DISCUSSION PAPER SERIES

No. 3563

THE STRUCTURE OF CORPORATE OWNERSHIP IN PRIVATIZED UTILITIES

Francesc Trillas

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ISSN 0265-8003

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Francesc Trillas, Universitat Autònoma de Barcelona

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September 2002

Centre for Economic Policy Research
90–98 Goswell Rd, London EC1V 7RR, UK
Tel: (44 20) 7878 2900, Fax: (44 20) 7878 2999
Email: cepr@cepr.org, Website: www.cepr.org

CEPR Discussion Paper No. 3563

September 2002

ABSTRACT

The Structure of Corporate ownership in Privatized Utilities*

The purpose of this Paper is to study the determinants of the concentration of ownership in a privatized, regulated firm. 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 of this separation interact with the regulation of the product market. The main issue to be addressed here is how the degree to which regulators weigh investor profits when setting prices (the 'regulatory climate') affects the structure of corporate ownership, and more specifically the degree of shareholder concentration. Another, related issue, to be addressed is how deregulation affects corporate structure.

In the benchmark case where the government maximizes privatization proceeds, it is shown that the optimal level of concentration increases with a tougher regulatory climate for investors. A more lenient regulatory regime increases the value of the commitment not to interfere implicit in a more dispersed ownership structure. Deregulation (through increasing monitoring costs) also pushes corporate structure in the direction of more ownership concentration. When political objectives are added to the analysis, it is shown that lobbying with managers induces 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. In the case of managerial lobbying, the leniency of the regulatory climate does not have any impact on the equilibrium stake of the blockholder, and has a negative impact on the difference between the political and the benchmark outcomes.

JEL Classification: G32, G34, G38, L22, L43, L51, L94 and P16
Keywords: corporate governance, political economy, privatization and regulation

Francesc Trillas
Universitat Autònoma de Barcelona
Edifici B-Campus de la UAB
08193 Barcelona
SPAIN
Tel: (34 94) 581 1717
Fax: (34 94) 581 2012
Email: francesc.trillas@uab.es

*This Paper is produced as part of a CEPR Research Network on The Evolution of Market Structure in Network Industries, funded by the European Commission under the Training and Mobility of Researchers Programme (Contract No ERBFMRX-CT98-0203).

Submitted 23 August 2002

The Structure of Corporate Ownership in Privatized Utilities*

Francesc Trillas
Universitat Autònoma de Barcelona
Edifici B-Campus de la UAB
08193 Bellaterra (Barcelona)
Spain
francesc.trillas@uab.es

Abstract

This paper applies recent theories of ownership dispersion to the case of a privatized, regulated firm. Contrary to the arguments in Demsetz and Lehn (1985), it is shown that a tough regulatory climate for investors may increase the level of optimal ownership concentration. A more lenient regulatory regime increases the value of the commitment not to interfere implicit in a more dispersed ownership structure. 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.

Keywords: Privatization, Regulation, Corporate Governance, Political Economy.

JEL Classification Numbers: G32, G34, G38, L22, L43, L51, L94, L97, P16.

1 Introduction

The purpose of this paper is to study the determinants of the concentration of ownership in a privatized, regulated firm. The discussion illustrates some aspects of the costs and benefits of different corporate

*This paper is based on Chapter 3 of my PhD thesis. I thank James Dow, Paul Grout, Vicente Salas, Ramon Marimon, Paolo Volpin, Rudolf Kerschbamer and two anonymous referees for their comments, which contributed to improve the initital version. I am grateful to audiences at CEPR workshops in Lisbon and London, at London Business School, at the University of East Anglia, and at the EEA Congress in Lausanne for helpful discussions. I am fully responsible for any remaining errors. This work has received financial help from a CEPR research network on The Evolution of Market Structure in Network Industries, funded by the European Commission under the TMR programme (contract no. ERBFMRXCT980203).

systems. Privatized utilities are large firms with professional management: there is a separation between ownership and control. The agency costs of this separation interact with the regulation of the product market. The main issue to be addressed here is how the degree to which regulators weigh investor profits when setting prices (the "regulatory climate") affects the structure of corporate ownership, and more specifically the degree of shareholder concentration. Another, related issue, to be addressed is how deregulation affects corporate structure.[1] The enhanced discretion provided by deregulation profoundly changes the role of managers. In firms in the energy, telecommunications or water sectors, some degree of deregulation (of entry restrictions, for example) coexists with price regulation.

