenue. But this interest in a low ownership concentration depends on the degree to which a high effort level translates into high profits for the shareholders. And this relationship between managerial effort and shareholders' profits in this context depends on regulation. Through a lenient regulatory regime (i.e., through a high  $\gamma$  in the regulator's objective function), high effort translates into high profits and hence makes the benefits of dispersion more relevant for the equity holders.

The following explanations develop the rationale for the effect of the other exogenous variables on the optimal shareholder concentration:

$\alpha$ : the higher the exogenous monitoring costs (as may be the case in industries subject to fast technological change, such as telecommunications), the lower the level of monitoring for a given stake of the large shareholder. That pushes the optimal stake to higher values, in order to make sure that the optimal level of monitoring is achieved.

$\beta$ : the higher the private cost of effort for the manager, the less effort he makes even in the case of low shareholder concentration, and hence the lower the commitment value of dispersion. The marginal benefit of initiative relative to the marginal benefit of control decreases.<sup>28</sup>

$\xi$ : the easier investment translates into higher private benefits, the higher the optimal effort level for the manager and hence the higher the commitment value of dispersion.

$\lambda$ : as congruence increases, there is less need for monitoring for a given stake of the largest

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<sup>28</sup>Salas (1992) obtains the opposite result, i.e. that the optimal stake of the largest shareholder decreases with the managerial cost of effort. The reason for that is that higher monitoring translates into better precision for incentive schemes, which allows the controllers to extract a higher effort from the manager, for a given level of the managerial cost of effort. If the cost of effort increases, the marginal benefit of monitoring decreases. In my model, monetary incentive schemes play no role.

shareholder, as long as the exogenous costs of monitoring and investing are low enough. Hence the commitment value of a low level of concentration decreases.

The benchmark can be interpreted as analyzing the relationship between deregulation and privatization techniques. Monitoring is facilitated by the degree of mandatory information disclosure and in general by the legal protection of outside investors. The existence of statutory regulatory agencies that collect information about the firm is a subsidy to the monitoring efforts by shareholders. If deregulation involves that these agencies disappear or their role is much reduced, this subsidy becomes lower and the monitoring costs increase again. If deregulation involves an increased level of firm specific uncertainty, it becomes more important for the firm as an organization to undertake the right projects with the right level of effort. The actions of the manager determine more of firm's value and at the same time are more difficult to monitor.<sup>29</sup> Deregulation may be also associated with a less lenient regulatory climate. Incumbents are still regulated, but entry occurs (sometimes by technological reasons or due to supranational decisions beyond the control of national regulatory authorities) and reduces the level or the stability of the incumbent's profits. Entry also reduces the bargaining power of the incumbent in the policy making game. A more competitive environment may also increase the congruence between managers and shareholders.<sup>30</sup>

Deregulation tilts the balance of privatization techniques in favour of concentrated ownership, if the government is interested in maximizing revenues.

### 3.5 Privatization with Political Objectives

In general, governments take into account not only privatization proceeds, but also political considerations, as shown in the more general set-up presented above, in Subsection 3.2.2. How

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<sup>29</sup>Part of the cost of managerial effort can also be associated with regulation, following Salas (1992). Regulation is a source of complementary slackness for the managers, increasing his opportunity cost of effort. Deregulation should then decrease this opportunity cost. However, I conjecture that deregulation also increases other components of the managerial cost of effort, such as learning in new technologies, following the competitors, etc.

<sup>30</sup>If competition is introduced in some segments of the firm's activities but not in others, shareholders may have an incentive to allocate their best managers to these competitive activities (managerial cross-subsidies). Laffont and Tirole (2000, p. 146) argue that "investment choices that jointly affect the marginal costs on competitive and regulated segments may be distorted towards achievement of low cost on competitive segments and high cost on regulated ones. Furthermore, if competitive environments provide more information about the quality of managers because they require more innovation on their part, the firm will overemphasize its fast-track policy of selecting its future top managers through the allocation of promising managers to competitive segments."

does politics change the optimal policy from the point of view of the privatizing government? To answer this question, assume now  $\eta > 0$  and  $0 < z < 1$ .<sup>31</sup> This means that the privatizing government attaches a positive weight to the expected vote relative to privatization proceeds, and that the bargaining power of private investors at privatization is also positive.

Inspection of the expression (3.4) helps to understand in which circumstances the addition of political objectives yields a level of dispersion that deviates from the level of dispersion in the benchmark case where the government maximizes privatization proceeds.

First, one has to consider the influence of the ideological bias, both through the direct effect of dispersion on it, and through the potential role of contributions from especial interests to influence the bias in electoral campaigns.

Second, the direct utility that median class voters derive from the privatization policy, both as consumers and as shareholders, must also be taken into account.

However, it can be shown that in many cases the comparative statics result that the equilibrium level of concentration increases with deregulation still holds. For example, consider again the effect of the parameter  $\gamma$ , which denotes the bargaining power of producers at regulation. This parameter reflects the leniency of the regulatory regime. It can be proved that if the only political consideration besides privatization proceeds is the direct ideological effect of dispersion on the ideological bias (i.e.,  $\eta > 0$  but  $k = 0$  and  $\frac{\partial y}{\partial C_1} = 0$ ), then the impact of  $\gamma$  on the equilibrium level of dispersion is negative, i.e. a negative correlation remains between the leniency of regulation and shareholder concentration.

### **3.5.1 The Role of Consumer Surplus and Shareholder Rents of Median Class Voters**

The literature has focused so far on the role of mass privatization as a way to further the interests of the voters as shareholders. However, it is apparent from equation (3.4) that although median class voters increase their share of profits with dispersion, the overall amount of profits depends on the trade-off between initiative and control. Besides, the bargaining power of private investors at privatization,  $z$ , has to be positive for the profits to play any role in the voting

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<sup>31</sup>If  $\eta > 0$  but  $z = 0$ , then the largest shareholder does not have incentives to lobby and the small shareholders do not take profits into account at the privatization stage, since they do not capture any rents from privatization.



behaviour of median class voters.

Using the same assumptions that have been used to obtain closed form solutions for the benchmark case, it can be shown that consumer surplus increases with shareholder dispersion, to an extent that depends on parameter  $\gamma$ , which denotes the bargaining power of producers at regulation.

Recall from the previous sections that  $CS = U(e(\sigma)) - p(\sigma)$ . As in the benchmark case, assume  $U(e) = e$  and  $c = 0$ . In the equilibrium of the regulation subgame, it was shown that the price is  $p^* = \gamma U(e) + (1 - \gamma)c$ . Then  $CS = U(e(\sigma)) - p(\sigma) = e(1 - \gamma)$ . And it was shown that if  $b(e)$  linear, then  $\frac{de^*}{d\sigma} < 0$ . If, for example, as it was assumed in the analysis of the benchmark case,  $b(e) = \xi e$ , then the positive relationship between consumer surplus and shareholder dispersion follows.

An important implication of this is that the party that has a direct ideological disadvantage with dispersed shareholding may also privatize with more dispersion than the benchmark if the median class is large ( $\frac{N^m}{N}$  large) and the contribution of the managerial input to consumer surplus is important. The role of median class voters as consumers is usually neglected in the analysis of the political determinants of privatization.

In this case politics has a benign effect on the outcome, since the government takes into account consumer as well as producer surplus, and both are ingredients of social welfare. However, the following sub-section explores another effect of politics that is usually harmful for social welfare.

### 3.5.2 Collusion between Politicians and Managers or Large Shareholders

There are two obvious candidates to behave as lobbies in this model: the manager and the large shareholder. Both derive rents from the privatization policy, which they can use as resources to put pressure on the privatizing politicians, in the form of "support" or "campaign funds" to have an influence in the bias of median class voters. Both cases can be motivated with real world examples. In the case of Russian privatization, the co-optation of insiders was a key strategy to make the privatization strategy politically feasible. In the privatization of telecommunications in Mexico, collusion between Carlos Slim, the largest shareholder in the privatized Telmex, and the then ruling party, PRI, was not a secret. In some other developing or transition countries,

privatization has been tainted by corruption scandals where government agents were suspect of favoritism towards the agents in control of the privatized firms.<sup>32</sup>

Here I do not model lobby group formation. I consider two separate cases: either the privatizing government is lobbied by the manager or it is lobbied by the blockholder.

Assume that median class voters are only motivated by ideology, i.e.  $k = 0$ . And assume further that  $\frac{\partial y}{\partial \sigma} = 0$ , i.e. that dispersion has no direct effect on the ideological bias. The ideological bias takes the form  $y = hC_l$ , with  $h > 0$ , where  $l = m, L$ .  $C_l$  are the contributions that either the manager or the blockholder pay to the party in government to campaign in order to influence the ideological bias of median class voters. Then, the privatizing government maximizes  $\eta(\frac{1}{2} + hC_l) + (1 - z)V(\sigma)$ ,  $l = m, L$ . The timing of the lobbying game is as follows. First, the lobby (either the manager or the blockholder, depending on the case) offers the party in government a contribution schedule: an amount to support the party's campaign, in exchange for each level of shareholder dispersion that the government approves at privatization. Second, the party in government either accepts the offer made by the lobby and chooses a level of dispersion accordingly, or rejects it and chooses the level of dispersion without funds to influence the bias of median class voters (equivalently, it chooses the level of dispersion to maximize privatization proceeds). The lobby anticipates that the incumbent party will implement its chosen policy with probability  $\varphi(\Sigma^0)$ :

$$\varphi(\Sigma^0) = \begin{cases} 1 & \text{if } \Sigma^0 > \frac{1}{2} \\ \frac{1}{2} & \text{otherwise} \end{cases}$$

$\Sigma^0$  is the expectation that the lobby forms about the proportion of votes that the incumbent party obtains in the election. This expectation must be true in equilibrium. Therefore, if the lobbying contributions are positive in equilibrium, the lobby anticipates that the party will implement its chosen policy after the elections. To simplify, the following notation is introduced:  $q = \frac{1-z}{\eta h}$ . Assumptions (3.15)-(3.18) are maintained.

**Proposition 9** *If  $q$  is not too high, the manager lobbies the incumbent politicians and the*

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<sup>32</sup>Although small shareholders also have a stake in the privatization policy, it is reasonable to assume that the free-rider problem will prevent them from acting as an interest group and that they will exert political pressure through voting.

following results are obtained:

- i) Collusion with the manager yields a higher level of dispersion than in the benchmark case.
- ii) If  $q$  is high enough, then the sign of the impact of an increase in the leniency of the regulatory climate on the stake of the blockholder in equilibrium, is negative.
- iii) The difference between the equilibrium level of dispersion and the benchmark decreases with the leniency of the regulatory climate, i. e.  $[(d[\sigma^* - \hat{\sigma}]) / (d\gamma)] < 0$ .

**Proof.** The manager maximizes  $\varphi(\Sigma^0)V_m - C_m$ , where  $V_m = ((1-\lambda)(1-a(\sigma)) + \lambda)b(e(\sigma)) - \beta \frac{e(\sigma)^2}{2}$ . The payoff of the government if it rejects the offer is  $\eta \frac{1}{2} + (1-z)V(\sigma^*)$ , where  $\sigma^*$  is the stake of the blockholder that maximizes the government's objective function in the absence of lobbying contributions, or, equivalently, the stake that maximizes privatization proceeds. The payoff of the government if it accepts the offer is  $\eta(\frac{1}{2} + hC_m) + (1-z)V(\sigma)$ . Hence, the condition for accepting the offer is  $\eta(\frac{1}{2} + hC_m) + (1-z)V(\sigma) \geq \eta \frac{1}{2} + (1-z)V(\sigma^*)$ . Or, equivalently,

$$C_m \geq q[V(\sigma^*) - V(\sigma)]$$

This constraint is satisfied with equality because once lobbying contributions are positive, their effect on the probability that the incumbent party will implement its policy remains unchanged (this probability is always 1 as long as contributions are positive). Hence, the marginal benefit of an increase in the contribution beyond that needed to influence the policy of the incumbent party is 0, whereas the marginal cost is 1. Let  $\hat{\sigma}$  denote the equilibrium level of the blockholder's stake when it accepts the contribution from the manager. Then, if the contribution is positive, replacing the contribution in the objective function of the manager by its expression in the constraint:

$$\hat{\sigma} = \arg \max_{\sigma} V_m(\sigma) + \frac{1-z}{\eta h} V(\sigma) = \beta \alpha \frac{q\gamma(\lambda-1) - \xi}{q\gamma[\gamma\xi(\lambda+1)(\lambda-1)^2 + \beta\alpha]}$$

If the manager decides not to lobby the government ( $C_m = 0$ ) then  $\varphi(\Sigma^0) = \frac{1}{2}$  and she obtains  $\frac{1}{2}V_m(\sigma^*)$ . Hence, the condition for the contribution being positive is then  $V_m(\hat{\sigma}) - q[V(\sigma^*) - V(\hat{\sigma})] \geq \frac{1}{2}V_m(\sigma^*)$ . Then,  $C_m > 0$  if  $q \leq [(V_m(\hat{\sigma}) - \frac{1}{2}V_m(\sigma^*)) / (V(\sigma^*) - V(\hat{\sigma}))]$ .

