Privatization and Efficiency vs. Ownership and Efficiency: The Case of Spain: 1985-1996

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1. Introduction

One of the most significant economic phenomena of recent years has been the privatization of state-owned enterprises all over the world. The amount raised by all governments only by public offering during the last two decades is over $400 billion (Megginson and Netter, 1997), a figure that would be considerably surpassed if direct sales were taken into account.[1] While there are several possible reasons why privatization may be undertaken (Yarrow, 1986), the main driver of this trend has been the search for an increase in the efficiency of the firms involved (Megginson et al., 1994).

The issues of whether and why privatization actually leads to that improvement in efficiency have been the subject of a now considerable amount of research. The issue of *when*, however, has been systematically overlooked. As a result, the *privatization-efficiency* hypothesis (PEH) has often been confounded with a related, but different, one: the *ownership-efficiency* hypothesis (OEH) -that private ownership leads to a higher efficiency than state ownership. This paper argues that these two hypotheses need to be clearly distinguished, both theoretically and empirically. The stage for our argument is set by reviewing the theories and empirical research behind these two hypotheses, and explaining what we believe is missing from this literature. We then proceed to argue that, while a positive relationship between ownership and efficiency is a necessary condition for the existence of a positive relationship between privatization and efficiency, it is not a sufficient condition. We see the net effect of a firm's privatization on its efficiency as the result of two groups of counteracting forces: On one hand are the potentially positive effects of a change from state to private ownership, as the OEH suggests. On the other hand, two types of negative effects seem also plausible: *government-related* and *firm-related* (these are discussed within the body of the paper). Neither of them is accounted for by the OEH. However, if the relationship of interest is that between

privatization and efficiency, they cannot be assumed away. That is, they need to be controlled for, not only in empirical research, but also in a complete theory of privatization. Given the possibility that negative forces are at work, and are likely to evolve over time, the issue of when the efficiency improvement due to privatization is observed becomes as relevant as those of whether and why.

We illustrate our point with an empirical analysis of the effects of privatization on the performance of 24 Spanish firms which were privatised between 1985 and 1993. While the OEH in Spain has been tested in a number of studies, this is the first time the actual privatization-efficiency relationship is analysed. We specifically examine the three issues we have mentioned: whether, when and why. Results show that, in our sample, privatization has led to significant increases in performance in only two or three cases (depending on the measure of performance increase used). In fact, in two (three) cases there have been significant *decreases*. Thus, if one were to test the PEH in this sample by simply looking at the "whether" issue, the obvious conclusion would be to reject it. However, when we examine the "when" issue we find a positive and significant effect for years 7 and 8 after privatization. This suggests that one or more of the negative forces described (or a similar one) might have actually been operating during the six first years after privatization, but their impact has finally been offset by the positive effects of private ownership. We attempt to uncover some of these forces by examining the "why" issue with the information we have available. This includes both government and firm-related variables, plus industry dummies and a firm dummy for Repsol as controls. Significantly positive effects are found for the state of the business cycle at which the company was privatized, Repsol, and the aluminum and automobile industries, while significantly negative effects are found for capital intensity, performance level at privatization date, and the electronic and equipment industries.

Section 2 is devoted to the privatization/ownership and efficiency literature: theoretical approaches are reviewed in subsection 1a, empirical evidence in 1b, and missing issues in 1c. In

section 3 we discuss the difference between the ownership-efficiency and privatization-efficiency hypotheses, and our "two groups of forces" view. Section 4 describes our empirical study of privatization in Spain, including methods, data, variables, and results. Section 5 concludes.

2. Privatization, ownership, and efficiency: Theories and evidence

This section provides the background for our arguments by reviewing the existing theories and empirical research about the ownership-efficiency and privatization-efficiency hypotheses. To highlight the distinction between these two hypotheses, we have classified the empirical studies into two hypothesis-based categories. This classification shows that the evidence regarding the relationship between *privatization* and efficiency is actually much more scarce than what has been implied by (1) previous empirical reviews of *this* relationship (e.g. Yarrow); and (2) previous theoretical works about *privatization* claiming support for their theories (e.g. Bös, 1991) This wrongly derived implication is a proof of the confusion between the two hypotheses that is endemic to the privatization literature. A second proof stems from the theoretical review, since most of the so-called privatization theories are really theories of state vs. private ownership (all except Boycko, Shleifer and Vishny (1996) and Martin and Parker, 1997). For this reason, we use a different criterion for their taxonomy: the general economic or organization theory which is being applied to the private-public distinction (such as property rights, agency theory, or public choice).

2.a. Theoretical approaches

Privatization can be defined in a strict sense as a change in ownership, from state to private, within a firm. To the extent that state-owned firms and private companies can be thought of as different organizational forms, such a change in ownership involves a major organizational change. To understand the possible effect in efficiency of this change it is necessary to clarify the differences between both organizational forms, and several streams of thought have contributed to

this. Essentially, each of these theories provides a different explanation for a common outcome: private firms are more efficient than state-owned.

- **Property rights / Agency theory**

The property rights explanation to the superior efficiency of private firms is based on the attenuation of property rights that takes place in state-owned firms (Alchian, 1965; De Alessi, 1980, 1987; Borcherding, 1983). Agency theory provides a slightly different framework for this problem: managers in both types of firms are assumed to seek the maximization of their own utility rather than that of the organization or its owners. In private firms, this divergence is reduced through the existence of: (1) a market for ownership rights which enables the owners to sell if they are not satisfied with managerial performance and can be used to align manager's objectives with the firm's by including stock options in their compensation (this is also the focus of property rights theory); (2) the threat of takeover; (3) the threat of bankruptcy; and (4) a managerial labor market. In the case of state-owned firms, all of these mechanisms are absent.[2] The problem is aggravated by the fact that the relationship between owners and managers is broken down into (at least) two other agency relationships in the case of state-owned firms (that between owners -the public- and politicians, and that between politicians and managers), which effectively reduces the incentives in these firms to monitor managers' behavior.

This agency framework has been used in many theoretical writings about ownership or privatization, including Aharoni (1981),Vickers and Yarrow (1988, 1991), Caves (1990), Estrin and Perotin (1991), Fernandez (1995), or Martin and Parker (1997). One further distinction is worth introducing: Jensen's (1983) between "the two agency literatures". The articles just mentioned would correspond to his "positive agency literature". However, the "principal-agent literature" (more mathematical, more normative, more focused on particular aspects of the agency problem -typically information and optimal incentives) has also been represented in the public-private

context: Bös (1991), Bös and Peters (1991), Sappington and Stiglitz (1987), Shapiro and Willig (1990), Laffont and Tirole (1993), Garcia-Cestona and Salas (1995).