In many countries, privatization and deregulation or regulatory reform have taken place simultaneously in the last 10 or 15 years. Privatization decisions determine to a great extent the corporate governance conditions of the firms. 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. But the form of financial markets is also shaped by the way large firms are privatized. **Public offers** in the form of share issue privatizations aim at involving small shareholders and **tenders** or **asset sales** aim at involving large shareholders, although many privatizations combine different techniques. I will focus here on how privatization of utilities shapes financial markets and control systems.

In the setting presented below there are three stages. First, at privatization, the government decides the proportion of shares to be allocated to the largest shareholder. It does so to constrain the future actions of the firm and the regulator,[2] anticipating their equilibrium behaviour. Following the recent empirical literature on privatization (see Megginson and Netter, 2001), the government chooses the terms of the sale of public firms taking into account both political and economic ends. In particular, here governments trade off privatization proceeds with the maximization of the expected vote. For example, in the case of the privatization programme of the Thatcher government in the UK, Newbery

[1] Lehn (2002) argues that "significant changes are likely to occur in the governance structures of telecommunications firms as the industry is increasingly freed from regulatory controls in the U.S. and throughout the world."

[2] The privatizing and the regulatory authorities are different entities here. The model fits well with the case of an independent regulator with a duty to take into account both consumers' and producers' interests. The regulator may also be a supranational authority. In the European Union, while the national governments decide on privatization, many regulatory issues depend on policies promoted by the European authorities. This is the case, for example, of liberalization policies in telecommunications and electricity.

(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[3] and an effort level, respectively. The modelling of this stage is based on 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.

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 consumers, in a proportion that depends on the regulatory climate.

In the benchmark case where the government maximizes privatization proceeds, it is shown that the optimal level of concentration increases with a tougher regulatory climate for investors. A more lenient regulatory regime increases the value of the commitment not to interfere implicit in a more dispersed ownership structure. Deregulation (through increasing monitoring costs) also pushes corporate structure in the direction of more ownership concentration. When political objectives are added to the analysis, it is shown that lobbying with managers induces 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. In the case of managerial lobbying, the leniency of the regulatory climate does not have any impact on the equilibrium stake of the blockholder, and has a negative impact on the difference between the political and the benchmark outcomes.

The literature on the implications of a diffuse ownership of equity goes back to Berle and Means (1933). The choice between a **dispersed ownership** based on the stock market and a **large shareholders** system has been well studied both from economic[4] and political perspec-

[3]There are 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.

[4]See Salas (1992), Holmstrom and Tirole (1993), Allen (1993), Dow and Gorton

tives.[5] 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.[6] 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. Demsetz and Lehn (1985) argue that a better "regulatory climate," i.e. an attitude by regulators favourable to producers, increases the control potential (the marginal product of monitoring) for blockholders and hence derives into more concentrated ownership structures. This argument (which I challenge below), however, once empirically tested, is not robust to different specifications of the econometric model.

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 his 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.[7] 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 regulation on the initiative effect remains unexplored, and one of the goals of this paper is to show that as well as regulation determines the "control potential", it also determines the "initiative potential."[8]

The remainder of the paper is organized as follows. In Section 2 I present the model. Section 3 solves the subgame that analyzes the interaction between regulators and the firm's agents. Section 4 presents a benchmark in which the government maximizes privatization proceeds. Section 5 adds political considerations to the analysis of the equilibrium, and derives implications related to the role of manager's or blockholder's lobbying. And Section 6 concludes.

(1997), Bolton and Von Thadden (1998), and Pagano and Roell (1998).

[5]For politico-economic perspectives, see Roe (1994) and Cantillo (1998).

[6]See Joskow et al. (1993) and Geddes (1997).

[7]See also Rajan (1992), Myers (1998), Acemoglu (1994) and Böss and Harms (1996).