The other results in the proposition are obtained as follows:

$$i) \sigma^* - \hat{\sigma} = \frac{\beta\alpha\xi}{q\gamma[\gamma\xi(\lambda+1)(\lambda-1)^2 + \beta\alpha]} > 0.$$

ii)  $[(d\hat{\sigma}) / (d\gamma)] = \beta\alpha\xi \frac{2\gamma\xi(\lambda+1)(\lambda-1)^2 + q\gamma^2(\lambda+1)(\lambda-1)^3 + \beta\alpha}{q\gamma^2[\gamma\xi(\lambda+1)(\lambda-1)^2 + \beta\alpha]^2}$ . The sign of this expression is determined by the sign of the numerator,  $2\gamma\xi(\lambda+1)(\lambda-1)^2 + q\gamma^2(\lambda+1)(\lambda-1)^3 + \beta\alpha$ . From this,  $[(d\hat{\sigma}) / (d\gamma)] < 0$  if  $2\gamma\xi(\lambda+1)(\lambda-1)^2 + \beta\alpha < q\gamma^2(\lambda+1)(\lambda-1)^3$ . i.e. if

$$q > \frac{2\gamma\xi(\lambda+1)(\lambda-1)^2 + \beta\alpha}{\gamma^2(\lambda+1)(\lambda-1)^3}$$

$$iii) [(d[\sigma^* - \hat{\sigma}]) / (d\gamma)] = \left[ -\xi\beta\alpha \frac{[\beta\alpha + \gamma\xi(\lambda+1)(\lambda-1)^2] + [\xi(\lambda+1)(\lambda-1)^2]\gamma}{q\gamma^2[\gamma\xi(\lambda+1)(\lambda-1)^2 + \beta\alpha]^2} \right] < 0 \blacksquare$$

It is common to refer to privatization strategies such as mass privatization as a mechanism to influence the voting behaviour of the population in the future. The conventional wisdom prevails that share ownership by a high number of voters will constrain future governments to investment friendly policies.<sup>33</sup> However, the proposition shows the possibility of a different channel for the outcome that mass privatization is politically desirable. It may be not so much the direct utility of individual citizens, but the lobbying behaviour of managers that pushes governments to privatize with a very high level of shareholder dispersion. Massive share ownership may be the outcome for reasons other than constraining the regulator to investment-friendly policies. This is consistent with the proliferation of golden shares, poison pills or constraints to political rights of shareholders, in the privatized utilities of countries such as Spain, Italy or France.<sup>34</sup>

Interestingly, also in this case a negative relationship between regulatory climate and shareholding dispersion may still be obtained, contrary to the predictions of Demstetz and Lehn (1985). The condition for this is that the value that politicians attach to privatization proceeds be not too low. When the weight of the privatization proceeds in the politicians objective function is very low, then the equilibrium level of dispersion is so high due to manager's lobbying that any improvement in the profitability increases the equilibrium stake of the largest shareholder. Hence, there is a range of values of  $q$  for which the manager lobbies and the relationship between the equilibrium stake and the leniency of the regulatory climate is negative.

And the regulatory climate has also an impact on the deviation from the benchmark case.

<sup>33</sup>This is an argument usually put forward by the political economy literature in favour of mass privatization in transition economies. See Biais and Perotti (1997) and Schmidt (1997).

<sup>34</sup>It is also consistent with the existence of serious corporate governance problems in recently privatized utilities (see Chapter 4 below and Thompson, 1999).

The better the regulatory climate for the investors, the lower the deviation from the benchmark. A more lenient regulatory climate, by increasing the size of the profits, narrows the gap between the lobbying outcome and the benchmark where the government maximizes privatization proceeds. The reason for this is that as the regulatory climate improves for the firm, the commitment value of dispersion increases, and both managers and shareholders benefit from high dispersion. On the contrary, a tougher regulatory climate for the firm makes concentration more valuable for shareholders but not for managers, and hence increases the deviation, yielding shareholding structures in the political equilibrium that are farther away from the shareholder value maximizing ones.

However, lobbying by the managers is not the only possible source of especial interest politics. If instead it is the large shareholder who lobbies the government, then the level of shareholder concentration is pushed upwards. In this case, the political survival of the government encourages high concentration levels. The following proposition develops this case.

**Proposition 10** *If  $q$  is not too high, then the blockholder lobbies the incumbent politicians. In this case, a sufficient condition for the equilibrium level of shareholder dispersion being lower than the benchmark is that the proportion of the privatized firm's surplus captured by the private investors is high enough and the regulatory climate is lenient enough:*

$$z \geq 1 - \frac{1}{(\lambda - 1)^2 \gamma \xi} \text{ and } \gamma \geq \frac{(1 - \lambda) - \lambda z \eta h \beta \alpha}{(\lambda - 1)^3 \xi (z - 1)}$$

**Proof.** The large shareholder maximizes  $\varphi(\Sigma^0)zV_L - C_L$ , where  $V_L = ((1 - \lambda)a(\sigma) + \lambda)\sigma\Pi(p) - \alpha\frac{a(\sigma)^2}{2}$ . The payoff of the government if it rejects the offer is  $\eta\frac{1}{2} + (1 - z)V(\sigma^*)$ , where  $\sigma^*$  is the stake of the blockholder that maximizes the government's objective function in the absence of lobbying contributions. The payoff of the government if it accepts the offer is  $\eta(\frac{1}{2} + hC_L) + (1 - z)V(\sigma)$ . Hence, the condition for accepting the offer is  $\eta(\frac{1}{2} + hC_L) + (1 - z)V(\sigma) \geq \eta\frac{1}{2} + (1 - z)V(\sigma^*)$ . Or, equivalently,

$$C_L \geq q[V(\sigma^*) - V(\sigma)]$$

This constraint is satisfied with equality because once lobbying contributions are positive,

their effect on the probability that the incumbent party will implement its policy remains unchanged (this probability is always 1 as long as contributions are positive). Hence, the marginal benefit of an increase in the contribution beyond that needed to influence the policy of the incumbent party is 0, whereas the marginal cost is 1.

Let  $\hat{\sigma}$  denote the equilibrium level of the blockholder's stake when the politicians accept the contribution. Thus, if the contribution is positive, replacing the contribution in the objective function of the blockholder by its expression in the constraint,

$$\begin{aligned}\hat{\sigma} &= \arg \max_{\sigma} zV_L(\sigma) + \frac{1-z}{\eta h} V(\sigma) \\ &= \beta\alpha \frac{\lambda z \eta h \beta \alpha + (\lambda - 1)^3 \xi \gamma (z - 1)}{\gamma \xi \left[ (1-z) [(\lambda - 1)^2 \beta \alpha + (\lambda + 1)(\lambda - 1)^4 \xi \gamma] - z \eta h \beta \alpha (\lambda + 1) (\lambda - 1)^2 \right]}\end{aligned}$$

If the blockholder decides not to lobby the government ( $C_L = 0$ ) then  $\varphi(\Sigma^0) = \frac{1}{2}$  and she obtains  $\frac{1}{2}zV_L(\sigma^*)$ . Hence, the condition for the contribution being positive is then  $zV_L(\hat{\sigma}) - q[V(\sigma^*) - V(\hat{\sigma})] \geq \frac{1}{2}zV_L(\sigma^*)$ . Then,  $C_L > 0$  if  $q \leq z \left[ \frac{V_m(\hat{\sigma}) - \frac{1}{2}V_m(\sigma^*)}{V(\sigma^*) - V(\hat{\sigma})} \right]$ .

$$\sigma^* - \hat{\sigma} = \frac{(1-\lambda)\beta\alpha}{\xi\gamma(\lambda+1)(\lambda-1)^2 + \beta\alpha} - \beta\alpha \frac{\lambda z \eta h \beta \alpha + (\lambda - 1)^3 \xi \gamma (z - 1)}{\gamma \xi \left[ (1-z) [(\lambda - 1)^2 \beta \alpha + (\lambda + 1)(\lambda - 1)^4 \xi \gamma] - z \eta h \beta \alpha (\lambda + 1) (\lambda - 1)^2 \right]}.$$

If the denominator of  $\hat{\sigma}$  is lower than the denominator of  $\sigma^*$ , then a sufficient condition for  $\hat{\sigma}$  being higher than  $\sigma^*$  is that the numerator of the former not be lower than the numerator of the latter. If  $z \geq 1 - \frac{1}{(\lambda-1)^2 \gamma \xi}$ , then the denominator of  $\hat{\sigma}$  is smaller than the denominator of  $\sigma^*$ . Then for the numerator of  $\hat{\sigma}$  to be larger than the numerator of  $\sigma^*$ , a sufficient condition is

$$\gamma \geq \frac{(1-\lambda) - \lambda z \eta h \beta \alpha}{(\lambda - 1)^3 \xi (z - 1)}$$

■

If the bargaining power of the government at privatization is not too high, so that the blockholder derives substantial rents from privatization, lobbying by the blockholder happens in equilibrium and may yield a higher level of shareholder concentration than the benchmark. A sufficient condition for this is that the regulatory climate be sufficiently benign for private investors, so that the profits to be derived from a larger stake are high enough, and that private investors capture a sufficient proportion of the firm's value through the privatization price. The

difference in the interests of the blockholder and shareholder value as a whole is twofold: on the one hand, the blockholder directly increases his rents as his stake increases: on the other hand, only the blockholder monitors. In equilibrium, the direct effect for the blockholder of a larger stake dominates the costs in terms of lower managerial effort. Then the rents of the blockholder increase when his stake is larger than the one that maximizes shareholder proceeds. And the incentives for lobbying increase with the profitability of the investment, which depend on the privatization price and the regulatory climate.

Notice that the degree of deviation from the benchmark, both in the case of managerial lobbying and in the case of blockholder's lobbying, depends on parameters  $\eta$ ,  $h$  and  $z$ . The higher the value of these parameters, the more the equilibrium policy will be biased in favour of each of the pressure groups.

The equilibrium level of dispersion will be closer to the benchmark as the weight on political considerations relative to privatization proceeds,  $\eta$ , diminishes. This reflects that if the priority is to obtain revenues, the politicians will be less interested in lobbying contributions to obtain political advantage.

The equilibrium level of dispersion will also be closer to the benchmark if the bargaining power of private investors at privatization,  $z$ , is low. This will reduce the available rents that the blockholder extracts and that can be used to lobby the politicians, and increase the interest of the government in revenues both in the case that the blockholder lobbies and in the case that the manager lobbies.

Finally, the equilibrium level of dispersion will be closer to the benchmark if the effect of contributions on the ideological bias of median class voters,  $h$ , is low. The intuition for this is that if median class voters are not very responsive to money spent on convincing them, then the political value of this money decreases.

### **3.6 Extension: The Identity of the Large Shareholder and Partial Privatization**

This section extends the model in the case that  $\eta = z = 0$  to show that partial privatization may arise as a combination of efficiency considerations and political strategies. Both motives

for keeping the government as the blockholder have been analyzed separately in the literature (see Perotti, 1995; and Shleifer and Vishny, 1998, respectively).<sup>35</sup>

In addition to the set-up introduced in Section 3.2. I assume that the government can choose between staying as the large shareholder of the company or selling the largest stake of the firm to a private strategic investor. The problem that the privatizing government solves consists of choosing the optimal  $\sigma$  as in the previous sections for two different potential large shareholders, and then choosing in the first place the one with which it obtains a highest payoff. These two potential blockholders are the government itself and a private strategic investor. The other shareholders are assumed to be atomistic as in the previous sections, regardless of the identity of the large shareholder. The two possible blockholders differ in their efficiency as monitors. If the government stays as a large shareholder it can obtain direct benefits of control<sup>36</sup> in addition to the profits of the firm, for example in terms of votes and patronage.

The private shareholder can also derive private control benefits, which do not benefit the small shareholders. In both cases, the control benefits are independent of the exact proportion of shares held by the blockholder, and are assumed not to interfere with the cash flows of the firm.

Let  $\alpha_G$  denote the exogenous monitoring costs if the government is the largest shareholder, and  $\alpha_P$  the exogenous monitoring cost if the largest shareholder is a private strategic investor. Let  $B_G$  denote the control benefits if the government stays as the largest shareholder and  $B_P$  the control benefits of the private strategic shareholder. These parameters will typically vary across countries, depending on the political system, the constraints on cross shareholdings, the characteristics of the financial system, etc.<sup>37</sup>

Let  $\sigma^*(\alpha_i)$ ,  $i = G, P$ , be the optimal stake of the largest shareholder, which is the equilibrium of the model presented in the previous section. Then the expected payoff for the

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<sup>35</sup>The choice of partial or full privatization does not exhaust the description of all possible options available for the structure of corporate ownership in a privatized utility. Trujillo et al. (1998) have analyzed the possibility of unbundling the financial and operational responsibilities in an infrastructure project. The water regulator in the UK has recently considered the possibility of allowing non-profit debt financed firms to own infrastructure assets. For the strategic advantages of non-profit firms, see Besley and Ghatak (2000).

<sup>36</sup>Jones et al. (1999) show that in practice governments introduce control restrictions after privatization for political reasons.