- **Public Choice**

This stream of thought is also referred to in the literature as "political market theory" (Borins and Boothman, 1985; Cragg and Dyck, 1997), particularly when it includes, as well as the public choice literature (Niskanen, 1971; Buchanan, 1972; etc.), the theory of economic regulation as presented by Posner (1971) and Stigler (1971). Central to this work is the argument that politicians pursue their own utility rather than the public interest. Accordingly, they impose on state-owned firms goals that can lead them to gain votes but can conflict with efficiency. For the general public, which are the ultimate owners of the firm, the costs of monitoring this public sector behavior (information gathering, lobbying) are likely to offset the benefits (less taxes, or more efficient public spending). This is not the case, however, for interest groups such as trade unions, which makes state-owned enterprises an easy target for rent-seeking activity. Specific applications of these ideas in the privatization literature include, for instance, Zeckhauser and Horn (1989), and Boycko, Shleifer and Vishny (1996).

- **Organizational theories**

Organizational research on this topic draws heavily from the economic theories just reviewed. However, it differs from them in that it explicitly acknowledges the mediating role played by organizational features in the relationship between privatization (or ownership) and efficiency. There is not, however, a unified organizational theory of privatization. Parker (1993, 1995a), and Martin and Parker (1997, chapter 9) compare how six organizational characteristics differ across both types of firms: management, objectives, organizational structure, communications/reporting systems, nature and location of the business, and labor. Perry and Rainey (1988) review the organizational theories and taxonomies in which the public-private distinction has played some role.

Walker and Vasconcellos (1997) have developed very specific hypotheses about the expected actions a firm's CEO will take after privatization. Fernandez (1984, 1985) has examined in detail how the organizational structure and management in state-owned enterprises differs from private firms. Ricart et al. (1991) offer a managerial perspective of how the incentives and control mechanisms compare across both types of firm.

2.b. Empirical approaches

We have classified the empirical research on this topic into two hypothesis-based categories: tests of the OEH, and tests of the PEH.

- **Empirical tests of the OEH**

The most rigorous methodology that has been used to compare the efficiency of state-owned and private firms consists on calculating their relative inefficiency with respect to an estimated profit, cost, or production frontier. Pestieau and Tulkens (1993) have argued for the superiority of this approach to efficiency measurement. They have also reviewed most of its applications in the private vs. public context. Table 1 includes all the studies they cite, as well as others.[3]

This methodology can also be applied dynamically to test the PEH. In fact, Boussofiane et al (1997) have done so. But since all other studies in Table 1 are static, we have opted for including the table in this subsection.

Most of the empirical research dealing with the ownership-efficiency issue, however, has been in the form of cross-sectional comparisons of private and state-owned firms in industries in which they coexist, as can be seen in Table 2. Cross-industry comparisons of public and private sectors are also included in this table (within the "various" industry category). Since most of these studies have already been included in one or more empirical reviews, and those reviews are frequently cited in the literature, we indicate, for each of the studies, the review(s) in which they appear.

As Tables 1 and 2 show, although a simple count of results would give a considerable edge to private ownership (adding up in both tables there are 102 in favor, 14 against and 35 neutral), the cumulative evidence isn't wholly conclusive. In fact, the authors of the various review articles we have mentioned offer very different conclusions, depending on the studies selected. While a proper meta-analysis is out of the scope of this paper, Table 2 can give some hints on: 1) how influential each study has been, 2) the pro/con proportion of the set of studies chosen by each of the reviewers, 3) indirectly, the methodological rigor required for the papers reviewed, and 4) the subjectivity with which the original results are sometimes interpreted. [4]

Two factors play a significant role in explaining the diversity of results within these Tables: market structure and efficiency measurement. As Vickers & Yarrow note, "statistical tests have rarely been sophisticated enough to take account of the interacting (non-separable) effects of ownership, competition and regulation on incentive structures, and hence on the performance of firms" (1988, p.39). Accounting for the market structure of each of the industries (and countries) to which the firms studied belonged, the conclusions from this literature can be summarised as follows: Under competition, there seems to be a very generalized agreement in favor of private ownership. However, in non-competitive environments, efficiency appears to depend more strongly on regulation and competition than on ownership in itself (Yarrow, 1986; Vickers & Yarrow, 1988).[5] As for efficiency measurement, one first thing to be noted is that many different concepts of efficiency are relevant in this context: productive and allocative, static and dynamic…(see Martin and Parker, 1997: 47-53; Walker and Vasconcellos, 1997: 27-29). Secondly, three different measures -profitability, productivity, and costs- can be and have been used in these studies, and the appropriateness of using one or another is highly dependent on market structure. In essence, profitability measures are only valid in a competitive context; otherwise, the efficiency ranking of

the firms being compared may vary with the measurement used (Borins & Boothman, 1985: 100-104; Cuervo, 1995c: 37-38; Cuervo and Peres, 1981).

- **Empirical tests of the PEH**

The availability and variety of studies in this category sharply contrast with the previous one. Many summaries of different countries' privatization programs have been written, almost always of a qualitative nature. In fact, so far there has only been one country for which quantitative studies of privatization are available: the UK (see Martin and Parker (1997: 85-86) for a review). Of these, only two studies have dealt with a sample size large enough to allow some kind of statistical analysis: Haskel and Szymanski (1993), and Cragg and Dyck (1997). In addition, six cross-country studies of privatization are of great interest: Ehrlich et al. (1994), Galal et al. (1992), Megginson et al. (1994), World Bank (1995), Jones et al. (1997) and Nash et al. (1997). All of them have found support for the PEH. Other than this, the only empirical evidence regarding privatization comes from case studies such as those included in Martin and Parker (1997), Ramamurti (1996), Vickers & Yarrow (1988), or Walker and Vasconcellos (1997). This is not to say that they are not valuable. In fact, these studies have greatly contributed to our understanding of how privatization works. The problem, of course, is that their conclusions can't be generalized.

2.c. Critical considerations

As this review shows, the issues of whether and why privatization leads to an improvement in firms' efficiency have been the subject of a now considerable amount of research. However, several critical considerations may be raised.

First of all, the issues of ownership-efficiency and privatization-efficiency have too often been confused. The ownership issue is essentially a question of organizational choice, and, as such, it is inherently static. In contrast, privatization is a form of organizational *change* and, as such, it is a dynamic issue. Some of the theoretical articles cited are simply about the differential effects of

private and public ownership in efficiency. Others, however, have attempted to explain why privatization is expected to lead to an efficiency improvement. To do so, they have gone back to the issue of ownership and efficiency, which is a very reasonable starting point. However, very rarely have they returned to the original issue of privatization.[6] We believe that, without an argument that connects both issues, the rationale for privatization is incomplete. Moreover, we believe that empirical support for privatization cannot be directly inferred from the evidence that private ownership implies a greater efficiency, as several authors have done. As we explain in more detail in the next section, several counteracting forces may operate, and the net effect is ultimately an empirical question. Therefore, only if those forces are controlled for can the inference be made.