[8]Vickers (1993), Scarpa (1994), Roemer (1997), and Spiegel and Spulber (1994) analyze different issues in the relationship between corporate finance and regulation, but none of them focuses on how regulation affects the managerial role.

2 The Model

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 chosen by the firm's manager, and $p \geq 0$ denote the regulated price of the good produced by the firm. Consumers obtain the following surplus:

$$CS(p, e) = U(e) - p, \tag{1}$$

where $U(e) = e$. The direct utility that consumers derive from the firm's product or service depends only on the quality enhancing 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 effort is not verifiable.[9]

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

$$\Pi(p) = p, \tag{2}$$

where the operating costs are assumed to be irrelevant. This makes it possible to focus the attention on the managerial effort and the shareholders' monitoring.

2.1 Privatization

The government decides the terms of the privatization. In particular, it chooses the level of shareholder concentration. It captures an exogenous fraction $(1 - z)$ of the surplus that private owners expect to extract from the firm. Let a denote the monitoring effort and let $\alpha > 0$ denote a parameter that reflects the exogenous cost of monitoring. The exogenous cost of monitoring may depend on the industry's environment.[10] The

[9] Since the effort is not verifiable, its optimal level cannot be enforced neither by the regulator nor by the shareholders.

[10] In particular, Lehn (2002) argues that "deregulation increases the costs of monitoring managerial performance. By removing the protective cover of regulation, deregulation injects uncertainty and instability into the business environment. Firms experiment with different pricing schedules, technologies, production processes, and asset mixes. Through luck or design, some firms succeed, while others fail. New firms enter the industry and old firms exit. Amidst this instability, investors face the challenge of determining how much of their firms' success or failure is due to the actions of managers and how much is due to factors beyond the managers' control. In short, the greater instability induced by deregulation increases the costs of observing managerial performance."

expected benefits for all shareholders, V, are equal to the expected profits of the firm, $E(\Pi(p))$, minus the private costs of monitoring, $\psi(a)$, where $\psi(a) = \alpha\frac{a^2}{2}$

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, σ, $0 \leq \sigma \leq 1$.

The firm once privatized has two types of shareholders. One large shareholder who holds a proportion σ of the firm's shares, and a continuum of infinitesimal shareholders who hold a proportion $(1-\sigma)$. Monitoring has the characteristics of a public good among shareholders. Once supplied, all 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 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 all the shareholders is denoted by:

$$V = V_L + V_s \tag{3}$$

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 election and privatization proceeds.[11] Let $\Sigma(.)$ denote the expected vote that the party in the government will obtain in the next election.

Formally, the government chooses σ to maximize

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

The parameter η is the weight on electoral concerns relative to privatization proceeds.[12] The relationship between shareholder concentration, measured by the stake of the largest shareholder, and the expected vote, is modelled as follows.

[11] 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. 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.

[12] For example, η would be lower the higher the pressure to reduce the fiscal deficit (for example, for those countries that were privatizing at the same time as meeting the Maastrich criteria for the Economic and Monetary Union at the EU).

There are two political parties. Assume that the incumbent 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 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. There is no abstention, and hence the elections are decided by the median class.

Let θ^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

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

The function $y(C_l)$ reflects an a priori advantage for party R, where C_l is a contribution to party R from a lobby that has a stake in the privatization policy (lobbying will be further developed below, in Section 5). It is assumed that $\frac{\partial y}{\partial C_l} > 0$.

The function $y(.)$ can be further rationalized as follows. Contributions from lobby groups are an input in the government's party campaign to sway median class voters. The contributions have a direct effect on the bias of voters for the party.

The utility of a median class voter is defined as

$$U^m = \delta(j)\theta^m,\ \delta(j) = 1 \text{ if } j = L \text{ and } \delta(j) = 0 \text{ if } j = R.$$

Then a median class citizen i prefers party R if $\theta^m < 0$. This defines a critical value $\widetilde{\theta^m}$ as:

$$\widetilde{\theta^m} = 0$$

Then all median class citizens with values of θ^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 $F(0)$ that a median class citizen votes for party R, where $F(.)$ is the cumulative distribution function of θ^m. Thus, the expected proportion of the median class that votes for party R is $F(0) = y(C_l) + \frac{1}{2}$.[13]

[13]For an overview of this type of probabilistic voting models, see Persson and Tabellini (2000).