<sup>37</sup>It is assumed that different countries will have different private strategic investors available. These may be a consortia of private investors, a foreign group, banks, pension funds, another utility, etc. All of these may differ in terms of monitoring efficiency and the private benefits that can obtain from the firm's control.



government under partial public ownership,  $V_G$ , has three components:

1) the revenues from the public offer to sell shares to the small shareholders, equal to

$$(1 - \sigma^*) [(1 - \lambda)a(\sigma^*(\alpha_G), \alpha_G) + \lambda] \Pi(p, e(\sigma^*(\alpha_G)));$$

2) a proportion of the expected profits of the firm minus monitoring costs, equal to

$$\sigma^* [(1 - \lambda)a(\sigma^*(\alpha_G), \alpha_G) + \lambda] \Pi(p, e(\sigma^*(\alpha_G))) - \alpha_G \frac{[a(\sigma^*(\alpha_G), \alpha_G)]^2}{2};$$

and 3) the "political" control benefits  $B_G$ . Adding these three terms,

$$V_G = [(1 - \lambda)a(\sigma^*(\alpha_G), \alpha_G) + \lambda] \Pi(p, e(\sigma^*(\alpha_G))) + B_G - \alpha_G \frac{[a(\sigma^*(\alpha_G), \alpha_G)]^2}{2} \quad (3.30)$$

The expected payoff for the government if it sells the largest stake to a private strategic investor,  $V_P$ , has two components:

1) the revenues from the public offer to sell shares to the small shareholders, equal to

$$(1 - \sigma^*) [(1 - \lambda)a(\sigma^*(\alpha_P), \alpha_P) + \lambda] \Pi(p, e(\sigma^*(\alpha_P)));$$

2) the revenues from selling a stake to the strategic investor. The government has all bargaining power at privatization and hence can extract all the surplus expected by the large shareholder. This expected surplus has two parts: a proportion of the expected profits of the firm minus monitoring costs, equal to

$$\sigma^* [(1 - \lambda)a(\sigma^*(\alpha_P), \alpha_P) + \lambda] \Pi(p, e(\sigma^*(\alpha_P))) - \alpha_P \frac{[a(\sigma^*(\alpha_P), \alpha_P)]^2}{2};$$

and the private control benefits  $B_P$ . Adding these terms:

$$V_P = [(1 - \lambda)a(\sigma^*(\alpha_P), \alpha_P) + \lambda] \Pi(p, e(\sigma^*(\alpha_P))) + B_P - \alpha_P \frac{[a(\sigma^*(\alpha_P), \alpha_P)]^2}{2} \quad (3.31)$$

Let  $\Delta$  denote the difference between the "political" control benefits and the control benefits that can be obtained by the private strategic investor, i.e.  $(B_P - B_G) = \Delta$ .

I will focus attention on the interaction between monitoring efficiency, control benefits and regulatory climate, making simplifying assumptions about the other parameters. Proposition 11 and Corollary 12 show the results.

**Proposition 11** *With  $\lambda = 0$ ,  $\beta = \xi = 1$ . partial public ownership is preferred if*

$$\left[ \frac{\gamma}{2\gamma + \alpha_G} \right] \frac{\gamma^2 + \gamma\alpha_G}{2\gamma + \alpha_G} - \frac{1}{2}\alpha_G \left[ \frac{\gamma}{2\gamma + \alpha_G} \right]^2 > \left[ \frac{\gamma}{2\gamma + \alpha_P} \right] \frac{\gamma^2 + \gamma\alpha_P}{2\gamma + \alpha_P} + \frac{1}{2}\alpha_P \left[ \frac{\gamma}{2\gamma + \alpha_P} \right]^2 + \Delta \quad (3.32)$$

**Proof.** With  $\lambda = 0$ ,  $\beta = \xi = 1$ ,

$$\sigma^*(\alpha_i) = \frac{\alpha_i}{\gamma + \alpha_i}, \quad i = G, P.$$

This is substituted in the expected payoffs of the government under each regime, i.e. (3.31) and (3.32), and the inequality in the proposition follows. ■

The preferred regime depends on a comparison of the monitoring efficiency of both large shareholders (the government and a private investor) and a comparison between the "political" benefits that the government may obtain under partial public ownership and the control benefits that a private strategic investor may obtain. Corollary 12 follows immediately from the previous proposition's inequality:

**Corollary 12** *If  $\gamma = 0$  and  $\Delta < 0$ , then a regime with partial public ownership always dominates a regime with a private strategic investor, i.e.  $V_G > V_P$ . In particular, this holds true for any value of  $\alpha_G$  and  $\alpha_P$ .*

No matter what is the differential efficiency as monitors of public versus private owners, if the regulatory climate is completely unfavourable to producers then if the political control benefits are higher than the private control benefits, partial public ownership is always preferred to a private strategic investor.

This formalizes the idea that a successful privatization must guarantee a positive return to investors. Levy and Spiller (1994) compare utilities' privatization and regulatory regimes

in several countries and conclude that different successful privatizations may have a number of institutional differences, but have in common that they are able to commit to a relatively lenient regulatory regime.

As liberalization progresses the private sector will be dominant in network industries because the costs (political and economic) of nationalizing entrants are much higher than the costs (political and economic) of keeping incumbents in the public sector (at least partially). As reflected in the previous exposition by parameter  $B_G$ , incumbents will typically have well entrenched interest groups associated to public ownership that will try to block full privatization. Entrants, however, will typically not have interest groups associated claiming for nationalization. Nevertheless, for the reasons presented above it should not be surprising that incumbents under government control still play an important role in these changing industries.<sup>38</sup>

### 3.7 Empirical Evidence

The following empirical implications emerge from the previous model: 1) we should expect blocks of limited size in the ownership of privatized utilities; 2) we should expect the type of privatization of utilities to evolve over time in accordance to the evolution of the parameters of the model, i.e. deregulation leading to higher shareholder concentration; 3) In some cases political and economic considerations may lead to partial privatization.<sup>39</sup> The second prediction is related to one of the findings of the literature on takeovers and industry effects, namely that

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<sup>38</sup>Other theories may also help explain the preference for partial privatization. Perotti (1995) points out that by keeping a stake of the firm, the government signals to private investors its commitment to policies that are favourable to investors. Bhagat et al. (1990) argue that concentrated ownership after takeovers may be only one step towards a restructuring of the firm through the reselling of some assets, leading to a new corporate specialization with new entities that, again, have a dispersed ownership. Both theories are consistent with an idea of partial privatization or concentrated ownership as a temporary stage. Neither of them is incompatible with the model presented above, by which some parameters loosely related to deregulation make full privatization through a dispersed shareholding a sub-optimal strategy. Whether and how governments that have partially privatized their utilities will eventually transfer their stakes to the private sector remains an open issue.

<sup>39</sup>If risk concentration is added as a concern for the privatizing government, a corollary follows these empirical implications. Given the size of firms in the utilities sector, single institutional investors that have smaller costs of underdiversification than individual shareholders should have high control of utilities. These single institutional investors may be governments themselves (partial privatization or sale to foreign state owned firms) or banks. Hence, except for the possible role of banks or other financial intermediaries, deregulation would not be a trigger for full privatization. In fact, by increasing the optimal size of the largest shareholder, it may make full sale to the private sector more difficult. A concern against wealth or power concentration in private hands would have the same effect.

deregulation is a significant factor explaining mergers and tender offers across industries.<sup>40</sup> This similarity of results should not be surprising, since a takeover implies an increase of shareholder concentration.

It is certainly too early in the privatization process of many countries to undertake an exhaustive statistical analysis of these predictions, but evidence can be provided to strengthen some of the points made above.

Meggison et al. (2000) analyze the determinants of the choice between share issue and asset sale at privatization for a sample of 1992 privatizations between 1977 and 1998. The evidence they present is consistent with the idea that governments have been increasingly inclined to privatize through asset sales yielding concentrated shareholding.<sup>41</sup> They show: 1) that governments are more likely to relinquish majority ownership through asset sales; 2) that asset sales have become larger and more numerous over time; 3) that strategic industries are more associated with asset sales in less developed countries; and 4) that share issue privatizations are positively related to the size of the firm and to its profitability. Although they do not distinguish between total and partial privatizations and they do not include the regulatory climate as an explanatory variable (which are important ingredients of the model presented above), their results are consistent with the main idea here, namely that total privatization with a very dispersed shareholding is a very extreme and unlikely case. Interestingly, they report that "prior to the 1990s, asset sales accounted for 38% of the privatizations in the number of transactions and 8% of the assets privatized. In the 1990's, these numbers changed dramatically, with assets sales accounting for 64% of the transactions and 38% of the privatized assets."

These results can be interpreted using the tools of the model presented above. The fact that asset sales have increased as a proportion over time is consistent with a tougher regulatory climate that has decreased profitability, at least in the case of regulated firms. Share

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<sup>40</sup>See for example Mitchell and Mulherin (1996).

<sup>41</sup>In a previous study, the same authors were providing arguments as to why governments were supposedly increasingly privatizing via share offerings (see Meggison and Netter, 1997). They made the following claims: 1)"Public offers are the only practical method of selling off the very largest state owned firms, from both an operational and a financial perspective." 2)"A public share offering is by far the most transparent method of selling corporate assets." 3)"Governments have realized that they can modify the share allocation, pricing, and other terms of a public share offering to achieve political -as well as economic- objectives." 4)"Public offers aimed (at least partly) at domestic investors have vastly increased the total capitalisation and trading volume of almost every major non-US stock market."

issue privatizations increasing with the profitability of the firms is consistent with more lenient regulation favouring the "initiative effect" on managerial effort.

Two reasons emerge for why strategic industries are more associated with asset sales in developing countries. First, in these societies the size of the median class is small, which reduces the political pressure for a dispersed ownership to increase consumer surplus. Second, these societies lack a managerial class that can make a significant contribution to product quality or that are politically strong enough to collude with politicians (note that transition economies do have such a class, which would favour mass privatization).

Since the privatization of BT in 1984 it has become a standard prescription to privatize a large telecommunications or electricity firm by means of a public offer. This would promote *popular capitalism* and facilitate regulation through the information provided by the stock price. According to the conventional wisdom, a privatized utility should be a *public company* based on the anglo-saxon model. Some large scale public offers, which were publicized as the largest in history in each country or even in Europe (such as Endesa in Spain or Enel in Italy) have contributed to the image that privatizations through public offers are the best option available, and that privatized utilities should normally have dispersed shareholdings. However, data on privatization techniques of electricity companies and a description of ownership structures of telecommunications incumbents in important European countries give quite another picture. In many cases, it turns out that public offers have been a complement to partial state ownership, so that the resulting companies can best be described as companies with a large blockholder, the blockholder being the government itself.

Out of seventeen countries analyzed by Bortolotti et al. (1999), only four have fully privatized their electricity firms to create a broadly dispersed shareholding. Out of these four, the English Regional Electricity Companies in the distribution sector were taken over after the British government lifted the golden share in 1995; and in Spain, another one of these four countries, the government has a 10 year golden share on the fully privatized and broadly held Endesa.

### **3.7.1 The Privatization of Telecommunications Incumbents**

Meggison et al. (2000) also report that telecommunications predominate among share issue privatizations (SIPs), representing 41% of the assets sold through SIPs (while being only 12.3% of the value sold through asset sales). Using the model presented above, a possible interpretation is that this is the case because the role of quality improving managerial effort is very important in an industry subject to technological change, and this more than compensates the effect of increasing firm-specific uncertainty. However, another explanation is that many of these SIPs keep the state as the largest shareholder. This is something that cannot be confirmed in Meggison et al. (2000), because they do not distinguish between total and partial privatization (this may also partly explain why larger firms in the sample favour SIPs; as a matter of fact, they find that governments are more likely to relinquish majority ownership through asset sales). Data from European incumbents seems to confirm this hypothesis.

In many countries, the privatization of stakes in telecommunications firms has taken place before electricity privatization. Hence, one would expect that telecoms privatization is basically a finished process in most countries. However, inspection of the reality in most Western European countries shows that, at the beginning of 2000, most of them still have the government as the controlling shareholder.

The following table summarizes the situation for fourteen countries in Western Europe. Most of these countries liberalized their telecommunications services in 1998, following the decisions of the European Union.

Ownership Structure in European Telecommunications Incumbents

Partially Privatized	Dispersed Ownership	Concentrated Ownership
Portugal Telecom (Portugal)		
France Telecom (France)		
Deutsche Telekom (Germany)		
Austria Telekom (Austria)		
KPN (Netherlands)	British Telecom (UK)	Telecom Italia (Italy)
Telenor (Norway)	Telefonica (Spain)	Telecom Eireann (Ireland)
Telia (Sweden)		
Swisscom (Switzerland)		
OTE (Greece)		
Sonera (Finland)		

Source: Financial Times Database

Most of the firms in which the government has the control have partially privatized the companies through public offers (most of them in the second half of the nineties), but the government still has a stake large enough to appoint the chief executive. Two companies have a fully privatized and broadly held shareholding. However, there are many differences among them. BT was privatized in 1984, a time of economic expansion in the business cycle (see Martin and Parker, 1997), and facing the prospect of a stable market share due to the British duopoly policy. Telefonica was fully privatized in 1996, when the telecommunications sector was already facing immediate liberalization and much faster technological change.<sup>42</sup> Only two companies have a fully private ownership and a blockholder of large size.<sup>43</sup>

It is remarkable that at the end of the nineties, after very significant public finance pressure (especially acute in some countries due to the creation of the single European currency), privati-

<sup>42</sup>Although at the time of the last privatization tranche Telefonica had a "hard core" of shareholders (two banks and one savings bank each holding 5% of the shares), the new management took steps to ensure it would have a large margin of manoeuvre. See Bel and Trillas (1999). The largest shareholder has become BBVA in February 2000. It reached 10% of shares but did not have the power to appoint the Chairman or CEO. The Spanish government holds since 1996 a ten year golden share on Telefonica.

