

Efficiency of French privatizations: a dynamic vision

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Abstract

We interpret privatization in light of corporate governance theory. After replicating some traditional tests, we test our new model on a sample of privatized French firms. We cannot confirm for French privatizations the positive effect on overall static and dynamic efficiency of the firm traditionally attributed to privatizations. In addition, we find that whatever positive value accrues from privatization is affected by the contextual, organizational, governance, and strategic variables that influence the privatization process.

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The French privatization program began in 1986. The aggregate value privatized, as well as the number of firms privatized, as well as the average size of the privatization, all make the French program one of the world's most ambitious privatization programs (Megginson, 2000; Jones et al., 1999; Bortolotti et al., 1998). Bortolotti et al. ranked privatizations by sales over the period 1977–1996, concluding that the French program was the third largest worldwide during that period, behind only Japan and the United Kingdom. In size, over the period 1979–1996, it represented nearly 12% of all of the world's privatizations (Levich and Huang, 1998, Table 2), and over the period 1993–1999 (in part), nearly 8% and more than 11% of those privatizations in the OECD countries (OECD, 2000).

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Although the reasons for and the context of French privatizations are country-specific to a certain extent, the French program belongs to a general movement on a global level, particularly in the most developed countries. Megginson and Netter (2001) note that the percentage of the state-owned enterprises (SOEs) in the GNP in these developed countries dropped from 8.5% to less than 5%, in a little more than 15 years. The reduction in the role of the state was more strongly marked in the less developed countries.

The analytic framework used to justify the efficiency of privatizations draws mainly on the neoclassical economic theory and its neo-institutional branches.¹ There are two core arguments. First, the privately owned firm should better remedy market failures than SOEs. The effectiveness of the change of ownership depends on the market structure: the more competitive the structure of the market, the more effective the privatization. Second, the corporate governance system—which we define broadly as the set of mechanisms controlling the managers' decisions—associated with privatization is usually thought to perform better than the corporate governance system of the SOE.

The literature on the efficiency of privatizations is abundant (see Megginson and Netter, 2001 and Villalonga, 2000, and sources cited therein). However, the existing studies are not specifically devoted to French privatizations. Because of problems such as the diversity of the legal frameworks, the domestic economic characteristics and the comparability of the accounting systems, we believe it is advantageous to supplement the multinational studies with domestic studies targeted to specific countries. Such studies would effectively «control» for differing legal, economic, and accounting systems. We make such a targeted study here, for France.

In Section 1, we outline our approach and discuss the rationale for our model. In Section 2, we describe the sample and our tests. In Section 3, we discuss static efficiency and in Section 4, we examine the dynamic efficiency of French privatizations. We then conclude.

1. A model to measure and explain efficiency

We consider four criteria to evaluate efficiency: (1) the measurement of efficiency; (2) the cross-sectional/time series dimension of efficiency; (3) the temporal effects of privatization (static/dynamic) on efficiency; and (4) the link between privatization and performance. Several of these criteria go beyond those used in existing studies of the efficiency of privatization. The expanded criteria yield differing results than do the existing studies.

1.1. The measurement of efficiency

Most prior studies are based on indicators of private value to owners, the typical metric used by investors. Thus, these studies grow out of the usual owner objective of the shareholder value maximization. Because share prices for SOEs are (usually) unavailable,

¹ For a short summary of the theoretical arguments (in particular those developed by the neo-institutional theories) that made it possible to oppose the SOE and private firms in terms of efficiency, see Villalonga (2000, p. 45).

the researchers have to find a proxy, such as accounting measures that, from a financial investor's standpoint, at best only roughly approximate efficiency and shareholder wealth maximization. Further, some studies also use measures such as the influence of privatization on the number of employees to evaluate how privatization affects other privatized firms' stakeholders.²

Accounting measures dominate the current studies. However, accounting measures have several weaknesses. Accounting principles and standards are not uniform in the different countries, and the possibility of manipulating or window-dressing the accounting indicators varies from country to country. Furthermore, the accounting measures selected are not free from criticisms, as they may only roughly be economically significant.