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

$$\eta \left[y(C_l) + \frac{1}{2} \right] + (1 - z)V(\sigma) \tag{4}$$

2.2 Manager and Shareholders

In the firm, there is a separation between ownership and control. The manager of the firm chooses the effort level e, which has a direct effect on consumer surplus, as shown above.

The manager and the shareholders have opposed interests. Their respective 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:

(i) The shareholders capture the firm's profits and obtain a payoff of $\Pi[p(e)]$ (through the regulated price, which in equilibrium depends on managerial effort through the consumers' utility, e affects shareholders' profits, as is shown below), and

(ii) The manager obtains 0.

With probability $(1 - a)$, the effort results in:

(i) A payoff of $b(e) = \xi e$ for the manager, with $\xi > 0$, and

(ii) A payoff of 0 for the shareholders.

The only way for the manager to enjoy private control benefits is to capture the profits of the firm. Due to some transaction costs, he cannot appropriate the whole profits, but he does capture an amount $b(e)$.[14]

The manager and the large shareholder decide simultaneously on effort and monitoring, respectively.

Table 1 summarizes the payoffs in each case:

Table 1

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

[14] 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 part of these profits, the remainder being wasted. For example, if, as shown in the regulatory equilibrioum below, $\Pi = \gamma e$, then $\xi = \lambda\gamma$ and $b(e) = \lambda\gamma e$, where λ is a parameter denoting the transaction costs. 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 large shareholder's objective function is

$$V_L = a\sigma\Pi(p) - \alpha\frac{a^2}{2}. \tag{5}$$

The manager's objective function is

$$V_m = (1-a)b(e) - \beta\frac{e^2}{2}, \tag{6}$$

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. [15]

2.3 Regulation

The regulator chooses p to maximize

$$W(p,e) = [CS(p,e)]^{1-\gamma}\,[\Pi(p)]^{\gamma} \tag{7}$$

where γ, $0 \leq \gamma \leq 1$, is an exogenous weight that reflects the regulatory climate.[16] This approach models the rate-setting process as a bargaining problem between consumers and investors, where the regulator acts as an arbitrator. It can also be interpreted as the regulator maximizing her own Cobb-Douglas utility function. The parameter γ 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.

In $CS(p,e) = U(e) - p$, $U(e) = e$ 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 effort costs are completely

[15] Demsetz and Lehn (1985) and Salas (1992) emphasize the costs of concentration derived from inefficient risk allocation. In my model, optimal concentration is lower than 100% in the absence of risk sharing concerns.

[16] Demsetz and Lehn (1985) and Joskow et al. (1993) mention that investment firms sistematically 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. To my knowledge, there is no jurisdiction where regulators have a duty to take into account the manager's utility.

sunk and claimholders are protected by limited liability (then their disagreement payoff cannot be negative).

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 γ is the weight on the monopoly price.

2.4 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. If the opposition party wins, there is no privatization. Second, the manager of the firm and the largest shareholder simultaneously choose a quality improving effort and a monitoring level. And, finally, 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 γ.[17]

3 The Interaction between The Regulator 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. The privatization decision is addressed in Sections 4 and 5.

3.1 The Regulated Price

Maximizing (7), the objective function of the regulator, is equivalent to maximizing

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

The first order condition is

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

[17]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 firms' strategic choices.

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

$$p(e) = \gamma U(e) = \gamma e \tag{8}$$

The price fixed by the regulator increases with the effort level. The intuition for this is that the regulator compensates the firm only for the effects of effort at the regulatory stage.

3.2 Effort and Monitoring

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

From (5), the large shareholder's first order condition is:

$$\sigma\Pi(p) - \alpha a = 0 \tag{9}$$

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

Thus the optimal value of a is

$$a = \frac{\sigma\Pi(p)}{\alpha} \tag{10}$$

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

$$a = \frac{\sigma\gamma e}{\alpha} \tag{11}$$

Hence, the monitoring level by the large shareholder increases with her stake in the firm and with the weight of investors in the regulatory process. Conversely, the monitoring level by the large shareholder decreases with the costs of monitoring.