<sup>43</sup>The controlling investor in TI is Olivetti after the takeover in March 1999 and the largest shareholder in Telecom Eireann is KPN of the Netherlands (itself under the control of the Dutch government, which holds 44% of the company's stock).

zation waves, and deregulation, most important countries in Europe still keep their telecommunications incumbents under state control. A plausible conjecture is that a sizeable controlling block maximizes the value of the company, and that selling such a block to a single private shareholder would raise important issues of risk and wealth concentration (possibly in the hands of foreign investors). Also, the state may keep the valuable real option of selling at a future date when the value of the exogenous parameters may make the choice of a broader ownership more desirable. But at the end of the nineties deregulation may have influenced the value of parameters such as monitoring costs, regulatory climate or congruence between manager and shareholders in such a way that dispersion has become a suboptimal strategy.

### 3.8 Conclusion

Privatizing governments may value shareholder dispersion for a number of reasons. A broadly held company may have a positive effect on managerial initiative, and there may also be political advantages of dispersion. The extent to which dispersion is *ex-ante* an efficient commitment device that increases the value for investors depends on exogenous parameters that may be generally related to the state of deregulation. High levels of firm specific uncertainty due to deregulation make ownership concentration more desirable, under some conditions. That is because a tougher regulatory climate, higher monitoring costs and better alignment between manager and shareholders may reduce the commitment value of dispersion.

Political objectives may yield more or less shareholder dispersion than the benchmark where the government maximizes shareholder proceeds. More dispersion may be caused by three factors: a direct ideological effect of dispersion on the median class bias in favour of the incumbent government; the impact of managerial effort on the consumer surplus of median class voters; and collusion between politicians and managers. Less dispersion may be caused by collusion between politicians and blockholders. Partial privatization may follow if the political costs of selling the optimal largest stake to a private blockholder are too high. The regulatory climate is an important determinant of the political equilibrium in all these cases.

The fact that there are very few regulated firms that have been fully privatized in the nineties by means of public offers is consistent with the model presented. There are available



options other than full privatization through public offers, such as selling the firm to strategic investors; keeping the firm temporarily in the public sector; or breaking it up and privatizing each segment differently.<sup>44</sup>

Some authors argue that the terms of a privatization can be chosen to promote the development of stock markets (see Jones et al., 1999). It may be conjectured that there are better instruments to achieve the objective of a more efficient stock market. Tirole (1991) argues convincingly that the order of priorities should be the opposite: first develop the stock market, and next base privatizations on it.<sup>45</sup> Recent takeovers of quoted privatized firms in Latin American countries have substantially reduced the liquidity of their stock markets, which shows that share issue privatization does not necessarily yield a developed local stock market after some time.<sup>46</sup>

An important topic that is left for future theoretical research is the role of the control market in constraining the political equilibrium. Burkart et al. (1997) show that, although an increase in the blockholder's stake would be *ex-post* beneficial, the optimal ownership structure is robust to retrading due to the free-riding problem among small shareholders.<sup>47</sup> A similar argument could be made to show that it is robust to takeovers. In their basic model they do not allow for the possibility of changes in the management of the firm nor for the existence of private control benefits for the blockholder.<sup>48</sup> The integration of these important issues in a political economy model would shed light on the role of privatized firms as bidders or targets in the market for corporate control.

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<sup>44</sup>Joskow and Schmalensee (1995) argue that political and information constraints may preclude widespread fine tuning of the existing industrial hierarchies prior to privatization.

<sup>45</sup>Fulghieri and Zingales (1998) favour dispersed shareholding in the long run, but in the short run, and until legislation that protects small investors is introduced, they favour the presence of strategic investors.

<sup>46</sup>The clearest example is the bid by Spanish Telefonica to acquire 100% of most of its American subsidiaries in January 2000.

<sup>47</sup>The literature on takeovers is inconclusive about the issue of whether the free-rider problem among small shareholders is enough to prevent efficient takeovers from happening. Grossman and Hart (1980) show that takeovers will not take place in equilibrium if shareholders are infinitesimal and have complete information about the raider's value. Yilmaz (1999) shows that takeovers do take place in equilibrium if there is incomplete information about the raider's value, and shareholders have the opportunity to vote for the raider as manager even if her takeover fails. On the other hand, takeovers in regulated sectors have additional problems that make them more costly and protracted (see below, Chapter 4).

<sup>48</sup>For the role of private benefits in control transactions and posttakeover moral hazard, see Burkart et al. (1998 and 2000).

## Chapter 4

# The Takeover of Enersis by Endesa: the Control of Privatized Utilities

### 4.1 Introduction

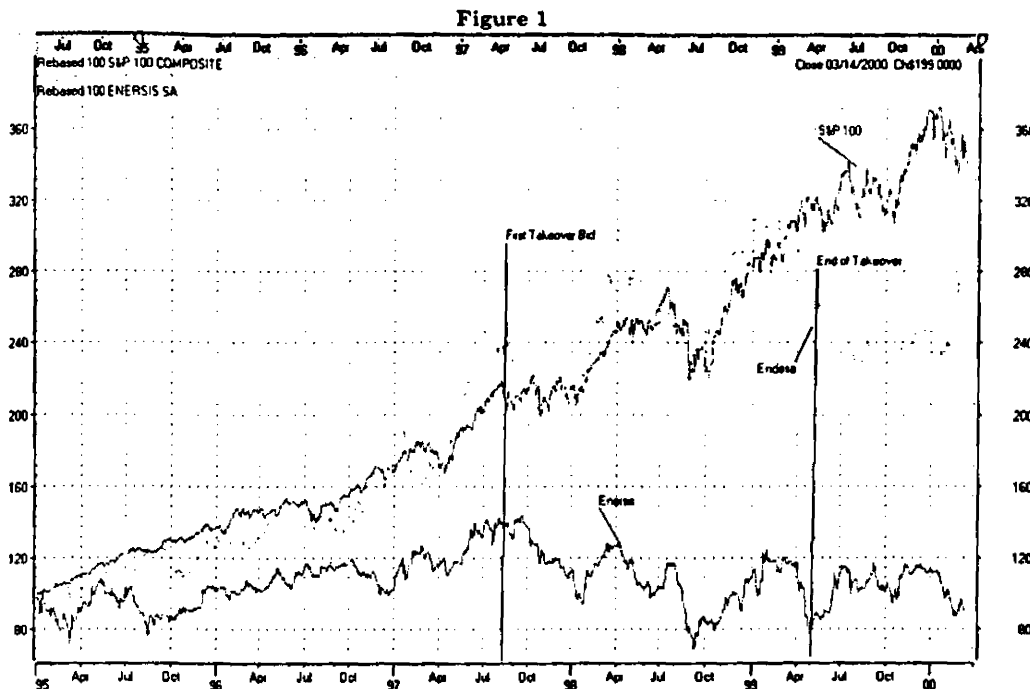
The acquisition of the 32 per cent of Chilean Enersis by Spanish Endesa in 1997 and of another 32 per cent in early 1999 illustrates the specific features that characterize the control market in sectors that experience regulatory reform. A firm with a majority of state ownership at the beginning of the events studied here, and that was in the process of being privatized, took over a fully privatized utility. The analysis suggests that the transaction did not create value for the shareholders involved. It is an example of the free cash flow theory: when there are no positive net present value projects available to the manager, he may waste the available resources instead of giving them back to investors. More than correcting a managerial problem in the target firm, the case shows an agency problem in the bidding firm.

Endesa,<sup>1</sup> the largest electricity company in Spain, initially expected to take control of Enersis, the dominant conglomerate in the Chilean electricity sector, for \$1,500 million, and it eventually spent more than \$5,000 million. The present chapter aims at answering the following questions: why was taking control of Enersis such a costly and protracted process for

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<sup>1</sup>Endesa stands for Empresa Nacional de Electricidad, S.A. By this name, I denote the Spanish firm. There is also a Chilean firm with the same name, that initially had no relationship whatsoever with the Spanish firm. To distinguish among them, I will refer to the latter as Chilean Endesa or Endesa Chile.

Endesa? What was the value impact for the shareholders of both companies of the different episodes in the control shift? Figure 1 shows the evolution of the stock prices of both companies, as compared to the S&P 100 index, during the pre-takeover period, the takeover period and the post-takeover period up until March 2000.



Comparison between Endesa, Enersis and S&P 100

The analysis is consistent with the hypothesis that takeovers of regulated firms are vulnerable to the political mobilization of affected constituencies. Control contests bring light to regulatory issues, which acquire a new salience as a result of takeovers.<sup>2</sup> This decreases the benefits of the acquisition (because it tilts regulation in favour of consumers), increases its costs (because incumbents use political tools to defend themselves) and also increases the time needed to complete the takeover, if it is successful. It is shown that the impact of the events in the case under study on shareholder value is consistent with the agency hypothesis of takeovers, by which the acquisition is a result of agency problems in the bidding firm. In the case of Endesa, these agency problems have their origin first in public ownership and also in the method and

<sup>2</sup>In terms of the model presented in Chapter 2, they increase the proportion of voters that are informed about these issues.

timing chosen to privatize the firm.

Endesa wanted Enersis to become its central platform for its expansion in Latin America. This chapter aims at judging Endesa's performance by its own standards. i.e., inquiring whether the acquisition of Enersis was favourable to shareholders' interests or not. The methodology employed is similar to other clinical studies<sup>3</sup> that analyze value creation or destruction in acquisitions by large firms, such as Ruback (1982 and 1983), Baker (1992), Lys and Vincent (1995), Bruner (1999) and Gillan et al. (2000).

The structure of the chapter is as follows. Section 4.2 presents key elements of the framework in which the events under study took place: electricity privatization in Chile, and the recent history of both Chilean Enersis and Spanish Endesa. It also explains the hypotheses used to analyze the facts and data. Section 4.3 shows the facts, and the quantitative results. Section 4.4 tackles the issue of whether Chilean companies benefitted from synergies in the vertical integration between different segments in the electricity industry. Section 4.5 concludes.

## 4.2 Background

### 4.2.1 Electricity Privatization in Chile: the Role of Enersis

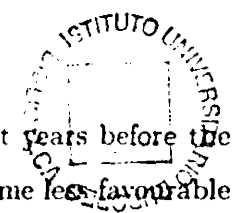
As it is well-known,<sup>4</sup> during the military dictatorship (1973-1989) Chile reduced the size of its public-enterprise sector in relation to GDP from 39% in 1973 to 16% in 1989 (6.6% if the largest remaining public enterprise, the copper-mining CODELCO, is excluded).

The privatization of the electricity industry took place at the end of this process. Although there were several firms in the resulting industry, Enersis was kept as a dominant holding with stakes in generation, transmission and distribution. The legislation on electricity left little scope for the regulators' discretion, in that it fixed precise formulae for the computation of tariffs. As a result, the industry undertook important investment projects and obtained high rates of return under private hands. Credibility and commitment were achieved at the cost of lenient

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<sup>3</sup>As argued by Ruback (1982), the study of individual takeovers may complement the research based on averaging techniques. The latter are usually based on one single announcement per firm, whereas a takeover often involves several distinct information releases. The analysis of protracted control contests shows that the definition of a "major announcement" is ambiguous.

<sup>4</sup>See for instance Galal et al. (1994).



regulation and high levels of market power for the incumbents.<sup>5</sup> In the last years before the takeover, and during the takeover, however, the regulatory climate had become less favourable for privatized utilities.

Just before the takeover by Spanish Endesa, Enersis had 5.4 million clients, controlling 40% of distribution in Chile (8.134 GWh). This it did through Chilectra, of which it owned 75%, and Rio Maipo, who were the market leaders. 48% of Chilean generation was controlled by Enersis through its 25.3% stake in Endesa Chile. It also participated in Transelec, which controls energy transmission in the Chilean system. It also owned shares in firms in Colombia, Peru and Argentina. The ownership of Enersis was distributed among the Chispas companies (Chispa Uno, Chispa Dos, Luz y Fuerza, Los Almendros, Luz) who owned 1/3, the pension funds (AFPs: Provida, Habitat, Santa Maria, Summa, Cuprum, Proteccion) with 1/3. The last 1/3 was dispersed amongst the stock exchanges of New York and Santiago, although some local investors, such as the Luksic group, had important stakes. The political rights in the holding were concentrated in the executives of the Chispas companies.<sup>6</sup>

#### 4.2.2 Endesa: Preparing for Deregulation

Endesa was founded in 1944 as a public sector firm. In the 1980s it started a strategy of expansion and diversification. The company expanded in Spain and abroad, and in other sectors, such as telecommunications and oil. As far as the privatization of Endesa is concerned, the following table summarizes the four privatization tranches of the company:

<sup>5</sup>See Levy and Spiller (1996), Spiller and Viana (1996), Bitran and Serra (1998) and Galetovic (1998).