From the shareholders' point of view, the indicator that best approximates shareholder value is the return on equity (ROE). But it is typically based on net income including extraordinary items. The disadvantage of using ROE is that it is very susceptible to accounting manipulation. A ratio based on net income on ordinary activities is more relevant. Moreover, leverage differences affect ROE. To cancel the effect of financial leverage, investors can substitute a measure of economic profitability such as the ratio of Earnings Before Interest and Taxes (EBIT)/(Equity + Financial debts)³ which measures the profitability of the capital invested by financial investors. These indicators, whatever their limits may be, are the best indicators of shareholder value.

Some studies (Megginson et al., 1994) are based on a series of ratios, most of which, strictly speaking, do not constitute profitability ratios. Thus, Megginson et al. propose, beyond two profitability ratios—ROE and return on assets (ROA)—profit margin ratios such as return on sales (ROS), or efficiency ratios such as sales efficiency (sales/number of employees), net income efficiency (net income/number of employees), even ratios representing the investment effort, capital expenditures to sales.

However, an increase of these ratios involves a profitability gain only under particular conditions. Regarding the sample of 19 French privatized firms used in this study, the coefficients of correlation for the year of privatization between ROS and the ratios of profitability are, respectively, 0.23 with EBIT/(Equity + Financial Debt), 0.69 with ROE and 0.42 with the ratio Net Income on Ordinary Activities/Equity. The ROS is equivalent to the ROE only if the turnover of equity capital (sales/equity) remains constant. In other words, a margin increase can be accompanied by a fall in profitability, particularly in the short term, if rotation decreases. For example, if there is a substantial modification of the business portfolio or of a significant investment effort. Moreover, the ratios based on the number of employees or the investment are very sensitive to the boundary of the firm, i.e., to the policy of vertical or horizontal integration; if supplier and user are integrated into the same firm, the employee-level appears higher than if one of the level is spun-off. These ratios of employee and investment levels are at best ambiguously connected to shareholder

² According to Megginson and Netter (2001), privatization does not systematically imply a reduction of the number of employees. The results of the various international studies are ambiguous on this point.

³ Villalonga (2000) and Dewenter and Malatesta (2001) use EBIT and relate it to the total assets. To be more rigorous, it would be preferable to relate it to the entire capital brought in by financial investors (stockholders' equity and financial debts).

profitability. Therefore, performance of these ratios is of limited direct relevance to shareholders.

These considerations, well known in financial analysis, are of primary importance. For example, Megginson et al. (1994, p. 426, Table 3) find a significant improvement of the performance of privatized firms on the basis of ratios based on sales. However, this improvement lessens or even disappears when the rates of return, ROE in particular, are retained.

To avoid the biases related to the accounting and financial indicators, some authors (e.g. Gathon and Pestieau, 1996) recommend the use of a technical efficiency measure founded on the functions of production (of the Cobb–Douglas or the translog types). This approach has the advantage of being based on physical, quantitative, or qualitative data. It also allows the researcher to quantify the efficiency of a firm by comparing it to standards represented by the function of production. This approach has been used to compare the efficiency of firms located within the same sector, in particular in the electrical field, airline companies, and the insurance and banking sectors. The majority of these studies conclude that it is not so much the nature of the ownership, but the strength of product market competitions that determines efficiency.

However, the approach based on technical productivity seems poorly adapted to the complexity of the activities of the firms (except for some industries). This approach supposes a strong homogeneity of the outputs and inputs and straightforward configurations of the value chain. Moreover, it seems unsuitable to compare the performances of firms whose business portfolios are diversified and unstable, and which are doing business in heterogeneous industries.