From (6), the first order condition of the manager's problem is

$$(1 - a)\xi - \beta e = 0 \tag{12}$$

The second order condition holds since $\beta > 0$.

Hence, the reaction function is

$$e = \frac{(1 - a)\xi}{\beta} \tag{13}$$

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 she may find herself in a situation where she does not capture any profit. Hence there exists a trade-off between initiative and control.

The following proposition derives an important conclusion from the equilibrium in the firm's sub-game.

Proposition 1 *In the equilibrium of the sub-game between manager and shareholders, managerial effort decreases with the stake of the large shareholder*

Proof. Substituting (11), the reaction function of the large shareholder into (12), the first order condition of the manager's problem, yields:

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

From this,

$$e = \xi\frac{\alpha}{\xi\sigma\gamma + \beta\alpha}$$

Finally,

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

■

Hence, 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. It can be shown by a similar argument that $\frac{da}{d\sigma} > 0$, i.e., that the optimal monitoring level increases with the stake of the largest shareholder, and hence the optimal level of σ will strike a compromise between these two effects.

The government's privatization decision is precisely about choosing the stake of the largest shareholder. By appropriately designing the privatization process, σ can be chosen to induce just the level of managerial initiative that maximizes the privatizing government's objective function.

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. The privatizing government chooses the stake of the largest shareholder to maximize V:

$$V = [\gamma(U(e(\sigma))] - \psi(a(\sigma))$$

The first order condition of this problem is:

$$\frac{\partial V}{\partial \sigma} = \frac{\partial e}{\partial \sigma}\left[\gamma U' a(\sigma)\right] + \frac{\partial a}{\partial \sigma}\left[\gamma(U(e(\sigma))) - \psi'\right] = 0.$$

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 γ, plays a crucial role in the determination of the optimal level of shareholder's concentration.

Proposition 2 *If the government maximizes privatization proceeds, the equilibrium is characterized by*

$$\sigma^* = \frac{\beta\alpha}{\xi\gamma + \beta\alpha} \tag{14}$$

$$a^* = \frac{\xi\gamma}{H} \tag{15}$$

$$e^* = \frac{K}{\beta H} \tag{16}$$

$$p^* = \gamma\frac{K}{\beta H} \tag{17}$$

where $H = 2\xi\gamma + \beta\alpha$ *and* $K = \xi\gamma + \beta\alpha$

Proof. From the solution of the regulatory stage, $\Pi = \gamma e$, and

$$V_L = a\sigma\gamma e - \alpha\frac{a^2}{2} \tag{18}$$

Using the First Order Condition, the reaction function is

$$a = \frac{\sigma\gamma e}{\alpha} \tag{19}$$

The manager maximizes

$$V_m = (1-a)\xi e - \beta\frac{e^2}{2} \tag{20}$$

Using the First Order Condition, the reaction function is

$$e = \frac{(1-a)\xi}{\beta} \tag{21}$$

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

$$a(\sigma) = \frac{\xi\sigma\gamma}{\beta\alpha + \sigma\gamma\xi} \tag{22}$$

$$e(\sigma) = \frac{\xi\alpha}{\beta\alpha + \sigma\gamma\xi} \tag{23}$$

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:

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

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

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 σ to maximize

$$V = (a(\sigma))\gamma e(\sigma) - \alpha\frac{a(\sigma)^2}{2} \tag{24}$$

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

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

This expression is maximized for the following value of a:

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

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

The equilibrium expressions for price and effort are obtained by substituting the equilibrium value of σ in (8) and (23), 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.[18]

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

Corollary 3 *The optimal stake of the large shareholder is*

i) decreasing in the weight of producers in regulation, γ.

ii) increasing with monitoring costs, α, and with the exogenous private costs of effort for the manager, β.

iii) decreasing with the effect of effort on the manager's private control benefits, ξ.

[18] 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.