<sup>6</sup>Bebchuk and Zingales (1996) show how dual vote shareholdings (such as Enersis' prior to Endesa's takeover) may increase the gap between the private and social optimality of an ownership structure based on a controlling group as compared to a structure based on dispersed ownership.

Table 1

## Privatization Tranches of Endesa

Date	Daily Initial Returns (%)	Gross Proceeds Euro 10 <sup>6</sup>	Capital Sold(%)	Remaining state stake
6/88	6.2	445.9	20	76
5/94	1.5	1007.9	9	67
10/97	-1.5	4195.8	25	34
6/98	-1.5	6834.8	33	3

Source: Bel (1999)

The figures in the table show that most of public ownership was divested in a very short period of time, with a high priority given to obtaining revenues, since there was no underpricing in the last two tranches. The government had also to be consistent with its objective of promoting popular capitalism and preserving (as in the privatization of other firms in this period) the managerial teams appointed by the government. The result of the privatization was a company with a very dispersed shareholding and a managerial team, certainly previously appointed by the government, that could behave with a high degree of discretion. Along the lines of protecting the managerial team from any interference, and as part of its privatization policy, the government established a 10 year Golden Share in Endesa.

On 12/5/97, before the privatization of the last tranche, the shareholders meeting approved a number of defensive measures to protect the management team and facilitate the appointment of *independent* directors. The statutes of the company were modified to open the door to an even bolder diversification strategy.

Endesa had in 1999 50% of generation and 43% of distribution in Spain. Historically, it has faced the competition of a number of private firms, the most important of which being Iberdrola. Iberdrola has also assets in both generation and distribution, but a higher weight in distribution.<sup>7</sup>

<sup>7</sup>See Trillas (2000) for further analysis of electricity privatization and regulation both in Chile and Spain.

### 4.2.3 Hypotheses

The introduction of competition in the original businesses may push incumbent utilities to diversify into other regions and sectors.<sup>8</sup> In developing countries, to the extent that some transfer of know-how is non-marketable, this transfer may only be possible through the direct involvement of foreign utility companies. However, takeovers may have important costs, which have been studied by the rich literature on the motives of takeovers (see for example Weston et al., 1998). The specific case of the corporate control market of privatized utilities raises two concerns. First, privatized firms may present inefficient corporate governance structures that shape mergers and acquisitions strategies. Second, regulation and the control market interact constraining the gains from takeovers.

The corporate governance problems of privatized utilities may be related to the free cash flow theory of takeovers (see Jensen, 1986 and 1988). Free cash flow is cash flow in excess of that required to fund all projects that have positive net present values when discounted at the relevant cost of capital. Thompson (1999) shows that in their immediate post-privatization, regulated environment the UK utilities experienced severe attenuation of all the principal forms of corporate governance, while remaining substantial cash generators but with limited scope for core business growth.

The takeover of a regulated firm may easily end up with the regulator expropriating the gains, if they exist, from the acquisition.<sup>9</sup> Additionally, on the one hand the time required for a utility transaction may reduce the value of any spread between the market and the transaction price. On the other hand, the pressure to consummate an acquisition gives intervener groups high leverage. Delay may be a significant impediment to any hostile offer. It allows the target firm time to arrange defenses or seek alternative bidders. Many stakeholders with little ability to affect a non-regulated offer can use the delay to organize opposition to a regulated offer and

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<sup>8</sup>This makes the work of regulatory authorities more difficult (for example, to compute the equity cost of capital of particular segments through the stock prices).

<sup>9</sup>Inside the group of regulated industries, different types of regulatory regimes may favour or not a takeover. With price cap regulation, if bidders retain efficiency gains made under the price cap, bidder incentives would be restored and the control market would be enhanced. Regulation in Chile at the time of the events studied here was not exactly based on price caps. It was similarly based on forward looking cost based prices, calculated using a benchmark "efficient firm." Efficiency gains could be expected to be kept because of this forward looking characteristic and because of the leniency of regulation. However, the regulatory climate in Chile was changing towards being less pro-investor at the time of the takeover.

influence the decision of the regulatory bodies. Regulatory scrutiny usually increases during a control event and typically includes public analysis of the potential effect of the offer on prices.<sup>10</sup>

### 4.3 Facts and Impact on Shareholders' Value

The quantitative methodology used consists of estimating a market model in an estimation window and computing the three day abnormal returns for the events of interest (the day before the event is announced, the announcement day and the day after). Abnormal returns and t-statistics are computed in a way that is standard in the event study literature (see Armitage, 1995, and Trillas, 2000).

The market returns (the index Ibex-35 in Spain and the index IPSA in Chile) have been adjusted to account for the high weight of the companies of interest, that is

$$r_m^{adj} = \frac{r_m - \omega_i r_i}{(1 - \omega_i)} \quad (4.1)$$

Where  $r_m^{adj}$  stands for the adjusted market return,  $r_m$  is the unadjusted market return,  $\omega_i$  is the weight of each company in the market index and  $r_i$  is the company's return. A weight of 11% was used for Endesa and a weight of 36% for Enersis<sup>11</sup>. Sensitivity analysis with different models and t-statistics is provided in the appendix. The estimation window used goes from 01/01/94 to 30/6/97.

Information on the events of interest was collected from CNSE reports, the web page of the Spanish stock exchange regulator (CNMV), plus press articles from the Spanish newspaper *El Pais*, the Chilean newspaper *El Mercurio* and *The Wall Street Journal*. Stock price and accounting data come from *Datastream* and *Sequencer*.

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<sup>10</sup>McLaughlin and Mehran (1995) analyze the issue of takeovers in the utilities sector using US data (the only data available prior to the privatization wave in other western countries in the 80s and 90s) and report that regulation significantly constrained takeover activity. In the US, of the twenty-one hostile offers for utilities between 1960 and 1990, only one was successful. In spite of this low rate of completion, announcement period returns to target utilities are positive and significant, although substantially lower than average returns to nonregulated targets.

<sup>11</sup>These correspond to the weight of Endesa in the Ibex-35 index at the end of 1998 and to the weight of both Enersis and Endesa Chile in the Ipsa index at the same time. The composite weight of both Chilean companies is the one used because Endesa Chile, controlled by Enersis, was also affected by the events reported here.



### 4.3.1 The First Takeover Bid

In the early days of August 1997, Endesa, the Spanish largest electricity company, announced a strategic alliance with a group of key executives of the largest Chilean electricity company, Enersis. At the time Endesa was still partially state-owned<sup>12</sup> with a majority of public ownership (66.9%). The alliance included a tender offer for the 5 investing Chispas companies. There were two types of shares in the Chispas societies: ordinary ones (type A) and the ones with political rights attached (type B). These ultimately guaranteed the control of Enersis by Jose Yurazcek and the group known as key executives ("directivos clave").

Endesa planned to acquire control of Enersis by taking over the Chispas societies (which owned around 30% of Enersis) and reaching an agreement with the managers that held the majority of political rights in them and the key managerial positions in Enersis. However, three related sets of events prevented Endesa from reaching its objectives:

- 1) One of the Chispas societies, Luz, initially rejected Endesa's offer.
- 2) Both the Spanish and Chilean securities regulators (CNMV and SVS, respectively) objected to the lack of transparency in the agreement reached between Endesa and the key executives.
- 3) Both the Chilean and Spanish Parliaments started inquiries about the deal struck between Endesa and the key executives.

It was known later in August that the agreement included the guarantee that the key directors, including Yurazcek, would remain in their positions in exchange for Endesa's control of Enersis' Board of Directors. Furthermore, these executives were given the option of buying up to 5% of Spanish Endesa's stock, thus becoming pivotal in the control of the Spanish company. During the following week, Endesa managed to buy up to 32% of Enersis. However, following a regulators-sponsored inquiry, Yurazcek and the key executives had to resign and Spanish Endesa had to partially pull back from the operation: it would remain the owner of 32% of Enersis, but it would not have a majority of the Board of Directors.

Meanwhile, the Spanish government was trying to sell 25% of Endesa through a Share Issue privatization. When the public offer started on 29 September, Endesa's stock price was 3,195

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<sup>12</sup>The government had just announced the public offer of 25 to 35% of the capital, which would take place in September-October 1997.

pesetas. When the price was fixed, on 20 October, the stock price, and the price actually paid by institutional investors, was 2,685 pesetas. In addition to that, a proportion of the shares initially reserved for institutional investors had to be transferred to retail investors, who were sold the shares with a 4% discount. This change in the distribution, due to lower than expected demand from institutional investors, reduced the state's receipts because institutional investors did not afford any discount.

Before summer 1997, there was a *de facto* control scheme in Enersis based both on the percentage owned by Chispas and the trust and long-term relationship (cemented by political trajectories or affiliations and a good administration) between other shareholders and the key executives. Endesa anticipated at that time that the cheapest way to have a significant control of Enersis was by taking over Chispas and signing a management contract with the key executives.

The following table summarizes the chronology of this first period (for each event and company, the three-day abnormal return and the t-statistic, in brackets, are reported):

Table 2

Date	Event description (First Bid)	AR End.	AR Ene.
30/7/97	Negotiations between Endesa and Chispas are known, and the trading of the Chispas societies is suspended.	0.30 (1.19)	-0.45 (-0.15)
1/8/97	Endesa announces a strategic alliance with Enersis, which includes the creation of the joint venture Endesis and the takeover of Chispas.	-1.55 (-0.97)	2.61 (0.89)
3/8/97	Endesa offers \$220 for Chispas A shares (\$260 for employees) and \$185.000 for Chispas B shares, belonging to the 14 Directors-owners of Enersis.	-1.83 (-1.15)	0.65 (0.21)
5/8/97	It is announced that Endesa will have 4 out of 7 Directors in Enersis and two key executives of Enersis will be in Endesa's board.  S&P places Endesa's long term debt under surveillance.  Endesa announces bidding conditions for Chispas shares	-1.27 (-0.79)	-1.29 (-0.44)
19/8/97	The Chamber of Deputies sets up a special Commission to inquire on the transaction between Enersis' managers and Endesa.	0.33 (0.21)	-1.80 (-0.61)

\*: Significant at 0.10 level

\*\* : Significant at 0.05 level

\* \* \* : Significant at 0.01 level

Date	Event description (First Bid)	AR End.	AR Ene.
28/8/97	Endesa completes the takeover on Chispas, obtaining the control of 25.28 of Enersis through them. Endesa controls all Chispas societies except Luz.	0.01 (0.01)	-0.18 (-0.06)
16/9/97	Endesa increases its stake in Luz, from 21% to 33%, and buys a distribution electricity company in Colombia, Codensa.	-2.31 (-1.44)	2.76 (0.95)
29/9/97	Starting day of the Public Offer of Endesa's shares.	1.04 (0.65)	-1.94 (-0.66)
9/10/97	It is known that Endesa reported to the New York SEC details of the agreement with the key executives. By these details, if Chispas lost control of Enersis, Endesa would be free to terminate its agreement with Enersis and be able to purchase Enersis' stake in Endesis at book value instead of market value.	2.06 (1.29)	-0.48 (-0.16)
14/10/97	It is known that the strategic plan about joint investments of Enersis and Endesa through Endesis, presented at the SEC on 17 September, has not been filed in the Spanish CNMV. This plan reveals that Endesa, but not Enersis, will have veto power in this company.	-3.91*** (-2.44)	-0.81 (-0.28)
15/10/97	Both Endesa and Enersis declare their willingness to revise their strategic alliance.	-4.70*** (-2.94)	-0.81 (-0.28)
16/10/97	The setting up of Endesis is stopped.	-2.95* (-1.84)	0.80 (0.27)

Date	Event description (First Bid)	AR End.	AR Ene.
17/10/97	Endesa informs the CNMV that it will keep the investment in Enersis, and that the renegotiation of the alliance will not affect the amount invested.	-5.90*** (-3.69)	0.58 (0.20)
20/10/97	The government fixes the prices of Endesa's shares sold in the privatization.	-4.85 (-3.03)	-0.02 (-0.01)
23/10/97	The Board of Enersis asks Jose Yurazcek to resign.	3.68** (2.30)	-0.76 (-0.26)
30/10/97	Endesa informs the CNMV that the agreements with the key executives are no longer valid.	1.06 (0.66)	8.05*** (2.75)
6/11/97	S&P downgrades Endesa's long term debt from AA+ to AA.	-0.20 (-0.13)	-3.28 (-1.12)
18/11/97	Endesa reaches an agreement with Luz, by which the latter sales to Endesa its rights in Enersis.	-3.68** (-2.30)	-1.51 (-0.51)
27/11/97	A new board of Enersis is chosen, where Endesa has 3 out of 7 directors.	0.53 (0.33)	-0.01 (-0.03)

As can be seen in the table, the most significant events for Endesa's shareholders during the first takeover bid had a negative effect on stock value. The only significant effect for Enersis took place precisely when the initial terms of the agreement with the former managers of Enersis were overruled.