Related to this, another striking feature of the research that has been done so far is the relative scarcity of empirical support of statistical significance for the PEH. If, as we are suggesting here, the static tests of the OEH are not valid as tests of its dynamic counterpart, and conclusions from privatization case studies are not generalizable, we are left with very little evidence to support the theoretical literature about privatization.

3. Privatization and efficiency vs. ownership and efficiency

The central tenet of this paper is that privatization-efficiency and ownership-efficiency are two different issues. Since privatization involves a change in ownership, a positive relationship between (private) ownership and efficiency is a necessary condition for the existence of a positive relationship between privatization and efficiency.[7] However, the condition is not sufficient to ensure that privatization will work.[8] The net effect of a firm's privatization on its efficiency can be seen as the result of two groups of counteracting forces: On one hand are the potentially positive effects of a change from state to private ownership, as the OEH suggests, and which we will not question in this paper. This change will trigger all the private firm mechanisms for reducing the agency problem

that were described in section 2a, or may even cause the disappearance of the agency problem if privatization is in the form of a direct sale and leads to its transformation into an owner-managed firm. On the other hand, two types of negative effects seem also plausible: government-related and firm-related. *Government-related negative effects* are typically a consequence of giving a higher priority to other privatization goals than to the efficiency objective, when the choice between those goals and that of efficiency involve a trade-off. Such would be the case, for instance, of selling the firm at a lower price to ensure the political success of the operation (Jones et al., 1997), of privatizing a monopoly before introducing competition or an appropriate regulation, as opposed to afterwards, in order to increase the revenue from privatization, (Vickers and Yarrow, 1988); or of hastening to privatize the firm in a period of recession in the industry or in all of the economy, regardless of that fact, in order to increase the state's revenues in that period. There is also the possibility of a government's mistake or failure in, for instance, choosing the optimal buyer or privatization method. *Firm-related negative effects* may also be due to "voluntary" or involuntary causes. Like government representatives before privatization, managers of a newly-privatized firm may give a higher priority to other conflicting objectives. For instance, if the firm is privatized by selling it directly to another firm, and the acquired firm is maintained as a separate business unit of the acquirer, rather than their activities being integrated, the maximization of the acquiring firm's performance as a whole may not coincide with the acquired business unit. On the other hand, it may also be the case that managers find themselves unable to turn around a low-performing firm, encounter resistance to change at some level of the organization, or face any other unintended situation.

While government-related counteracting forces have been acknowledged indirectly in the context of privatization objectives (e.g. Yarrow, 1986), firm-related have invariably been overlooked in the privatization literature, even within the organizational stream. The main reason

we see for this oversight is the confusion we have mentioned between the ownership-efficiency and privatization-efficiency hypotheses. Neither of these types of negative effects is accounted for by the OEH. However, if the relationship of interest is that between *privatization* and efficiency, they cannot be assumed away. They need to be controlled for, not only in empirical research, but also in a complete theory of privatization. Given the possibility that negative forces are at work, and are likely to evolve over time, the issue of when the efficiency improvement due to privatization is observed becomes as relevant as those of whether and why.

4. Privatization in Spain, 1985-1996:

To illustrate our point, in this section we analyse the effects of privatization on firm performance in a sample of 24 Spanish firms which were privatised between 1985 and 1993. The positive effects of private ownership in efficiency have been confirmed for Spanish firms in a number of studies (see Maroto (1991) for a review; Azofra, 1992; Argimón et al.; 1997). This is, however, the first time the PEH is tested. [9] Before Spain's official privatization program was started in 1996, seventy three firms were fully privatized (all except two through direct sales) by the former government, and four others had their privatization process started through public share offerings (Villalonga, 1996).[10] Therefore, enough time has gone by for enough firms to allow an analysis of privatization effects. This analysis is used to illustrate some of the more general issues we have raised in the previous sections, for which the Spanish case may be as good as any other country's. Given the scarcity of empirical privatization studies and of samples studied (the British firms, plus Ehrlich et al.'s (1994) and Megginson et al.'s (1994) samples), we hope our study may, at least, add some variety to this literature. However, we not attempt to extend any conclusion drawn from our results beyond the Spanish case, since the institutional environment and the privatization process during the socialist government were highly idiosyncratic (Villalonga, 1996; Cuervo, 1997). Rather,

our goal with this study is to illustrate our case for the need to distinguish between the ownership-efficiency and privatization-efficiency hypotheses, and show how the examination of the "when" and "why" issues can contribute to clear up the confusion. Details of the Spanish state-owned sector's structure and reorganizations during that period can be found in Sanchís (1996). For the purpose of this paper, it is sufficient to note that all the firms in our sample were operating in competitive environments at the time of their privatization, so no *de*- or *re*-regulation interferes with our estimation of strict privatization effects.

We specifically examine the three issues mentioned of *whether*, *when* and *why*. Our analysis of the "why" is conditional on the "whether". That is, after determining whether privatization increases (or decreases) the performance of each of the firms in our sample by estimating its net effects, we examine some the possible forces that may have played a role in arriving at those net effects.[11] Although we are constrained by our data in the choice of the forces to be examined, we have been able to include both government and firm-related. The government-related forces considered are: (1) the firm's capital intensity, to test for the possibility of a typical privatization objective different from efficiency: increased capital investment; (2) the state of the business cycle at which the company was privatized; and (3) the foreignness of the buyer, which is typically an issue of political concern. The firm-related forces examined are: (1) the difficulty of running or turning around a low-performing privatized firm, which is assumed to be reflected in the company's starting performance level as a private firm; and (2) the resistance to change encountered, which we assume would be reflected in the size of the organization.

- **Methods**

We examine the "whether" issue by using similar methods to those that have been used in previous statistical tests of the PEH. Similarly to Megginson et al. (1994), we compare through *t*-statistics the difference between the means and medians of our efficiency measure in the pre- and

post-privatization periods, and use *z*-statistics to test if the proportion of firms that changed in the expected direction is significantly different from 0.5 [12]. We also compare, as Ehrlich et al. (1994), the time trends of efficiency in both periods, by estimating the following fixed-effects model:[13]

$$effi_{i\,t} = \alpha_i + \beta_{1i} * priv_{i\,t} + \beta_{2i} * time_{i\,t} + \beta_{3i} * time*priv_{i\,t} + \gamma_4 * size_{i\,t} + \gamma_5 * cycle_{i\,t} + \varepsilon_{i\,t} \qquad (1)\,,$$

where *effi* stands for efficiency, *priv* is a dummy variable for the post-privatization period, and *time, size,* and business *cycle* are self-evident. The effect of privatization in this model can be seen from the coefficients of *priv* and *time*priv*: *priv* captures differences in performance *levels* before and after privatization, while *time*priv* captures changes in performance *trends*. That is, a positive coefficient in *time*priv* would indicate that performance increases more over time after privatization than before (or decreases less, if the *time* coefficient is negative). Chow specification tests lead us to reject the hypothesis of common intercept and slope coefficients for the *priv*, *time* and *time*priv* terms. Thus, we estimate those coefficients individually for each firm (α_i, β_{1i}, $\beta_{2i,}$ and β_{3i}), but those of the control variables, *size* and *cycle*, (γ_4 and γ_5) in common. The method of estimation has been Generalized Least Squares (GLS), in order to take account of the heteroskedasticity of the data.[14] We estimate firm-specific weights in a preliminary regression with equal weights and then apply them in a weighted least squares estimation as a second step.