Proof. To simplify, the following notation is used: $R = [\xi\gamma + \beta\alpha]^2$,

i) $\frac{d\sigma^*}{d\gamma} = \frac{-\beta\alpha\xi}{R} < 0$

ii) $\frac{d\sigma^*}{d\alpha} = \frac{\beta\xi\gamma}{R} > 0$;

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

iii) $\frac{d\sigma^*}{d\xi} = \frac{-\beta\alpha\gamma}{R} < 0$ ■

Hence, the more lenient the regulatory process, the lower the optimal level of ownership concentration. This is **contrary to Demsetz and Lehn's predictions** (see introduction above). 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. In their argument, 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 here 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 she can extract a high level of effort from the manager. However, managerial effort is not contractible, and the manager anticipates that with high concentration, monitoring is also high and his payoff from undertaking 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 γ in the regulator's objective function), high effort translates into high profits and hence makes the benefits of dispersion more valuable for the equity holders. Monitoring also becomes more valuable (the control effect), but the initiative effect dominates because effort is not bounded below one, and hence it has an unbounded effect on profits.

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

α: the higher the exogenous monitoring costs, 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. This fits well with the prediction made by Lehn (2002): "Insofar as deregulation increases monitoring costs, ownership structures should become more concentrated after deregulation in order to encourage socially valuable monitoring."[19] 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 diminished, this subsidy becomes lower and the monitoring costs increase again.

β: the higher the private cost of effort for the manager, the less effort he undertakes 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.[20] This pushes the optimal stake upwards.[21]

ξ: the easier effort translates into higher private benefits (perhaps because transaction costs of stealing profits are low due to bad corporate governance standards), the higher the optimal effort level for the manager and hence the higher the commitment value of dispersion. This pushes the optimal stake downwards.

Deregulation may be also associated with a less lenient regulatory climate for incumbents. Incumbents are still regulated, but entry occurs (sometimes for 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

[19] See also footnote 11 above. Lehn (2002) reports that for the US the ownership structure of airline companies became significantly more concentrated after deregulation. However, he did not find a significant change in the ownership structure of ATT and the Baby Bells after the US 1996 Telecommunications Reform Act. He says that this may be explained by the enormous market capitalization of the companies. The empirical relationship between exogenous monitoring costs and ownership structure remains to be explored for other countries and firms.

[20] 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.

[21] 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.

bargaining power of the incumbent in the policy making game, resulting for example in asymmetric regulations that punish the incumbents relative to entrants.

Deregulation and a tougher regulatory climate for incumbents tilt the balance of privatization techniques in favour of concentrated ownership, if the government is interested in maximizing revenues.

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 2.1. How does politics change the optimal policy from the point of view of the privatizing government? To (indeed partially, since politics may operate in many other ways) answer this question, assume now $\eta > 0$ and $z = \frac{1}{2}$.[22] 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.

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.[23] Both cases can be motivated with real world examples. In the case of Russian privatization, the co-optation of insiders was key to make the privatization strategy politically feasible.[24] 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.[25] 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.

Here I do not model lobby group formation. Leaving more complex interest group structures for future research, I consider here two separate cases: either the privatizing government is lobbied by the manager or it is lobbied by the blockholder.

The ideological bias takes the form $y = hC_l$, with $h > 0$, where

[22] If $\eta > 0$ but $z = 0$, then the largest shareholder does not have incentives to lobby, and part of the additional structure of the political model presented below loses its relevance. The results obtained in this section hold for all values of z such that $0 < z < 1$, but attaching to it a particular value simplifies the analysis.

[23] Laffont (2000) emphasizes the importance of endogenizing the rents that are used to capture policy-makers.

[24] See Shleifer and Treisman (2000).

[25] See Oppenheimer (1998), especially Chapter 5.

$l = m, L$. 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 $\varphi(\Sigma^0)$:

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

Σ^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 with probability 1. To simplify, the following notation is introduced: $q = \frac{1}{2\eta h}$. Then q is an inverse measure of the clout of the pressure group at privatization. This clout of the pressure group is positively related to the weight of electoral concerns relative to privatization proceeds, η, and to the impact of campaign contributions on the electorate, h.