To see the effects of the Enersis events on the public offer (PO) to sell a 25% stake of Endesa that took place between 29/9/97 and 20/10/97 (the day in which the price was fixed according to the closing stock price of the day), the Cumulative Abnormal Returns (CARs) for the PO period and for 1 and 2 weeks after that are reported here:

Table 3

Days	CARs	t-statistic
29/9 to 20/10	-9.89***	-2.68
21/10 to 27/10	5.22***	2.52
21/10 to 3/11	5.88**	2.02

The problems in Chile undoubtedly reduced the value of the shares that were being sold: once the effect of the overall market movements is discounted, the residual effect, as an estimate of the abnormal return, is negative and statistically significant. The new shareholders obtained significant gains in the two weeks after the PO, but these less than compensated for the government's loss during the PO. This is clearly at odds with the definition that experts give of a successful equity offer.<sup>13</sup>

#### 4.3.2 The Transition: Endesa, a Minority in Enersis' Board

Endesa eventually obtained 3 out of 7, instead of 4 (as it was its initial target) of the directorships on the Enersis board. It had to reach an agreement about the appointment of a new Chairman, José Antonio Guzmán, with the other blockholders in the company, mainly the pension funds. Endesa had spent US\$ 1,500 million in the operation. In 1998, the Spanish company kept insisting that its final aim was to obtain strategic control of the company.

However, Endesa did not undertake any attempt to gain further control of Enersis during 1998. The last privatization tranche of Endesa took place in May-June 1998. Again, the revenues obtained by the state were lower than initially expected.

On December 18th of 1998 a crucial decision was taken by the Enersis Board of Directors, with the abstention of Spanish Endesa's representatives. This put an end to the stalemate in the company and opened the door to the final control contest. This decision was the sale of

<sup>13</sup>According to Lilja (1997): "If the offer is one of shares that are already being traded, then the share price should not decline between announcement and pricing. The share price should experience a modest rise and should not underperform the local index or comparable companies. (...) Fund managers often feel that companies come to the market before they are ready. This is the case with many privatizations where politicians dictate the timetable and where banks feel compelled for competitive reasons to recommend that the company do a deal as soon as possible."

Enersis' stake in Chilean Endesa, the electricity generating company.<sup>14</sup>

Table 4

Date	Event description (Transition Period)	AR	AR
		End.	Ene.
11/3/98	Enersis and Endesa sign a new strategic alliance.	7.47*** (4.67)	3.57 (1.22)
2/4/98	A consortium integrated by Endesa and Enersis wins the tender offer for the 51% of Coelce, a Brazilian electricity firm with 1.5 million clients, in a deal valued at \$873 million.	1.81 (1.13)	0.18 (0.06)
3/4/98	The Spanish government decides the sale of its 41% in Endesa.	2.87* (1.80)	1.11 (0.38)
17/4/98	A consortium led by Endesa reaches an agreement to manage the electricity interconnection between Brazil and Argentina.	-3.68** (-2.30)	0.51 (0.17)
8/6/98	The Spanish government announces the final price and share distribution of Endesa's privatization.	-8.23*** (-5.15)	2.63 (0.90)

<sup>14</sup>Some investment and asset restructuring decisions may be undertaken as defensive adjustments against ongoing or potential takeover attempts, as predicted by Dann and De Angelo (1988). The decision of a majority of Enersis' board to sell its stake in Chilean Endesa in December 1998 is an example of a bidder-specific deterrent. This sale had the objective of drawing the attention of antitrust authorities (which effectively happened) and creating unique (i.e. incumbent specific) advantages over the alternative management team (since it was argued that Spanish Endesa's experience was based on a vertically integrated company).

Date	Event description (Transition Period)	AR End.	AR Ene.
12/8/98	The Fiscalia General del Estado brings criminal charges against former key executives of Enersis and "other persons" responsible of the deal with Endesa.	3.06* (1.91)	-1.60 (-0.54)
14/10/98	Synapsis, a subsidiary of Enersis, loses against a subsidiary of Endesa in a bid for a supplying contract with a Colombian firm controlled by Endesa. At the same time, it is known that Endesa's executive will face more legal problems from the agreements with the Yurazcek team. Endesa reaches a strategic agreement with Gas Natural.	-9.02*** (-5.64)	1.90 (0.65)
18/12/98	Enersis board announces sale of stake in Endesa Chile	-4.36*** (-2.72)	9.54*** (3.26)
21/12/98	A consortium integrated by Enersis and Anglian Water wins the tender offer for the privatization of 35% of Esval, a water company in Valparaiso (Chile).	-4.60*** (-2.88)	5.90** (2.02)

It has to be taken into account that the events in the second half of December may have confounding effects from the controversy about the securitization of the stranded costs that was taking place in Spain. This decision was discussed by the Spanish Senate and Congress in the two last weeks of the year, and it was accompanied by numerous articles and statements from opposition politicians against it. It was also opposed by the electricity watchdog, CNSE. All this may have increased the political risk for investors in Endesa. The securitization was eventually approved on December 22nd., but its final implementation still depended on an inquiry opened by the European Commission.



### 4.3.3 The Second Takeover Bid

On January 22nd of 1999 Spanish Endesa announced a takeover bid for another 32% of Enersis, two weeks before the shareholders meeting that was expected to approve the sale of Enersis' stake in Chilean Endesa. Spanish Endesa announced that it would subsequently take control of Endesa Chile. The takeover would take place both in the Chilean and US stock markets, for an expected cost of US\$ 1,450 million. The offer included a 36% premium on the current stock trading. The offer was conditional on a previous lifting by Enersis' shareholders of the 32% ceiling on a single shareholders' ownership. For this decision to be taken, the vote of the Pension Funds was pivotal.<sup>15</sup> Although Endesa lost the vote in a first shareholder meeting by a very narrow margin and due to not enough vote from the owners of ADRs, some irregularities were detected in the vote. A new shareholders' meeting took place (as it can be seen in table 5), this time at the initiative of the pension funds represented in the Board of Enersis.<sup>16</sup>

According to newspaper *El Mercurio* (23/1/99), if the takeover succeeded, Endesa's investment in Chile would total US\$ 3,000 million, US\$1,500 million for each tranche. This amount was bound to be eventually even higher if Spanish Endesa increased Enersis' or its own participation in Chilean Endesa, as turned out to be the case. Spanish Endesa announced that it would also try to lift the limits on shareholder concentration in Chilean Endesa.

This second takeover bid for Enersis had two aims from Endesa's point of view: first, to put an end to the problems in Chile triggered by the first takeover and, second, to bolster its presence in the Latin American region.

The timing of the operation was targeted at preventing Enersis from selling its stake in Chilean Endesa and taking advantage of low stock prices in Latin America after the crisis in Brazil.

The pension funds holding shares in Enersis admitted that the \$320 offered by Spanish Endesa was a unique opportunity, given that they had been unable to sell so far given the

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<sup>15</sup>This change in Enersis' statutes needed the support of 75% of shareholders attending the meeting. Historically, nearly 80% of outstanding shares were represented in shareholders' meetings. If this percentage was maintained, Spanish Endesa would only need 60% of all shares to modify the statutes, which was achievable summing the 29.2% owned by Pension Funds and the 32% owned by Endesa.

<sup>16</sup>The behaviour of the main blockholders (the pension funds and the Luksic group) in the shareholders' meetings where the cap on shareholders' concentration was raised is consistent with the findings obtained by Brickley et al. (1988) for a sample of American firms. They show that blockholders usually endorse the bidder in this kind of votes.

insufficient liquidity in the market. They believed that such an opportunity would not occur again and the takeover eventually succeeded.

Once Endesa had acquired control in Enersis, it used the Chilean holding to fight for the control of Chilean Endesa with the US electricity company Duke Energy, which had just announced a takeover bid for a majority stake in Endesa Chile. According to *The Wall Street Journal* (19 April 1999), Spanish Endesa pursued the Chilean company after Duke rejected a proposal to share control. The financial newspaper also said that the news of Spanish Endesa's increased bid raised fears that the Spanish utility might be overstretching its finances at a time of falling electricity rates and revenue at home. The final winner of this contest was Spanish Endesa, after both it and Duke increased their initial bids in the following days. After Duke withdrew from the battle, Spanish Endesa still had to overcome the last hurdle: the Chilean antitrust authority decided to temporarily block the takeover on anti-competitive grounds. On May 10th the final go ahead was given and Spanish Endesa completed a control battle that had started twenty-one months earlier and that had costed more than three times the initial estimate.

Table 5

Date	Event description (Second Bid)	AR End.	AR Enc.
22/1/99	Endesa announces that it will make a public offer for an additional 32% of Enersis, both in Chile and the US, at a price of Pesos 320 per share.	0.94 (0.59)	6.65** (2.27)
28/1/99	A legislative official announces that the Chamber of Deputies could initiate an inquiry about Endesa's takeover attempt on Enersis.	-3.16** (-1.98)	0.35 (0.11)
29/1/99	Endesa officially announces a tender offer for 32% of Enersis' capital.	-3.63** (-2.27)	7.33*** (2.50)
4/2/99	The shareholders' meeting of Enersis decides to sell its 25.28% stake in Endesa Chile.	-3.47** (-2.17)	-2.74 (-0.94)
7/2/99	The Pension Funds announce that they will reject to raise the cap on shareholders' concentration.	-3.02* (-1.89)	-1.70 (-0.58)
18/2/99	The US electricity company Duke Energy offers to buy 51% of Endesa Chile for Pesos 250 per share.	1.48 (0.93)	-4.01 (-1.36)
24/2/99	The shareholders' meeting of Enersis rejects the proposal to raise the cap on shareholders' concentration from 32 to 65%.	-0.52 (-0.32)	0.43 (0.15)
9/3/99	Enersis board decides to hold a new shareholders' meeting on 30/3 to raise the cap on shareholders' concentration	0.24 (0.15)	0.64 (0.22)
30/3/99	The shareholders' meeting approves the proposal to raise the cap on shareholders' concentration from 32 to 65%.	0.21 (0.13)	1.09 (0.37)
7/4/99	Endesa completes successfully its tender offer for Enersis, acquiring 21.78% of it in the Santiago, and 10.22% in the New York stock exchanges.	-2.99* (-1.86)	-19.88*** (-6.79)

Date	Event description (Second Bid)	AR	AR
		End.	Ene.
13/4/99	Enersis offers to buy 29.7% of Endesa Chile at a price of Pesos 305 per share.	-5.85*** (-3.66)	-0.84 (-0.29)
16/4/99	Duke Energy increases its offer to Pesos 275 per share to acquire a 60% of Endesa Chile.	-7.79*** (-4.87)	-2.91 (-0.99)
20/4/99	Enersis raises its bid for Endesa Chile from Pesos 305 to Pesos 360 per share, for a 34.7% of the target firm.	-1.19 (-0.74)	-12.39*** (-4.23)
21/4/99	Duke withdraws its offer for Endesa Chile.	3.27** (2.04)	-18.26*** (-6.24)
22/4/99	Enersis announces the success of its takeover on Endesa Chile and the antitrust authority announces an inquiry.	2.98* (1.86)	-4.48*** (-4.09)
27/4/99	The antitrust prosecutor, Rodrigo Asenjo, announces his position in favour of stopping the takeover of Enersis on Endesa Chile.	0.35 (0.22)	-4.61*** (-3.26)
28/4/99	The Chilean antitrust authority approves an injunction blocking the tender offer for Endesa, in order to inquire whether the increased stake of Enersis in Endesa reduces competition in the sector.	-1.12 (-0.7)	-8.03*** (-2.74)
10/5/99	The Anti-trust authority eventually announces that Enersis can complete the takeover of Endesa under some conditions.	2.24* (1.40)	4.88* (1.67)
14/5/99	A new Board of Directors is appointed in Endesa Chile, with a majority of representatives from Enersis. Pablo Yrarrazaval, a Chilean stock market operator, is appointed as Chairman.	0.43 (0.26)	1.32 (0.45)

As can be seen from the quantitative results, Endesa's shareholders reacted negatively to the announcement of the second takeover, and they reacted negatively as well to the announcement of the takeover bid on Endesa Chile (in this case, the bidder was Enersis itself, but the operation was financed with a loan from Spanish Endesa, the new controller of Enersis at the time). Enersis reacted positively to the takeover announcement of Spanish Endesa, and negatively to the completion of the takeover. This reflects that the problems in all the process had increased the bargaining position of those who sold their shares, but that the deal was not value-enhancing for those who remained as small shareholders of Enersis.

#### **4.3.4 Summary and Discussion**

Although in general the reaction of investors in the Spanish company to the events in Chile was negative, Endesa's executives were trapped in a escalation of commitments due to the high sums initially invested in Enersis. Only in 1999, Endesa disbursed \$1407 million for the control of Enersis, and \$ 2113 million for the control of Endesa Chile. The company announced a significant increase in its debt level. Table 6 summarizes the results for Endesa's shareholders.