The "when" issue is examined by regressing efficiency growth on time dummies, using the same GLS procedure and weights.

Finally, the issue of "why" is analysed as a second step after the estimation of (1). The estimated parameters of *priv* and *time*priv* from (1), i.e. β_{1i}, and β_{3i} , are used as alternative measures of *efficiency increase* (in levels and in trend, respectively), and become the *dependent* variable in the following cross-sectional model:[15]

$$effinc_i = \alpha + \beta_1 * capint_{i\,0} + \beta_2 * cycle_{i\,0} + \beta_3 * fbuyer_i + \beta_4 * perf_{i\,0} + \beta_5 * size_{i\,0} + \beta_6 * aluminum_i +$$

$$+ \beta_7 * \text{auto}_i + \beta_8 * \text{electronic}_i + \beta_9 * \text{food}_i + \beta_{10} * \text{equipment}_i + \beta_{11} * \text{Repsol}_i + \varepsilon_{i\,t} \qquad (2),$$

where *effinc* means efficiency increase, *capint* is the firm's capital intensity, *fbuyer* is a dummy for foreignness of the buyer, *perf* is performance, *Repsol* is a firm dummy, and the rest of the variables have either been already defined for model (1) or are industry dummies for those industries from which there is more than one firm in our sample (for the rest, an industry effect would be indistiguishable from a firm effect). *Effinc*, *capint*, and *fbuyer* represent government-related forces, while *perf* and *size* are firm-related. *Repsol* and the industry dummies are used as control variables. The dummy for Repsol is included because there are several characteristics of this company that set it apart from the rest of the sample: (1) its pre-tax profits at privatization date are over three hundred times larger than the next most profitable firm's (and its sales ten times larger than those of the next biggest) (2) it is the only one that was privatized through public offer, and (3) it was privatized over an eight year period. As before, we use a GLS estimator to correct for heteroskedasticity, which in this case arises from the dependent variable's being estimated with varying precision. Following Saxonhouse (1976), each observation is weighted on all variables by the inverse of the estimated standard error of the dependent variable.

- **Data**

Our sample of 24 firms results from excluding companies from the population of Spanish firms privatised between 1985 and 1995, as listed in Villalonga (1996), in the following order: (1) Those that were privatised after 1993, for which a maximum of two years of post-privatization data would be available; (2) Partial privatizations, i.e. those that remained under state control; (3) Those for which data couldn't be obtained for a minimum of three years of public and three years of private ownership, on the following variables: profits before taxes, assets, financial expenses (interests), sales, and number of employees.

Data on the state ownership period for each firm have been obtained from the annual reports kept at the (former) Instituto Nacional de Industria (INI)'s library. In most cases, however, individual companies' reports weren't available, and data come from the annual reports of the holding groups to which the firms belonged when they were sold (INI, Teneo, or Patrimonio). Post-privatization data were directly requested from companies through fax and/or phone and/or in person. If and when the request was denied, company reports were requested from the Registro Mercantil of the province in which the firm was incorporated. The requirement to file in company reports is fairly recent, though (1989) and, as it appears, often disregarded. Our most recent year of data is 1996. In addition, we have data on the average profitability of Spanish firms until 1995 from the Central de Balances del Banco de España's annual reports.

This information has allowed us to construct a panel data set on profitability, sales, employees, a dummy for foreignness of the buyer, and average profitability of Spanish firms, for 24 firms and a number of years between 7 and 14 (between 3 and 5 pre-privatization, the privatization year, and between 3 and 8 post-privatization). The average number of years per firm is 10.2.

The list of firms in our sample, together with the available data for each of them in the year of their privatization, is shown in Table 3. The table also contains information on the year each firm was privatized, the industry, the buyer, and whether it is foreign or not.

- **Variables and measures**

Our measure of *efficiency* -in (1)- or *performance* -in (2)- is Return on Assets (ROA), calculated as earnings before interest and taxes divided by total net assets. It is the measure more commonly used in cross-industry *privatization* studies, and is considered a correct indicator of efficiency in competitive environments (Borins and Boothman, 1986; Cuervo, 1995), as it is the case for all the firms in our sample in the time period considered. Firm *size* is proxied by number of employees in model (2), and by sales in (1), since too many data points were missing for the

number of employees. Average profitability of Spanish firms is used to control for the possible variations in firms' performance that may be due to the business *cycle*. *Capital intensity* is measured by a capital/labor ratio (assets per employee).

- **Results and discussion**

The values of the *t* and *z*-statistics used to test the PEH in its more basic form, i.e. the "whether" issue, are reported in Table 4. As the table shows, none of the statistics are significant at the conventional levels. Hence, we cannot reject the null hypotheses that the mean and median levels of efficiency for each firm are the same before and after privatization. We cannot reject, either, the null hypothesis that the proportion of firms for which these levels increased after privatization is equal to 0.5. The conclusions are the same concerning mean and median *increases* in efficiency.

We also examine the "whether" issue through the estimation of model (1), the results of which are reported in Table 5. There we can see that the coefficient of the post-privatization period dummy (*priv*) is only significant in four cases, of which two are positive (*Astican* and *Icuatro*) and two negative (*Coisa* and *Enasa*). The coefficient of the *time***priv* is significant in six cases, which are again equally split into positive (*Astican*, *GEA,* and *Enasa*) and negative (*SKF Española*, *Evatsa*, and *Icuatro*). Overall, then, our results show that, in our sample, the effect of privatization has led to significant increases in performance in only two (three) cases. Furthermore, in two (three) cases there have been significant *decreases*.

Considering the results from Tables 4 and 5 jointly, we can see that, if we were to test the PEH in this sample by simply looking at the "whether" issue, the obvious conclusion would be to reject it. It is precisely when such conclusion is reached that the other issues of when and why are more worth investigating, particularly if inferences are to be drawn about the effect of *ownership*, *about which nothing can be concluded at this point* (though, if the hypothesis were supported, we

might still be interested in estimating the actual effect of ownership by controlling for other variables that may have helped attain the positive net effect of privatization, e.g. the business cycle, or industry-level factors). The results of regressing efficiency growth on time dummies through which we examine the "when" issue are shown in Table 6. We have chosen to report the regression using bi-yearly dummies since we faced a trade-off between dividing the time period as much as possible to be able to answer the "when" question with greater precision, and keeping the specification parsimonious. Results were similar, though, when yearly dummies were used.