Proposition 4 *If the clout of the manager at privatization is not too low, i.e. if q is not too high, the manager lobbies the incumbent politicians and collusion with the manager yields the maximum possible level of dispersion.*

Proof. The manager maximizes $\varphi(\Sigma^0)V_m - C_m$, where $V_m = (1 - a(\sigma))b(e(\sigma)) - \beta\frac{e(\sigma)^2}{2}$. The payoff of the government if it rejects the offer is $\eta\frac{1}{2} + (1 - z)V(\sigma^*)$ where σ^* 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 $\eta(\frac{1}{2} + hC_m) + \frac{1}{2}V(\sigma) \geq \eta\frac{1}{2} + \frac{1}{2}V(\sigma^*)$. Or, equivalently,

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

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 $\widehat{\sigma}$ denote the equilibrium level of the blockholder's stake when the government 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:

$$\arg\max_{\sigma} V_m(\sigma) + qV(\sigma) = \beta\alpha \frac{-q\gamma - \xi}{q\gamma\left[\gamma\xi + \beta\alpha\right]}$$

Since this expression is negative, it turns out that, if contributions are positive, the equilibrium level of the blockholder's stake is 0. 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 $V_m(0) - q\left[V(\sigma^*) - V(0)\right] \geq \frac{1}{2}V_m(\sigma^*)$. Then, $C_m > 0$ if $q \leq \left[\left(V_m(0) - \frac{1}{2}V_m(\sigma^*)\right) / \left(V(\sigma^*) - V(0)\right)\right]$. ■

Corollary 5 *In the case of collusion with managers:*

i) The equilibrium level of dispersion is not affected by the regulatory climate.

ii) The difference between the equilibrium level of dispersion and the benchmark decreases with the leniency of the regulatory climate.

Proof. Since $\arg\max_{\sigma} V_m(\sigma) + qV(\sigma) < 0$ independently of the value of γ, *i*) follows. Since the equilibrium level of the blockholder's stake when the manager does lobby is 0, the difference between the benchmark case and this equilibrium level is σ^*. And by corollary 3, $\frac{d\sigma^*}{d\gamma} < 0$. ■

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.[26] However, the proposition shows the possibility of a different channel for the outcome that mass privatization

[26]This is an argument usually put forward by the political economy literature in favour of mass privatization in transition economies. See Biais and Perotti (2002) and Schmidt (1997).

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.[27]

The level of shareholder dispersion obtained under collusion with managers is not sensitive to the regulatory climate. In this case, politicians cannot fine tune the structure of corporate ownership to the realities of regulation in the product market.

The regulatory climate has an impact on the deviation from the benchmark case. 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, allows for more dispersion and narrows the gap between the lobbying outcome and the benchmark where the government maximizes privatization proceeds. A tougher regulatory climate for investors 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 6 *If the clout of the blockholder at privatization is not too low, i.e. if q is not too high, then the blockholder lobbies the incumbent politicians. In this case, if the regulatory climate is lenient enough, i.e. if γ is not too low, the equilibrium level of shareholder dispersion is lower than the benchmark where the government maximizes privatization proceeds.*

Proof. The large shareholder maximizes $\varphi(\Sigma^0)zV_L - C_L$, where $V_L = (a(\sigma))\sigma\Pi(p) - \alpha\frac{a(\sigma)^2}{2}$. The payoff of the government if it rejects the offer is $\eta\frac{1}{2}(1-z)V(\sigma^*)$, where σ^* is the stake of the blockholder that

[27] For the case of telecommunications in European countries, see Trillas (2002). To know more about the existence of serious corporate governance problems in privatized utilities see Thompson (1999).