**Table 6**  
Endesa's stock returns (%)

	$r_i$	$r_m$	CAR	t-statistic
Overall Period (All Trading days)	90.53	114.61	-30.34*	-1.52
Overall Period (Only takeover related events)	-13.7	-4.78	-14.82*	-1.60
1997 (Only takeover related events)	-3.76	-2.75	-9.25*	-1.51
1998 (Only takeover related events)	3.69	2.15	6.16**	2.22
1999 (Only takeover related events)	-13.63	-4.18	-11.74**	-1.85

$r_i$ : Endesa's stock return

$r_m$ : Ibex-35 return

CAR: Cumulative Abnormal Returns

$$t = \frac{CAR}{\sqrt{N \cdot SD(AR)}}$$

Table 7 summarizes the results for Enersis' shareholders (note that the negative returns of the Chilean market are related to the emerging economies crisis of 1998):

**Table 7**  
**Enersis' stock returns (%)**

	$r_i$	$r_m$	CAR	t-statistic
Overall Period (All Trading days)	-32.76	-22.02	-40.53	-1.09
Overall Period (Only takeover related events)	14.9	23.32	-8.70	-0.52
1997 (Only takeover related events)	8.68	2.13	7.43	0.72
1998 (Only takeover related events)	15.52	7.52	13.43**	2.29
1999 (Only takeover related events)	-9.3	13.68	-29.57***	-2.55

$r_i$ : Enersis stock return

$r_m$ : Ipsa return

CAR: Cumulative Abnormal Returns

$$t = \frac{CAR}{\sqrt{N \cdot SD(AR)}}$$

Table 8 reports the effects of the events analyzed on the combined market value of both Endesa and Enersis. The measure of this combined market value is a portfolio index of both stock prices, weighted by the market capitalization of each company five days before the first announcement of the takeover took place, following Bradley et al. (1988). The estimation window goes between January 1995 and June 1997. The market index used is the S&P 100 Index of the US. This reflects the opportunities for diversification of international investors, which can invest in American Depositary Receipts of both companies in the New York Stock Exchange.

**Table 8**  
Portfolio's returns (%)

	$r_i$	$r_m$	CAR	t-statistic
Overall Period (All Trading days)	1.68	8.19	-18.35*	-1.62
Overall Period (Only takeover related events)	0.63	43.06	-55.92**	-2.24

$r_i$ : Portfolio Index Return

$r_m$ : US S&P 100 return

CAR: Cumulative Abnormal Returns

$$t = \frac{CAR}{\sqrt{N \cdot SD(AR)}}$$

These results are consistent with an agency motivation for the takeover (see Weston et al., 1998). The abnormal returns for the acquirer and the joint portfolio are negative and the abnormal returns for the target are non significant. The shareholders did not expect any value creation from the takeover. If agency motivations in the bidding firm determine the acquisition, shareholder wealth is not maximized, and hence they result in a loss for the joint value of target and bidder (negative abnormal returns), and in a loss for the bidder shareholders (also negative abnormal returns). In the case of target shareholders, they could extract part of the agency rents depending on the price paid by the bidder. In this case, however, the returns for the target shareholders are not significant either.

If the shareholders expected any significant synergies between both firms, this should be reflected in a significant positive return for the joint value and for target shareholders (Weston et al., 1998). The acquirer shareholders would obtain positive, zero or negative returns depending on the price paid.<sup>17</sup>

Agency problems in Endesa at the time of the first takeover bid may be related to the fact that the firm was still in the public sector, and the Chairman and the managerial team

<sup>17</sup>Under the *hubris* hypothesis, the managers of the bidding firm overestimate their ability to manage the target assets and pay in excess of their ability to create value. See Roll (1986).



owed their positions to political appointments. The firm was then privatized to result in a very widely held company, and the same managerial team stayed in place and undertook the second takeover bid. The managerial team had probably had time to learn and it faced now the scrutiny of the financial markets (although part of the ownership had already been floated before), but besides these "external" control, there was no strategic investor able to overcome the free-rider problem and effectively monitor the managers.

The regulatory agreement of the Spanish government with the electricity companies in 1998 may also have had a positive impact on the decision to commit more funds to the control of Enersis.<sup>18</sup> This agreement (which complemented the effects of the pool generation market in operation since 1 January 1997) involved the acceleration of liberalization, the elimination of tariff uncertainty for the next years and the securitization of stranded costs. This agreement decreased regulatory risk but increased market risk. As a result, the Spanish electricity companies, and Endesa in particular as the largest one, increased both their means (more cash-flow) and their motivation (reduced earnings prospects in the domestic market) to undertake investments in foreign markets.

Endesa's management team learned that to succeed in the control of Enersis the pension funds (AFPs) played a key role.<sup>19</sup> The behaviour of the pension funds in the process was based on their role as pivotal shareholders in Enersis and their desire to reduce their exposure to the Chilean electricity sector. Although they could not legally control companies, as a result of their ownership stake, they *de facto* proposed the new Chairman after Yurazcek's resignation and their votes were crucial in the Directors' Board during the transition period. But as institutional investors, their fundamental goal was to obtain the maximum return for their clients through a diversified portfolio.

Chilean politicians showed a remarkable degree of activism over the whole process of control

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<sup>18</sup>The situation for many electricity companies facing liberalization in the home market is similar to the oil companies in the seventies, analyzed by Jensen (1986 and 1988) as an illustration of his free cash flow theory. They have high levels of cash flow (due to high product prices for oil companies in the seventies and to generous regulation the electricity companies on the eve of deregulation), but they also face the prospect of declining earnings in the core business (due to excess capacity the oil sector in the seventies and due to liberalization the electricity sector).

<sup>19</sup>The AFP were the result of the privatization of the Social Security system in Chile. In 1985-86 they were allowed to enter the stock market, although they were formally prevented from controlling companies, to minimize the risk of insider trading.

change in Enersis. Many of the political reactions to the first takeover bid took place in the run-up to the legislative Chilean elections of 11 December 1997 (a perfectly predictable event that could have been taken into account by Endesa's strategists when considering the timing of the takeover). In January 1999 the Chilean government sent to the Parliament new legislation on takeovers and small investor protection. At the same time, the regulatory climate towards private utilities had become tougher in the late nineties, as a result of demands for better and cheaper services coinciding with an economic crisis

#### **4.4 The Vertical Integration of Electricity in Chile**

The evidence this clinical study may provide on the vertical integration issue in the electricity industry is of independent interest. In Chile, Spanish Endesa was in favour of maintaining the vertical links between Enersis and Endesa Chile, and Guzmán's team was in favor of putting an end to the vertical integration and focussing Enersis on consumer service in the distribution segments of energy, water and other end-user products. Indeed, the boardroom battle in Enersis and the control contest for Endesa Chile can be interpreted as a war of ideas about different strategies in the network industries.

The events analyzed here may provide a testing ground for the hypothesis of synergies between the two Chilean companies Enersis and Endesa (through productive efficiency or through collusion in the product market).

In the following I report the reaction of Enersis and Endesa Chile's stock prices (in the form of three-day abnormal returns) to the 4 events related to the Enersis-Endesa Chile relationship.

Table 9

Date	Enersis	Endesa Chile
18/12/98	9.54*** (3.26)	6.70*** (3.20)
4/2/99	-2.74 (-0.94)	-0.54 (-0.26)
18/2/99	-4.01 (-1.36)	2.30 (1.10)
13/4/99	-0.84 (-0.29)	2.23 (1.07)

The events in table 11 are: 1) 18/12/98: the decision of Enersis' board to sell its stake in Endesa Chile. 2) 4/2/99: the same decision by the shareholder meeting. 3) 18/2/99: Duke's takeover bid announcement for Endesa Chile. 4) 13/4/99: Spanish Endesa's announcement of the takeover of Endesa Chile, through Enersis.

The only significant effect for both companies<sup>20</sup> is the first, and in both cases it is positive. This suggests that the synergies (either productive or collusive) between the two companies were inexistent, if shareholders attach a positive probability that the divestiture will eventually take place. It also suggests that Chilean Endesa's shareholders reckoned that vertical integration would prevent the company from obtaining competitive prices for its generated electricity. A possible alternative interpretation to the significantly positive reaction to the event in December 1998 is that shareholders were reacting positively to the gains they would make from the takeover activity that was being opened, irrespective of any effect from a productive or collusive point of view. But if this is the case, the investors also expected that takeovers of both companies separately would be more profitable than a takeover on one single firm. Alternatively, the event on 18/12/98 may have been interpreted by investors as increasing the probability that Spanish Endesa's full takeover on Enersis would take place. There is no evidence of shareholder value

<sup>20</sup>As shown in Cox and Portes (1998), to make any point about synergies from an event study, inferences must be based on stock data on both companies affected (to avoid drawing normative conclusions from data that might reflect only bargaining power).

creation in the announcement of further vertical integration in Chilean electricity industry (non significant reaction to the announcement of the fourth event, on 13/4/99).

## 4.5 Conclusions

The case shows that takeovers in regulated sectors may trigger the political reaction of stakeholders, which creates additional costs as compared to other sectors. The clinical study presented also suggests that agency problems in the bidding firm investing the free cash flow may outweigh any synergies achieved with the transaction.<sup>21</sup>

Jensen (1988) expects that in case of managerial slack in the bidding firm the bidder will become the target in a subsequent takeover. Mitchell and Lehn (1990) show empirical evidence consistent with this, although electric utilities are excluded from their sample. However, a successful takeover bid for Endesa seems unlikely in the short run, since the Spanish government has a 10 year golden share on Endesa (as compared to 5 year golden shares in the UK privatized electricity companies, for example).<sup>22</sup>

Incumbent utilities, especially those that are still related to governments, have a large free cash flow, and the mechanisms to correct their potentially bad managerial performance are weak.

## 4.6 Appendix

Table A1 shows the daily returns of the companies and the market indices of interest in the relevant dates and the results of the sensitivity analysis. Five different models were estimated in addition to the simplest one (M0) reported in the main text:

-**Model 1 (M1)**. The same as M0 but without adjusting the market returns for the weights of each company, i.e.,  $\omega_i = 0$  in equation (4.1). (Columns 6 to 9 in the first table).

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<sup>21</sup>Burkart (1997) suggests that the protection of shareholders in bidding firms should be part of takeover regulation, which so far only protects target shareholders. He proposes that takeover bids should be approved by a shareholder meeting of the acquiring company.

<sup>22</sup>Hirshleifer (1995) points out that the possibility of dilution (excluding minority shareholders from the gains in the resulting company after the takeover) may allow the bidder firm to overcome the free-rider problem in a tender offer. Burkart et al. (1998) also point out that agency problems in the resulting firm may be an incentive for bidding managers to undertake a takeover attempt.

**-Model 2 (M2).** The estimation procedure is like in M0 but the t-statistics are computed differently. In T2 they are adjusted for the autocorrelation of returns. In t3, they are the t-statistics of the prediction error. In both cases the test statistic for the 3-day abnormal returns is given by  $t = \frac{AR_3}{SD_3}$ , where  $AR_3$  is the three day prediction error as an estimator of the abnormal returns.

In T2,

$$SD_3 = [3 * VAR(AR_t) + 4 * COVAR(AR_t, AR_{t-1})]^{1/2} \quad (4.2)$$

In t3,

$$SD_3 = \left[ VAR(AR_t) \left\{ 3 + \frac{9}{N} + \frac{\left( \sum_{\tau=\tau_1}^{\tau_3} R_{m\tau} - (3 * \bar{R}_m) \right)}{(N-1) * VAR(R_m)} \right\} \right]^{1/2} \quad (4.3)$$

where variances and covariances are computed using the estimation window and  $N$  is the number of observations in the estimation window.  $R_m$  is the market return and the subindex  $\tau$  is used to denote observations in the event window. (Columns 10 to 12 in the first table and 2 to 4 in the second table).

**-Model 3 (M3).** The normal returns are computed like in M1 but imposing the values  $\alpha = 0$  and  $\beta = 1$ . (Columns 5 to 8 in the second table).

**-Model 4 (M4).** The normal returns are obtained with a two-factor model where the explanatory variables are the market return and the change in the interest rates, where interest rates are the eight-year government bond in Chile and the ten-year government bond in Spain, obtained both from Datastream. (Columns 9 to 12 in the second table).