Although the amount of variance explained by this regression is very small, we find a positive and significant effect for years 7 and 8 after privatization. This suggests that one or more of the negative forces described might have actually been operating during the six first years after privatization, but their impact has finally been offset by the positive effects of private ownership. Thus, inferences about the PEH (particularly if it is rejected) made from looking at short post-privatization periods (e.g. Sanchís, 1996) may be misleading. At the least, we can conclude that *the effect of privatization on efficiency is contingent upon the time period considered*, which is a limitation of all empirical privatization studies, including ours.

Finally, we examine the "why" issue by estimating equation (2). The dependent variable is efficiency increase, as measured by the coefficients in columns 1 (increase in *levels*) and 5 (increase in *trend*) of Table 5. Results for both measures are shown in Table 7. Since the GLS transformation inflates the R^2 from the regression, we report the R^2 (and adjusted R^2) values from regressing the untransformed dependent variable on the predicted values using transformed regressors and the coefficients from the weighted regression (Waring, 1996). As Table 7 shows, when the dependent variable is taken to be the increase in the efficiency trend, only one of the coefficients is significant, and the explanatory power of the regression, as indicated by the adjusted R^2, is very low. For this reason, we focus our discussion on the estimation using the alternative measure of efficiency

increase: the increase in levels. As column 2 indicates, capital intensity is negative and highly significant, which supports the possible existence of a privatization objective different from efficiency: increased capital investment in the privatized firms (indeed, De la Dehesa (1992) mentions as a main reason for the privatization of several firms in that period their lack of appropriate size, technology and/or distribution infrastructure). If that were the case, and the acquiring firm had effectively invested in the acquired one, the efficiency of this one would probably increase in the longer run, but might not appear so within the period we are analysing (this becomes particularly important because of our use of ROA as the underlying measure of efficiency); Also significant, but positive, is the state of the business cycle at which the company was privatized. This suggests that the government may have hastened to sell some of the firms regardless of the fact that the economy was in recession at that time, which, as we had predicted, would be a potential negative force contributing to the net effect of privatization on efficiency. The third of the government-related variables, the foreignness of the buyer, is not significant, which suggests that, at least for the firms in our sample, the efficiency argument cannot be appealed to as a response to popular and political concerns about "selling the country away". Firm size turns out to be insignificant. While this seems somewhat surprising, it may be noted that such an insignificance would be observed if, for instance, larger firms, in which problems like resistance to change or cultural clash are more likely to be found, had also been able to downsize in a greater proportion and attain a greater level of efficiency based on that restructuring. However, we have not been able to test this explanation due to the high proportion of missing data on number of employees. The other firm-related effect we have estimated is the company's starting performance as a private firm, which is negative and significant. This implies that the lower this performance is, the more likely it is to improve with respect to the state-owned period. So the difficulty of running or turning around a low-performing privatized firm does not seem to have played a role in arriving at the observed

effects of privatization in efficiency. Regarding industry effects, for the aluminum and automobile industries they turn out to be positive and significant, while for the food and equipment industries they have the opposite sign. Finally, Repsol also shows a positive significance, but we cannot say which of its differential characteristics mentioned have led to this result, since our information does not allow us to discriminate between them.

5. Conclusions

Our results show that, in our sample, privatization has only led to significant increases in performance in two (three) out of twenty-four cases. Moreover, in two (three) other cases it has led to decreases. This finding, together with the evidence reported in previous studies that, in the same country and period, private ownership was significantly associated to higher levels of performance, lends support to our claim that ownership-efficiency and privatization-efficiency are two different issues. Neither does the positive effect of ownership on efficiency observed in other studies lead to a positive effect of privatization on efficiency, nor does the inconclusive effect of privatization on efficiency observed in our study imply that ownership has no effect on efficiency. Thus, the discrepancy can only be solved by examining, together with the "whether", the issues of when and why such discrepancy has arisen. Our analysis of these two issues shows that (1) a positive net effect of privatization on efficiency is actually observed when a sufficiently long post-privatization period is considered, and (2) several government-related, firm-related and industry forces have effectively played a role in the net effect observed and its timing.

Notes

[1]According to the World Bank, over 2000 firms were privatised during the period 1980-1993 (almost half between 1991 and 1993), less than 5% of which involved public share offerings.

[2] The fourth mechanism, the managerial labor market, may not be exactly absent. More typically, there are two separate managerial labor markets, one for private firms managers, another for state-owned. But since the latter is frequently governed by political decisions rather than by the price of managerial ability, it may be useless as a threat to managerial discretion.

[3] For lack of space, full references of the studies contained in Tables 1 and 2 have been omitted in this paper whenever the studies have appeared in one or more published reviews, as indicated in each Table. All other studies, and of course the review articles, *are* fully referenced here

[4] Hirsch's (1965) study provides a good illustration for this point. It has been classified as favorable to private ownership by Yarrow and by De Alessi, as favorable to state ownership by Millward & Parker, and as neutral by Borcherding et al. and by Boardman & Vining -and in this paper, in view of the discrepancies.

[5] This conclusion is often invoked by privatization detractors, and it may well be the case that when privatization is accompanied by an increase in competition, the efficiency effects of the change in ownership are dwindled by those of competition. This shouldn't be taken to mean, however, that ownership doesn't matter, since when the effects of competition are controlled for, the evidence shows that ownership does matter.

[6] The only exception is Martin and Parker (1997), who argue: "…in so far as ownership and competition are important, they impact on performance through *an internal adjustment process*" (their emphasis, p.170).

[7] A change in ownership, in turn, is needed to achieve a substantive and durable increase in efficiency. Those skeptical of privatization might argue that similar increases might be achieved through "simple" imitation of private firm behavior under state ownership, sometimes referred to as "corporatization". And, to some extent, this is an empirical question (Shirley and Nellis, 1991). While some studies of public sector reform have provided evidence in favor of this argument (Bollard and Mayes, 1993; Parker, 1995b), those who have studied both policies in a more general context agree the effects of reform without ownership transfer are seldom positive (World Bank, 1995), and when they are, "government ownership seldom permits sustained good performance over more than a few years" (Kikeri et al., 1992: 1).

[8] At this point it is important to clarify that privatization in this paper (and in most of the literature) refers strictly to the change in ownership, and not to the possible changes in the competitive or regulatory environment that may accompany it. Therefore, when we say the positive relationship between ownership and efficiency is not sufficient for privatization to work, we are not referring to the fact that competitive conditions may need to be established through de-or re-regulation.