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 $\eta(\frac{1}{2} + hC_L) + \frac{1}{2}V(\sigma) \geq \eta\frac{1}{2} + \frac{1}{2}V(\sigma^*)$. Or, equivalently,

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

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 $\widehat{\widehat{\sigma}}$ 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,

$$\widehat{\widehat{\sigma}} = \arg\max_{\sigma}\left\{zV_L(\sigma) + \frac{1-z}{\eta h}V(\sigma)\right\}$$

$$\widehat{\widehat{\sigma}} = \frac{\beta\alpha}{\beta\alpha + \xi\gamma - \eta h\beta\alpha}$$

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 $V_L(\widehat{\widehat{\sigma}}) - q\left[V(\sigma^*) - V(\widehat{\widehat{\sigma}})\right] \geq \frac{1}{2}zV_L(\sigma^*)$. Then, $_L > 0$ if $q \leq z\left[\left(V_m(\widehat{\widehat{\sigma}}) - \frac{1}{2}V_m(\sigma^*)\right) / \left(V(\sigma^*) - V(\widehat{\widehat{\sigma}})\right)\right]$.

Next, I compare the equilibrium level of dispersion with the benchmark level of dispersion:

$\sigma^* - \widehat{\widehat{\sigma}} = \frac{\beta\alpha}{\xi\gamma+\beta\alpha} - \frac{\beta\alpha}{\beta\alpha+\xi\gamma-\eta h\beta\alpha}$

If $0 < \widehat{\widehat{\sigma}} < 1$, then $\widehat{\widehat{\sigma}} > \sigma^*$. For $\widehat{\widehat{\sigma}}$ to be an interior solution, it must be the case that $\beta\alpha + \xi\gamma > \eta h\beta\alpha$, i.e. that $\gamma > \frac{\eta h\beta\alpha - \beta\alpha}{\xi}$. ■

If the blockholder has sufficient clout at 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. The difference in the interests of the blockholder and shareholder value as a whole is twofold: on the one hand, the blockholder directly increases

her rents as her 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 her stake is larger than the one that maximizes shareholder proceeds. And the incentives for lobbying increase with the profitability of the investment, which depends on the regulatory climate. Notice however that the case of blockholder lobbying does not yield a corner solution: the large shareholder is not interested in full concentration, because there are still benefits to be obtained from committing not to monitor too much.

Notice that the degree of deviation from the benchmark depends on parameters η and h. First, the equilibrium level of dispersion will be closer to the benchmark as the weight on political considerations relative to privatization proceeds diminishes. This reflects that if the priority is to obtain revenues, the politicians will be less interested in lobbying contributions to obtain political advantage. Second, the equilibrium level of dispersion will be closer to the benchmark if the effect of contributions on the ideological bias of median class voters 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.

6 Conclusion

Privatizing governments may value shareholder dispersion for a number of reasons. One of them is that a broadly held company may have a positive effect on managerial initiative. This is because, due to the free rider problem among small shareholders, a broadly held ownership may be a commitment device not to interfere too much with managerial rents, which may encourage managerial effort. The extent to which dispersion is *ex ante* an efficient commitment device that increases the value of the firm for investors depends on exogenous parameters that may be related to the regulatory climate faced by investors and to the state of deregulation. A tougher regulatory climate may reduce the commitment value of dispersion. Deregulation makes ownership concentration more desirable through increasing monitoring costs, because achieving the optimal degree of monitoring becomes more expensive.[28]

Political objectives may yield more or less shareholder dispersion than the benchmark where the government maximizes shareholder proceeds. More dispersion may be caused by collusion between politicians and managers. Less dispersion may be caused by collusion between

[28] An increasing role of asset sales as opposed to share issue privatizations over the last decades is consistent with deregulation causing a higher equilibrium stake for the blockholder.

politicians and blockholders. The regulatory climate is an important determinant of the political equilibrium in some of these cases as well. However, if politicians collude with managers, in equilibrium they may not have incentives to fine tune the ownership structure to the realities of product market regulation.[29]

Since full dispersion is rarely optimal, it is worth taking into account that 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.[30] Further research may explore costs and benefits of these alternative possibilities.

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[29] A larger role for asset sales in developing countries is consistent with the lack of a politically powerful "managerial class" in these countries. Notice that many "transition" countries do have such a class.

[30] Joskow and Schmalensee (1995) argue that political and information constraints may preclude widespread fine tuning of the existing industrial hierarchies prior to privatization. Tirole (1991) argues that the order of priorities should be as follows: first develop the stock market, and next base privatizations on it.

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