Despite their limitations, the requirements of the quantification and our concern for comparing the efficiency of the French privatization program with that of other national programs led us to retain traditional accounting indicators. Thus, our two favored criteria are EBIT/(Equity + Financial Debt) and ROE. We prefer EBIT/(Equity + Financial Debt), since it is less sensitive to the extraordinary items.

1.2. The cross-section/time series dimension

Megginson and Netter (2001) note that in studies of the incidence of the ownership structure on the performance, there is a contrast between the two principal approaches. The first approach is cross-sectional in nature: it compares the performance of the privatized firms with that of a group of nonprivatized firms or with their hypothetical performance had they remained state-owned. The majority of these studies find that efficiency increases appreciably with privatization.

These studies relate mainly to a small number of industries, industries that are often strongly regulated, and they use a limited methodology. Research that relies on hypothetical performance is particularly contestable. The studies that require a comparison with a sample of private firms are confronted with the difficulty of making such a sample.

The second approach, suggested by Megginson et al. (1994), compares the data of the privatized companies—the privatization occurs by way of public offerings of common stock—for 3 years before the year of privatization, the year of privatization and 3 years afterwards. The advantage of this approach is that it allows researchers to compare

samples of firms of economically significant size, located in heterogeneous industries, in various countries, and in different periods.

However, this approach also has several limitations (Megginson and Netter, 2001). First, there is a selection bias: usually only the largest companies are privatized, and often, the companies that are privatized by way of public offerings—in particular, those that are privatized first—are in good financial health. Second, the measures of performance used are, without exception, the traditional accounting measures or the physical indicators such as the number of employees. Since these measurements are made during nonsynchronous periods and within different accounting systems, significant biases are possible. Third, the industrial and macroeconomic changes that take place during the 7 years affect the firms differently depending on whether they are more, or less, multinational in character. Finally, the method does not take into account the deregulation that often accompanies privatizations. Deregulation can allow for greater profitability even if privatization had not occurred. The point here is that it may well be the deregulation of, say, prices, that induces greater profitability, not the privatization itself.

The first two limitations are difficult to correct. However, the last two can be at least reduced, if not completely dismissed, by introducing control variables that correct for the economic situation and the changes in the regulation. Furthermore, some limits are less important in studies of firms of the same country. Thus, accounting biases, even if they remain, are less significant when the firms belong to the same national accounting system.

1.3. The time effects of privatization

The method suggested by Megginson et al. (1994) compares performance before and after privatization (over 3-year periods). This method supposes implicitly that the influence of privatization occurs instantaneously, and that there is a rupture or a shock leading to a relatively fast recovery of the firm's performance, and that privatization is that rupture. But in fact, on the one hand, in certain firms, there is a restructuring prior to privatization, such as an equity issue or a downsizing. And, on the other hand, the effects of privatization might take a long time to occur. The improvement in performance reflects the changes in the corporate governance system, the reconfiguration of the organizational architecture, and the implementation of a new strategy. Developing these systems or implementing these strategies can take time, often more than 3 years, because of the organization's inertia. The static method suggested by Megginson et al. (1994), which tests for significant changes in the level of performance (a threshold effect) between pre- and post-privatization, does not capture the dynamic effects of privatization, i.e., the speed with which the performance change occurs.

These dynamic effects are measured in certain studies, based on the econometric analysis of panel data (simultaneously conducted with data of a cross-sectional and time series nature). The Ehrlich et al. (1994) study, which uses the criterion of technical efficiency, evaluates the effects of privatization by separating the short-term effects (the static approach), from the long-term effects (the dynamic approach). The Ehrlich et al. study, which relates to 23 companies of the air transport industry for the period 1973–1983, shows that the favorable influence of the private ownership appears clearly in dynamic terms, through the growth rates of productivity or of costs reduction. But, the

short-term or threshold effects, which relate to the change of ownership, appear non-significant. According to the authors, the “age” of the company influences the effects of privatization. More recently, [Villalonga \(2000\)](#) has applied a similar method to a measure based on EBIT.