[9] Sanchís (1996) claims to be doing so on a dataset that ends in 1990. However, of the 17 firms in his sample for which he examines the effects of "privatization", 11 were not really privatized (3 were transferred to another state-owned firm, 8 -counting Repsol as 5- had just minority stakes sold through IPO, and remained under the state's control and majoritary ownership), and 5 (plus the 5 included in Repsol) were privatized in 1989 (including 3 that he says were privatized in 1988), so he just has one year of post-privatization data for them. Thus, only his results for one company (Seat) are trustworthy estimates of the effect of privatization on efficiency, and so we do not consider it as a privatization study.

[10] See, for a dynamic source of information on Spain's privatization program, Expansion newspaper's website at: http://www. recoletos.es/privatizaciones.

[11] Alternatively, the analysis of the "why" could be conditioned on the "when", by examining the forces behind the timing of the observed effects. See note 15.

[12] Megginson et al. (1994) use Wilcoxon signed-rank tests to test whether the median difference between the pre- and post-privatization periods is zero.

[13] We are treating the effects as fixed, as opposed to random, for two reasons: (1) Given the idiosyncratic nature of the Spanish privatization process during the period considered in this study, and how our sample has been selected, our inferences are conditional on the individual characteristics, not unconditional on the population characteristics (Hsiao,1986: 41, 136; Baltagi, 1995: 10, 13), and (2) We have no reason to assume that our regressors are uncorrelated with individual-specific coefficients, which is a key assumption in random effects models (Mátyás and Sevestre, 1996). These arguments correspond to the two alternative views within the panel data econometrics as to what justifies the choice of fixed vs. random effects models.

[14] Since the number of cross-sectional units (firms) in our data set is very small, we do not need to difference away the intercepts through a 'deviation from individual means' transformation, as it is common practice in the estimation of fixed effects models in large N panels.

[15] One alternative method to examine this "why of the whether" issue would be using a probit or logit model of the probability of there being an efficiency increase after privatization. However, the observed efficiency increase still needs to be determined from the estimates from (1) or similar measures (e.g. difference between post- and pre-privatization means), and the dichotomization of those measures involves a loss of information, as well as a certain subjectivity in choosing the cutoff point. Another alternative would be to examine the slightly different issue mentioned in note 11 of the "why of the when". This could be done using an accelerated event-time model of the number of years it takes a firm to increase its efficiency after privatization (Mitchell, 1989). The fact that this may take a longer period for some firms that the one included in the sample is not a problem, since this model allows for right-censoring of the data. However, there is again a certain subjectivity required in deciding when to consider an increase as definitive (e.g. first year of positive efficiency growth, or only when the next year also exhibits a positive growth?). Note that the estimation of *when* there is a change in trend as in (1) but using, instead of the post-privatization period dummy (time >0), a dummy for years 2 onwards (time >1), 3 onwards (time>2) etc., becomes unfeasible at a certain point. Due to the problems associated with these two alternatives, we think our method is preferable.

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Table 1. Empirical studies of ownership-efficiency based on efficiency frontiers

INDUSTRY	STATE-OWNED MORE EFFICIENT	NO SIGNIFICANT DIFFERENCES	PRIVATE MORE EFFICIENT
Electricity	Färe et al. (1985), US Côte (1989), US Pollit (1994, 1995), US & UK *	Hjalmarsson &Veiderpass (1991), Sweden	
Airlines		Barla & Perelman (1989), US & Europe	
Refuse collection		Distexhe (1993), Belgium	Cubbin et al. (1987) Burgat &Jeanrenaud (1990), Switzerland
Railways		Filippini & Maggi (1991), Switzerland	Oum &Yu (1991), Canada
Financial		Tulkens (1993), Belgium	
Insurance	Fecher et al. (1993), France		

Healthcare Education Petroleum Sugar Various	Grosskopf &Vladamis (1987), US		Wilson&Jadlow (1982), US * Rhodes&Southwick (1988), US Al-Obaidan &Scully(1991),International* Ferrantino &Ferrier (1991), India Boussofiane et al. (1997), UK * Argimón et al. (1997), Spain *

(*) Not included in Pestieau & Tulkens

Table 2. Cross-sectional studies of ownership-efficiency

INDUSTRY	STATE-OWNED MORE EFFICIENT	NO SIGNIFICANT DIFFERENCES	PRIVATE MORE EFFICIENT
Electricity	Meyer (1975), US {D[1],BPS,M,BB,B,Y,VY,BV,PM} Neuberg (1977), US {M,B,Y[2],BV,PM} Primeaux (1977),US {M} Pescatrice & Trapani (1980),US {PM}	Shepherd (1966), US {D,BV} Mann (1970), US {D,BV} Yunker (1975), US {M,BB,B,Y,BV,PM} Spann (1977), US {BPS,BV} Edison Electric Institute (1985), US {VY} Atkinson & Halvorsen (1986), US, {PM} Di Lorenzo & Robinson (1982), US, {PM} Holmes (1990), Europe {PM}	Moore (1970)[3], US {D,BPS,B,BV, MP} Wallace & Junk (1970), US {BPS, PM} Peltzman (1971), US {D,MP,B,Y,VY,BV,PM} Tilton (1973), US {D,BV} De Alessi (1974,75,77), US {M,B[4],Y,VY,BV,PM} Foreman-Peck and Waterson (1984), US {PM}
Airlines		Forsyth & Hocking (1980), Australia {MP,BB,DP,BV,PM} Morrison (1981), Australia {BV} Jordan (1982), US & Australia {BB,DP,BV}	Davies (1971, 1977), Australia {D,BPS,M,BB,B,DP,Y,BV,PM} MacKay (1979), Australia {DP,VB} Pryke (1982), UK {Y,VY,VB} Findley & Forsyth (1984),Australia{VB}