Table A.2  
Sensitivity Analysis

Date	Endesa	Ibex	Energis	Ipsa	AR(Ele)	M1T(Ele)	M1AR(Eis)	M1T(Eis)	M1AR(Ele)	M2t2(Ele)	t3(Ele)
30/7/97	0.19	-0.05	0.67	1.37	0.285401	0.2034	-0.92755	-0.4848	0.29619	0.17	0.178
1/8/97	-5.22	-3.57	2.64	0.9	-1.037456	-0.7394	1.604308	0.8386	-1.548761	-0.88	-0.93
4/8/97	-3.95	-2.15	1.06	0.74	-1.416246	-1.0094	0.215578	0.1127	-1.83927	-1.04	-1.1
5/8/97	0.57	1.59	-1.26	-0.5	-1.238836	-0.8829	-0.62208	-0.3252	-1.271796	-0.72	-0.76
19/8/97	1.47	1.11	0.51	2.59	0.218502	0.1557	-2.54598	-1.3308	0.333925	0.19	0.2
28/8/97	-1.13	-1.04	-1.55	-2.11	0.11491	0.0819	1.012576	0.5293	0.005884	0	0.004
16/9/97	1.33	3.15	2.43	0.43	-2.290184	-1.6323	1.956163	1.0225	-2.311324	-1.31	-1.38
29/9/97	3.07	2.02	-1.32	0.11	0.761882	0.543	-1.4113	-0.7377	1.039281	0.59	0.623
9/10/97	-2.67	-4.16	-0.28	0.03	2.197605	1.5683	-0.27566	-0.1441	2.062259	1.17	1.232
14/10/97	-4.58	-1.04	-1.6	-1.51	-3.33509	-2.377	0.245313	0.1282	-3.906674	-2.21	-2.34
15/10/97	-5.68	-1.41	-1.07	-1.44	-4.005475	-2.8548	0.691633	0.3615	-4.703177	-2.66	-2.82
16/10/97	-5.25	-2.45	-0.36	-1.46	-2.36791	-1.6877	1.425541	0.7451	-2.947909	-1.67	-1.77
17/10/97	-6.42	-1.12	-0.36	-1.22	-5.0822	-3.6222	1.138636	0.5952	-5.895863	-3.33	-3.54
20/10/97	-2.85	1.34	-0.36	-0.58	-4.368556	-3.1136	0.373556	0.1953	-4.845816	-2.74	-2.9
23/10/97	-0.73	-3.68	-1.05	-0.77	3.580267	2.5517	-0.08931	-0.0467	3.67731	2.08	2.198
30/10/97	6.83	5.5	8.55	3.54	0.481184	0.3429	4.358351	2.2781	1.061762	0.6	0.634
6/11/97	-2.41	-2.06	-4.54	-3.07	0.019253	0.0137	-0.8298	-0.4337	-0.202492	-0.11	-0.12
18/11/97	1.12	4.08	-0.76	0.45	-3.580025	-2.5516	-1.25775	-0.6574	-3.683021	-2.08	-2.2
27/11/97	3.47	2.81	0.4	0.59	0.244597	0.1743	-0.26511	-0.1386	0.53001	0.3	0.317
11/3/98	7.48	0.85	3.57	1.2	6.530393	4.6543	2.175676	1.1372	7.466619	4.22	4.478
2/4/98	5.35	3.51	0.72	0.76	1.311813	0.935	-0.14833	-0.0775	1.808867	1.02	1.083
3/4/98	7.25	4.4	1.44	0.79	2.178416	1.5526	0.535806	0.2801	2.878822	1.63	1.722
17/4/98	-1.77	1.39	-2.28	-3.91	-3.346612	-2.3852	2.434365	1.2724	-3.681758	-2.08	-2.21
8/6/98	-7.75	-0.44	4.14	3.04	-7.201762	-5.1328	0.54607	0.2854	-8.233008	-4.65	-4.94
12/8/98	0.68	-1.86	-4.17	-4.36	2.877029	2.0505	1.082312	0.5657	3.058027	1.73	1.832
14/10/98	1.64	8.95	4.61	4.49	-8.714681	-6.2111	-0.71732	-0.3749	-9.02916	-5.1	-5.32
18/12/98	-1.13	2.54	11.51	6.19	-4.0419	-2.8807	4.15044	2.1694	-4.357642	-2.46	-2.61
21/12/98	0	3.79	6.4	2.76	-4.3633	-3.1098	3.140793	1.6417	-4.599715	-2.6	-2.75
22/1/99	-0.85	-4.23	17.06	9.18	4.098884	2.9214	6.12608	3.2021	4.211595	2.38	2.514
28/1/99	0.42	3	0.11	-0.3	-3.026015	-2.1567	0.508833	0.266	-3.160502	-1.79	-1.89
29/1/99	1.08	4	6.57	1.47	-3.527136	-2.5139	4.852908	2.5366	-3.630875	-2.05	-2.17
4/2/99	-4.53	-1.35	-2.23	-0.33	-2.925143	-2.0848	-1.7953	-0.9384	-3.472123	-1.96	-2.08
8/2/99	-6.6	-3.65	1.15	3.41	-2.324566	-1.6568	-2.88624	-1.5086	-3.016275	-1.71	-1.8
18/2/99	1.75	0.43	-0.78	3.12	1.288083	0.918	-4.46957	-2.3362	1.480293	0.84	0.888
24/2/99	0.72	1.11	-0.7	-1.55	-0.531498	-0.3788	1.193131	0.6236	-0.516631	-0.29	-0.31
9/3/99	-0.49	-0.64	1.14	0.87	0.290482	0.207	0.140171	0.0733	0.244147	0.14	0.146
30/3/99	1.08	0.85	1.95	1.55	0.130393	0.0929	0.137273	0.0718	0.20854	0.12	0.125
7/4/99	1.29	3.67	-13.12	2.48	-2.933966	-2.0911	-16.0445	-8.3863	-2.990495	-1.69	-1.79
13/4/99	-5.4	-0.21	0.51	1.56	-5.11882	-3.6483	-1.31468	-0.6872	-5.848271	-3.31	-3.51
16/4/99	-9.33	-2.27	0	3.06	-8.656912	-4.7445	-3.61784	-1.891	-7.794329	-4.41	-4.67
20/4/99	-1.11	-0.04	-8.88	0.51	-1.02621	-0.7314	-9.44947	-4.9392	-1.190296	-0.67	-0.71
21/4/99	2.26	-0.56	-16.16	-3.63	2.947572	2.1008	-11.7804	-6.1575	3.265344	1.85	1.958
22/4/99	5.25	2.46	-14.67	-8.26	2.430989	1.7326	-4.75548	-2.4857	2.975265	1.68	1.783
27/4/99	1.48	1.11	-8.39	-1.87	0.228502	0.1629	-6.11433	-3.1959	0.345266	0.2	0.207
28/4/99	0.09	1.02	-5.8	0.24	-1.056997	-0.7533	-6.0467	-3.1606	-1.1214	-0.63	-0.67
10/5/99	2.95	0.92	5.48	2.54	1.919115	1.3678	2.483789	1.2983	2.24394	1.27	1.346
14/5/99	-1.94	-2.14	0.6	-0.64	0.582142	0.4149	1.405282	0.7345	0.428032	0.24	0.256

Notes:

Endesa, Energis: 3-day returns of each company's stock price.

Ibex, Ipsa: 3-day return of each stock exchange index.

AR: 3-day abnormal return.

Table A.2  
(Continued)

Date	AR(Eis)M2	t2(Eis)	t3(Eis)	AR(Ele)M3	t2(Ele)	AR(Eis)M3	t2(Eis)	AR(Ele)M4	t(Ele)	AR(Eis)M4	t(Eis)
7/30/97	-0.45161	-0.15	-0.154	0.269663	0.1571	-1.09375	-0.361	0.306503	0.2186	-0.92164	-0.482
8/1/97	2.612281	0.872	0.891	-1.85393	-1.08	2.71875	0.8984	-1.07448	-0.766	1.606236	0.839
8/4/97	0.653055	0.218	0.223	-2.02247	-1.178	0.5	0.1652	-1.51713	-1.062	0.213709	0.112
8/5/97	-1.29143	-0.43	-0.44	-1.14607	-0.668	-1.1875	-0.392	-1.37907	-0.984	-0.62291	-0.326
8/19/97	-1.79679	-0.6	-0.612	0.404494	0.2356	-3.25	-1.074	0.266183	0.1898	-2.53923	-1.327
8/28/97	-0.18475	-0.06	-0.063	-0.10112	-0.059	0.875	0.2891	0.149475	0.1066	1.012535	0.529
9/16/97	2.76815	0.924	0.944	-2.04494	-1.191	3.125	1.0326	-2.23085	-1.591	1.96509	1.027
9/29/97	-1.93734	-0.65	-0.661	1.179775	0.6873	-2.23438	-0.738	0.72302	0.5156	-1.40638	-0.735
10/9/97	-0.47581	-0.16	-0.162	1.674157	0.9753	-0.48438	-0.16	2.123571	1.5145	-0.26715	-0.14
10/14/97	-0.80804	-0.27	-0.275	-3.97753	-2.317	-0.14063	-0.046	-3.28605	-2.343	0.258075	0.135
10/15/97	-0.16598	-0.06	-0.057	-4.79775	-2.795	0.578125	0.191	-3.98785	-2.844	0.697321	0.364
10/16/97	0.799684	0.267	0.273	-3.14607	-1.833	1.71875	0.5679	-2.41853	-1.725	1.431217	0.748
10/17/97	0.577046	0.193	0.197	-5.95506	-3.469	1.34375	0.444	-5.13725	-3.664	1.142644	0.597
10/20/97	-0.01666	-0.01	-0.006	-4.70787	-2.743	0.34375	0.1136	-4.41448	-3.148	0.379739	0.198
10/23/97	-0.76083	-0.25	-0.259	3.314607	1.9309	-0.4375	-0.145	3.594568	2.5635	-0.09382	-0.049
10/30/97	8.048949	2.686	2.744	1.494382	0.8706	7.828125	2.5867	0.410479	0.2927	4.354889	2.276
11/6/97	-3.28273	-1.1	-1.119	-0.39328	-0.229	-2.29688	-0.759	0.023116	0.0165	-0.83053	-0.434
11/18/97	-1.50573	-0.5	-0.513	-3.32584	-1.937	-1.89063	-0.625	-3.57397	-2.549	-1.25974	-0.658
11/27/97	-0.08821	-0.03	-0.031	0.741573	0.432	-0.29688	-0.098	0.245403	0.175	-0.2759	-0.144
3/11/98	3.574564	1.193	1.219	7.449438	4.3397	3.703125	1.2236	6.601479	4.7079	2.189491	1.144
4/2/98	0.180956	0.06	0.062	2.067416	1.2044	-0.0625	-0.021	1.319938	0.9413	-0.16027	-0.084
4/3/98	1.113575	0.372	0.38	3.202247	1.8655	1.015625	0.3358	2.220303	1.5834	0.535803	0.28
4/17/98	0.51125	0.171	0.174	-3.55056	-2.068	2.546875	0.8416	-3.3618	-2.398	2.427926	1.269
6/8/98	2.628028	0.877	0.896	-8.21348	-4.785	1.71875	0.5679	-7.20234	-5.136	0.547545	0.286
8/12/98	-1.59248	-0.53	-0.542	2.853933	1.6626	0.296875	0.0981	2.946652	2.1014	1.094713	0.572
10/14/98	1.909883	0.638	0.65	-8.21348	-4.785	0.1875	0.062	-8.83789	-6.303	-0.73796	-0.386
12/18/98	9.537167	3.184	3.249	-4.1236	-2.402	8.3125	2.7467	-4.03564	-2.878	4.160543	2.174
12/21/98	5.902515	1.97	2.013	-4.25843	-2.481	5.6875	1.8793	-4.43455	-3.163	3.142062	1.642
1/22/99	14.16693	4.729	4.82	3.797753	2.2124	12.3125	4.0684	4.191039	2.9889	6.131497	3.204
1/28/99	0.35056	0.117	0.12	-2.89888	-1.689	0.640625	0.2117	-3.05804	-2.181	0.448644	0.234
1/29/99	7.325967	2.445	2.497	-3.2809	-1.911	7.96875	2.6331	-3.57685	-2.551	4.793862	2.505
2/4/99	-2.74307	-0.921	-0.935	-3.57303	-2.081	-2.96875	-0.981	-2.98079	-2.126	-1.80862	-0.945
2/8/99	-1.70374	-0.57	-0.581	-3.31481	-1.931	-3.53125	-1.167	-2.316	-1.652	-2.88455	-1.507
2/18/99	-4.00925	-1.34	-1.363	1.483146	0.864	-6.09375	-2.014	1.254537	0.8947	-4.47171	-2.337
2/24/99	0.429628	0.143	0.148	-0.4382	-0.255	1.328125	0.4389	-0.55618	-0.397	1.193439	0.624
3/9/99	0.639176	0.213	0.218	0.168539	0.0982	0.421875	0.1394	0.344893	0.246	0.112797	0.059
3/30/99	1.088873	0.363	0.371	0.258427	0.1505	0.625	0.2065	0.126491	0.0902	0.147155	0.077
4/7/99	-19.8766	-6.64	-6.686	-2.67416	-1.558	-24.375	-8.054	-2.89115	-2.062	-16.0509	-8.387
4/13/99	-0.8413	-0.28	-0.287	-5.83146	-3.397	-1.64083	-0.542	-5.13833	-3.664	-1.31419	-0.687
4/16/99	-2.91311	-0.97	-0.991	-7.93258	-4.621	-4.78125	-1.58	-6.71827	-4.791	-3.61637	-1.89
4/20/99	-12.3931	-4.14	-4.211	-1.20225	-0.7	-14.6719	-4.848	-0.97141	-0.693	-9.44965	-4.938
4/21/99	-18.2638	-6.1	-6.221	3.168539	1.8458	-19.5781	-6.469	3.029604	2.1606	-11.7832	-6.157
4/22/99	-11.9812	-4	-4.075	3.134831	1.8262	-10.0156	-3.309	2.396491	1.7091	-4.76133	-2.488
4/27/99	-9.53165	-3.18	-3.249	0.41573	0.2422	-10.1875	-3.368	0.210119	0.1498	-6.11605	-3.196
4/28/99	-8.03408	-2.68	-2.738	-1.04494	-0.609	-9.4375	-3.118	-1.07039	-0.763	-6.04706	-3.16
5/10/99	4.87938	1.629	1.664	2.280899	1.3287	4.59375	1.5179	1.858167	1.3252	2.471548	1.292
5/14/99	1.319603	0.44	0.45	0.224719	0.1309	1.9375	0.6402	0.545994	0.3894	1.404356	0.734

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