This method offers several advantages. It allows:

- for more observations.
- for a simultaneous evaluation of the incidence of privatization on the standard and the variation of the performance. The efficiency increase is measured by the variations of the performance trend.
- for quantification of the incidence of the privatization, for each individual firm, for both static and dynamic efficiency.
- for better identification of the moment when the effects of privatization occur. Thus, for the Spanish firms studied by Villalonga, some significant positive effects appear 3 to 4 years before privatization, which means that restructurings take place prior to privatization. However, the most significant effect occurs 7 to 8 years after privatization, corroborating the assumption that positive effects of privatization appear only over a long period. This long-term effect seems to also be confirmed by the results of [Dewenter and Malatesta \(2001\)](#).

1.4. The modeling of the privatization/performance link

The evaluation of the effects of privatization is also influenced by the way researchers model the link between efficiency and privatization. The studies that propose an explanatory model of the performance are relatively rare. The two principal ones are those of [D’Souza et al. \(2000\)](#) and of [Villalonga \(2000\)](#). To capture the efficiency of French privatizations, we use these studies as a starting point. We also allow for linkage between modifications of the corporate governance system and efficiency.

Three indicators that connect up with corporate governance theories make it possible to better identify this link: the context of privatization, the organizational and corporate governance characteristics of the firm and, finally, the ways—the levers of efficiency—in which the change of ownership structure can influence value creation. We present these indicators in Appendix B.

1.4.1. The context of privatization

The context—i.e., the external conditions—of privatization is both economic and political.

The additional flexibility offered by privatization can play out differently according to the macroeconomic context; thus, firms seldom launch a new equity issue in a bear market. (French privatizations were temporarily suspended after the crash of 1987.) In other words, from the corporate governance point of view, the intensity of the monitoring influence of the stock market is supposed to be a function of the economic situation, and this influence is reinforced during the economic depressions. Furthermore, since restructurings are easier during favorable economic situations, the positive dynamic effect of privatization should be higher during these periods.

The economic context also depends on the more or less regulated character of the industry. Many authors (Megginson and Netter, 2001) conclude that privatization is truly efficient only if the sector is simultaneously deregulated. D'Souza et al. (2000) find that, whatever the context, privatization leads to a performance gain but that this gain is more significant in the sectors with stronger competition.

From the corporate governance point of view, deregulation influences the discipline exerted by the product markets. In France, the effect of deregulation is very unequal, and varies according to the industry. For example, if this effect is particularly sensitive in the telecommunications industry (not presented in the sample), it is probably weaker in the financial industry, where the degree of competition between firms was already very intense before privatization.

On the political level, even if the government usually finds it beneficial to launch privatizations in a favorable economic context, budgetary constraints can be such that it is necessary to hasten the process.

The political and legal contexts can also raise difficulties. Thus, the government tends to privatize first those companies where privatization is easiest. The legal framework can also change during the period of privatization.

To take into account these various aspects, we introduce different control variables:

- the growth rate of the gross domestic product (GDP) at the time of privatization (variable Cycle0), which allows us to characterize the state of the business cycle.
- an indicator of the regulated character of the activities conducted by privatized firms (belonging to the industrial sector or not; variable Industry). Unlike the privatizations carried out in some other nations, until 1997 the French privatizations did not take place in strongly regulated businesses such as energy or transportation. We retain only the distinction between financial and nonfinancial industries to separate businesses of very different nature and to take into account the banking environment subject to numerous regulations. However, these regulations do not exclude the fact that competition between banks is strong.

We use a variable that accounts for the national budgetary constraint, the year of privatization (the Public expenditures/GDP ratio, the year of privatization—variable ExpGDP0—or, alternately, the amount of the public expenditures the year of privatization—variable Exppub0). In the presence of a flexible constraint, the government could more easily facilitate privatization. For example, it can make a new equity issue easier, and keep a partial ownership within the privatized company.