		Millward & Parker (1983),Australia {DP} Ashworth & Forsyth (1984), International {PM}	Kirby & Albon (1985), Australia {DP} Kirby (1986), Australia {DP,VB} Forsyth et al. (1986) {VY,VB, PM} Gillen et al. (1989), Canada {VB} Windle (1991), US & Europe {PM}
Refuse collection	Pier et al. (1974), US { BPS,M,Y,BV}	Hirsch (1965)[5], US {D,BPS,MP,Y,BV} Spann (1974), US {Y} Feller & Menzel (1976), US {B} Kemper & Quigley (1976), US {BPS,BV} Collins & Downes (1977), US {BPS,BV} Savas (1977a), US {D[6]M,B} Audit Commission (1984), UK {VY}	Savas (1974, 1977b,c,d, 1980), US {D,BPS[7],M,B,Y,VY,BV} Edwards & Stevens (1976, 1978), US {BPS,M,BV} Kitchen (1976), Canada {BPS,M,B,Y,VY,BV} Pommerehne (1976), Switzerland {BPS} Petrovic & Jaffee (1977), US {BPS} Pommerehne & Frey (1977), Switzerland {M,B,Y,BV} Stevens (1978), US {BPS,MP,VY,BV} Stevens & Savas (1978), US {BPS} Bennett & Johnson (1979,80) US {D,M} Boorsma (1982), Netherlands {VB} Hartley & Huby (1985), UK {VY} McDavid (1985), Canada {VB} Lawarrée (1986), Bélgica {VB}
Water supply	Mann & Mikesell (1976), US {BPS[8],B,Y,BV,PM} Bruggink (1982), US {Y,VY,BV, PM}	Feigenbaum & Teeples (1983) {Y,BV,PM}	Hausman (1976), US {BV} Morgan (1977), US {BPS,BV} Crain & Zardkoohi, (1978, 1980), US {D,BPS,M,B,Y,VY,BV,PM} Boland (1983), US {VB} Lynk (1993), UK {PM}
Railways		Caves & Christensen (1980), Canada {BPS,M,BB,B,Y,BV,PM} Caves et al. (1982), US & Canada {BV} Freeman et al. (1985), Canada {VB}	
Urban Transport-ation			Oelert (1976), Germany {BPS,PM} Pashigian (1976), US {D,MP,BB,Y,BV} Bails (1979) {VB} Pucher (1982) {VB} Palmer et al. (1983), Canada {BB,BV,PM} Pucher et al. (1983) {VB} McGuire & Van Cott (1984), US {BV} Wallis (1985) {VB} Perry & Babitsky (1986) {VB}
Construction			Schneider & Schuppener (1971), Germany {BPS} Rechnungshof Rheinland-Pfalz (1972), Germany {BPS} Muth (1973), US {BPS}
Telecom	Denny et al. (1983), Canada {BB}	Gordon (1981), Canada {BB} Duch (1991), International {PM}	Foreman-Peck (1985), International {PM}
Financial		Lewin (1982), Europe {BV}	Davies (1981), Australia {BPS,BV,PM} Davies & Brucato (1987) {VB}
Insurance		Finsinger (1981, 1984[9]), Germany {BPS, Y, BV, PM[10]}	Frech (1976, 1979, 1980) {BPS,Y,BV} Kennedy & Mehr (1977),Canada {BPS} Hsaio (1978) {VB}
Healthcare		Becker & Sloan (1985) {BV} Renn et al. (1985) {BV}	Clarkson (1972), US {D,BPS,MP,BV,PM} Hrebiniak & Alutto (1973) {VB} Lindsay (1975,76), US {D,BPS[11],BV} Bishop (1980) {BV} Frech & Ginsburg (1981), US {BV} Schlesinger & Dorwart (1984), US {BV} Schulz et al. (1984) {VB} Frech (1985), US {VB}
Cleaning services			Hamburger Senat (1971),Germany {BPS} Bundesrechnungshof (1972), Ger {BPS} Fischermenshausen (1975), Ger {BPS}

Timber			Bundesregierung Deutscheland (1976), Germany {BPS} Pfister (1976), Germany {BPS}
Various	Millward (1990, 91), UK & US {PM} Pryke (1971), UK {PM} Molyneux & Thompson (1987), UK {PM}		Ahlbrandt (1973,74), US {BPS,MP,Y,BV} Pausch (1976), Germany {BPS} Funkhouser & McAvoy (1979), Indonesia {MP,BV,PM} Bennett & Johnson (1980), US {BPS} Kim (1981), Tanzania {BV,PM} Pryke (1981,82), UK {Y,VY,VB, PM} Boardman &Vining (1989), non-US {VB,PM} Picot & Kaulmann (1989), non-US {VB,PM} Vining & Boardman (1992), Canada {PM} Bhaskar & Khan (1995), Bangladesh {PM} Enderwick (1994), Latin America, Asia {PM} Adhikari & Kirkpatrick (1990), {PM} Hamilton (1971), UK {PM} Gantt & Dutto (1968), Less Developed Countries {PM} Monsen & Walters (1983), Europe {PM} Plane (1992), International {PM}

D = De Alessi (1980); BPS = Borcherding, Pommerehne & Schneider (1982); M = Millward (1982); MP = Millward & Parker (1983), not in M
BB = Borins & Boothman (1985); B = Boyd (1986); DP = Domberger & Piggott (1986); Y = Yarrow (1986); VY = Vickers & Yarrow (1988)
BV = Boardman & Vining (1989); VB = Vining & Boardman (1992), not included in BV; PM = Martin & Parker (1997).
Note: Millward (1982) is included and extended in Millward & Parker (1983). So is Boardman & Vining (1989) in Vining & Boardman (1992).
(1) Classified as neutral by De Alessi
(2) Classified as neutral by Yarrow.
(3) Classified as neutral by Boyd and by Martin & Parker.
(4) Boyd classifies De Alessi (1975) as neutral or as favorable to state ownership, depending on the measurement employed.
(5) Classified as favorable to private ownership by De Alessi & Yarrow; as favorable to state ownership by Millward & Parker.
(6) Classified as favorable to private ownership by De Alessi.
(7) Classified as neutral by Borcherding et al.
(8) Classified as favorable to private ownership by Borcherding et al.
9 Classified as favorable to private ownership by Vining & Boardman; as favorable to state ownership by Yarrow.
10 Classified as favorable to state ownership by Martin & Parker.
11 Classified as favorable to state ownership by Borcherding et al.

Table 3. Summary data for the sample

PRIVATIZ. DATE (1)	COMPANY	INDUSTRY	BUYER (2)	ROA(%) AT PRIV DATE	EBIT (3) AT PRIV DATE	SALES(3) PRIV DATE	# EMPLOYEES AT PRIV DATE
1985	Ingenasa	Biotechnology	ERT	-26.2	-64	38	n/a
1985	SKF Española	Bearings (Autom)	Aktiebogalet SKF *	8.5	302	8,513	991
1986/90	Seat	Automotive	Volkswagen AG *	-6.3	-27,434	231,954	22,197
1986/**88**/94	Telesincro	Electronic	Bull *	14	149	2,715	175
1987	Evatsa	Aluminum	Cebal *	3.9	15	642	77
1987	Litofan	Aluminum	Baumgartner Iberica *	-5.6	-37	554	48
1987	Alumalsa	Aluminum	Montupet *	13.7	98	1,518	n/a
1989	Astican	Shipbuilding	Italmar	14	-490	3,457	329
1989/92	MTM	Equipment	GEC Alsthom *	-4.3	-1,727	2,315	1,315
1989/92	Ateinsa	Equipment	GEC Alsthom *	4.5	-636	4,255	482
1989/91	Enfersa	Fertilizers	Ercros	3.2	382	25,587	1,657
1989	Oesa	Food	Ferruzi *	-1.6	-598	19,096	125
1989	Pesa	Electronic	Amper	8.8	401	7,141	351
1991/93	Enasa	Automotive	Iveco/Fiat *	-19.1	-19,738	54,876	5,123
1991	GEA	Industrial Crafts	Pickman (Estudesa)	-32.4	-3171	3,606	1,291