We also use a dummy variable (Serie1) that allows us to distinguish if the privatized company belongs to the first series of privatizations. In France, the first wave of privatizations took place between 1986 and 1988 during a conservative administration, after a period of nationalizations. This wave was followed by the “ni–ni” (neither nationalization, nor privatization) period, from 1988 to 1993. The second privatization program began in 1993. And it continues to today, despite the return to power of the Socialist Party in 1997.

Some experts claim that the companies in the first series were the easiest to privatize, in which case the recovery to profitability that resulted from privatization should be less significant for these firms.

1.4.2. Organizational and corporate governance characteristics of the privatized company

The complexity of the privatized company and its initial level of performance will most probably influence the success of privatization. The more complex the firm is, the longer and more difficult it may be for the firm to successfully privatize and obtain efficiency gains. We measure firm complexity by three variables: the capital-intensive degree, *Capint0*; the number of employees, *Emp1Num0*; and the degree of internationalization, *Interna0*, at the time of privatization.

Furthermore, from a dynamic point of view, it is especially easy for a firm to improve its performance if this performance was initially low. We introduce the variable *Perf0*, which measures the initial economic profitability, to measure this effect.

The success of privatization is also constrained by the characteristics of the corporate governance system. Thus, privatization should imply that the stock market exerts a more significant discipline, that there is a restructuring of the ownership, a modification of the management, and changes in the firm's relationship with the shareholders.

(1) We evaluate the intensity of the stock market discipline by considering whether the firm is or is not included in the French stock market index, the CAC40 (variable *CAC*). This inclusion increases the attention of institutional investors (domestic and international) and stock exchange authorities. The volume of transactions is highest for the shares of these companies. This reinforcement of the discipline should favorably influence dynamic efficiency.

(2) The restructurings carried out at the time of the privatization lead to very different ownership structures. The government keeps a more or less significant share of equity (see Appendix A). If privatization increases efficiency, the more significant this share, the less favorable will be the effect of privatization. The level of discipline likely depends on the nationality of the investors, but also on the incentives implicit in the share of equity held by the employees.

Three variables account for the shares of the equity, respectively, held by the state (*State0*), the foreign investors (*Foreign0*), and the employees (*EmpShare0*), at the time of privatization. Since the success of the privatization process can be especially easy if there is a dominant shareholder, we introduce a variable that measures the share held by the largest shareholder after privatization (variable *Share1*).

(3) With only rare exceptions, changes in management accompany privatizations, so we do not use an indicator of management turnover. Privatization also was accompanied with a profound reorganization of the boards of directors. According to Megginson et al. (1994, Table 7), the boards of directors of the French privatized companies in their sample were modified in the following proportions: (% of pre-privatization directors remaining immediately after privatization): BIMP (14%); Paribas (8%); Suez (19%); CCF (30%); Elf (15%); Saint Gobain (0%); Société Générale (31%); Sogenal (64%).

D'Souza et al. (2000) use a dummy variable to indicate a significant change (turnover of more than 50%) in the board of directors. Usually even if only due to legal modifications in the structure of the representation of the state and of the employees on the privatized firms' boards, the boards of the French privatized companies were modified beyond this threshold. Therefore, we do not use the D'Souza et al. Indicator, because most privatizations had to be accompanied by extensive board modifications. In spite of the difficulty in measuring the discipline exerted by the board of directors with only quantitative criteria, such as the size of

the board or the proportion of outside directors, to compare our study with others, we perform tests on these two indicators.

(4) Following privatization, dividend payouts usually increased. That increase is sometimes interpreted as signaling greater discipline of managers by shareholders. Although the theory that justifies dividend policy as a disciplinary mechanism receives little empirical corroboration, we test the link between the efficiency of privatization and the modifications of the dividend policy by using the dividend payout ratio (Vardiv).