1991	TSD	Electronic	Telepublicaciones	-22.7	-364	1,021	41
1992	Icuatro	Medical Equipm	Grupo Alegre	10.4	136	2,419	23
1989/90/2/**3**/5/6	Repsol (Grupo)	Petroleum	PUBLIC OFFER	10.2	122,319	2167,287	18,797
1990	Hytasa	Textile	Textil Guadiana	-14.7	-3,363	3,768	1,047
1990	Salinas Torrevieja	Salt	U. Salinera (Solvay *)	-17.2	-1,049	1,608	354
1991	Coisa	Frozen food	Rusticas	4.1	-14	592	60
1991	Jobac	Distribution	Consum (Eroski)	-1.8	-504	20,731	1,419
1993	FSC	Equipment	Navacel/ TTT/ L.Telleria	-37.2	-1,486	566	259
1993/94	Palco	Aluminum	Alcan Deutscheland *	-6.8	-66	867	44

1 The date in bold shows when the state became a minoritary owner. These are the dates that have been considered as the effective privatization dates (year 0) for this study.
2 Foreign buyers have been marked with an asterisk.
3 Millions of pesetas

Table 4. "Whether?": Tests for changes in efficiency after privatization

Efficiency measure	Sample statistic	Pre-priv. Mean	Post-priv. Mean	Mean of differences	t-statistic for differences	Proportion of firms that changed as predicted	z-statistic for prop > 0.5
ROA	Means	-4.9 %	-2.4 %	2.5	0.96	0.46	-0.28
	Medians	-3.4 %	-1.4 %	2.1	0.98	0.54	0.28
ROAGrowth	Means	-670%	50 %	719	1.16	0.54	0.28
	Medians	-630%	-57 %	574	0.96	0.58	0.57

Table 5. "Whether?": Fixed-Effects Regression of Efficiency on Post-Privatization period, Time, and Time*Post-Privatization period

Dependent Variable: ROA		
Common coefficients:		
Variable	**Coefficient**	***t*-statistic**
Size	1.20E -8	0.11
Business Cycle	0.01	3.37

Firm-specific coefficients: *	Post-priv period		Time		Time*Post-priv period	
Firm	**Coefficient**	***t*-statistic**	**Coefficient**	***t*-statistic**	**Coefficient**	***t*-statistic**
Ingenasa	- 0.30	- 1.13	- 0.10	- 0.76	- 0.23	1.58
SKF Española	0.09	1.29	0.01	0.46	- 0.07	**- 2.39**
Seat	0.05	0.78	- 0.01	- 0.74	0.55E -2	0.26
Evatsa	- 0.31	- 1.36	0.16	2.86	- 0.13	**- 2.12**
Litofan	- 0.01	- 0.14	0.02	0.82	- 0.01	- 0.43
Alumalsa	- 0.06	- 0.80	0.05	1.16	- 0.06	- 1.18
Telesincro	- 0.07	- 1.65	0.17E -2	0.01	0.02	1.19
Astican	0.13	**2.38**	- 0.07	- 4.70	0.07	**4.02**
Oesa	- 0.88E -2	- 0.13	- 0.02	- 0.99	0.02	1.08
Pesa	0.34	1.59	- 0.03	- 0.55	- 0.12	- 1.68
MTM	0.05	0.34	0.09	2.45	- 0.07	- 1.27
Ateinsa	0.11	0.78	0.70E -2	0.20	- 0.01	- 0.30
Enfersa	0.05	0.30	- 0.04	- 0.60	0.06	0.74
Hytasa	0.10	0.70	- 0.04	- 1.02	- 0.11E -2	- 0.02
Salinas Torrevieja	0.28	1.10	- 0.06	- 1.14	0.08	0.78
GEA	0.11	0.97	- 0.01	- 0.44	0.08	**1.84**
TSD	0.08	0.21	- 0.09	- 0.53	0.12	0.57
Coisa	- 0.21	**- 4.93**	0.05	3.20	0.01	0.53
Jobac	0.04	0.06	- 0.01	- 0.51	0.02	0.64
Enasa	- 0.15	**- 3.24**	- 0.06	- 4.51	0.17	**8.70**
Icuatro	0.36	**3.31**	0.04	1.90	- 0.19	**- 3.87**
FSC	0.71	1.41	- 0.01	- 0.21	- 0.30	- 0.96
Palco	0.03	0.54	- 0.04	- 2.56	0.05	1.36
Repsol (Grupo)	0.02	-1.41	0.02	0.64	- 0.01	- 0.58
R^2 = 0.92	**Adj.** R^2 = 0.86					

* Firm-specific intercepts have been omitted from this Table

Table 6. "When?": Regression of ROA Growth on Bi-yearly Dummies

Dependent Variable: ROA Growth		
Variable (Time dummies)	**Coefficient**	***t*-statistic**
Years -4 to -3 (Pre-privatization)	20.20	0.05
Years -2 to -1 (Pre-privatization)	-172.05	-0.47
Year 0 (Privatization year)	-156.02	-0.31
Years 1 to 2 (Post-privatization)	-60.28	-0.17
Years 3 to 4 (Post-privatization)	-56.67	-0.15
Years 5 to 6 (Post-privatization)	-492.27	-1.03
Years 7 to 8 (Post-privatization)	2612.47	**3.94**
R^2 = 0.07	**Adj.** R^2 = 0.04	

Table 7. "Why?": Regression of Efficiency Increase on Government-related and Firm-related variables

Dependent Variable: Efficiency increase	(levels)		(trend)	
Variable	**Coefficient**	***t*-statistic**	**Coefficient**	***t*-statistic**
Constant	- 0.05	- 1.31	0.08	1.25
Capital Intensity	-0.57E-2	**- 7.17**	0.72E -3	0.64
Business Cycle at privatization date	2.69	**3.13**	- 1.19	- 0.98
Foreign Buyer	- 0.02	- 0.56	- 0.02	- 0.34
Performance at privatization date	- 0.98	**- 4.04**	- 0.33	- 0.99
Size	- 4.87E -5	- 1.20	0.52E -6	0.95
Aluminum Industry	0.49	**5.46**	- 0.20	**- 2.13**
Automotive Industry	-.36	**2.13**	- 0.22	- 0.95
Electronic Industry	- 0.12	**- 2.07**	- 0.06	0.74
Food Industry	- 0.12	- 1.50	- 0.02	- 0.22
Equipment Industry	- 0.15	**- 2.71**	- 0.19E -2	-0.02
Repsol	1.36	**1.71**	- 1.13	- 1.08
R^2	0.96		0.74	
Adj.R^2	0.84		0.04	