The possibility of issuing more new equity should mean, all else equal, a relative decline of the firm's financial debt after privatization. Moreover, this effect should be reinforced by the rise of profitability that increases internal financing. This relative decrease of the debt is apparently confirmed by the results of Megginson et al. (1994, p. 427). In terms of corporate governance, such a result could mean a substitution effect between the discipline exerted by the financial creditors and that exerted by the shareholders. According to the free cash flow theory, it should lead to a decline in performance.

We also note that if the financial leverage effect is positive, a decrease of the debt involves, all else equal, a decrease of the ROE. Such a decrease can explain certain contradictory results in Megginson et al. (1994), concerning the indicators of profitability. In addition, due to the withdrawal of the state and the resulting drop in the guarantee to creditors, the debt decrease can have positive effects on the performance because it reduces the insolvency risk, thus reassuring the various stakeholders of the firm. The financial policy is captured by the Financial Debt/Equity and Financial Debt/Total Assets ratios. We also use the Cash Flow/Investment ratio that makes it possible to better measure the real financial autonomy of the firms.

1.4.3. Levers of efficiency

Even without making an exhaustive study of the processes by which privatization influences the performance, we can assume that privatization increases efficiency by offering more strategic flexibility. We capture this additional flexibility through the three following dimensions: the possibility of a greater internationalization of the business portfolio, increasing new equity issues, and relying more on external growth. We measure these three dimensions by using the following variables: the variation of the sales realized in foreign countries after privatization (Difinter variable); the share of financing made possible by a new equity issue (compared to the stockholders' equity: Issequity variable; and compared to the investment: Issinv variable); and the importance of external growth (measured by the variation of the proportion of financial assets after privatization, the Varffa variable).

2. Presentation of the sample and description of the tests

Following Megginson et al. (1994), we use a time-series study. For reasons of availability of data and for homogeneity of the horizons, we use a common horizon of 7 years. Although data was available for certain firms in other years, and that would have allowed us to study the effects over a longer period for this sub-set of firms, using the extended data would bias the results, so we decided not to do so.

Thus, for each firm, we have a 7-year horizon of 3 years before privatization, the year of privatization, and 3 years afterwards. This time frame yielded 23 firms privatized by way of a public offering. Of these 23 firms, data for four are missing. UAP was acquired by AXA less than 3 years after its privatization, so we excluded it. Similarly, annual reports for the BTP, the BIMP and the Matra Group were unavailable. Two of these companies with missing data are banks (BTP—Banque du Bâtiment et des Travaux Publics, BIMP—Banque Industrielle et Mobilière Privée), whose importance is very marginal. Net, we have a sample of 19 firms. Although this sample is small, our judgment is that it is representative of French privatizations. Some recently privatized French firms, such as France Telecom, Bull, Aérospatiale, and Crédit Lyonnais, cannot be included because we do not have their 3-year post-privatization performance.

Although our information comes in part from the *Worldscope* database, our primary source is the annual reports of the companies. When the two conflicted, we used the annual reports. There were occasional conflicts. We obtain some additional information from international privatization studies and from the [Megginson \(2000\)](#) database.

The final sample of 19 includes 7 banks and financial institutions (Paribas, Sogenal, Crédit Commercial de France, Société Générale, Suez, Crédit Local de France, BNP), 1 insurance group (AGF), 9 industrial groups (Saint-Gobain, Compagnie Générale d'Électricité, Total, Rhône-Poulenc, Elf, Renault, Seita, Usinor, Pechiney) and 2 media groups (Havas, TF1). Supplementary information on these firms is provided in Appendix A.

The empirical study proceeded in two steps corresponding to the two procedures, used by [Megginson et al. \(1994\)](#) and [Villalonga \(2000\)](#).

The first step tests the static efficiency by evaluating the impact of privatization on the variables of performance. We calculate these variables firm-by-firm and, on average, over 3-year periods, before and after privatization. We test for differences in median (the Wilcoxon test) on the two series of means, calculated before and after privatization, thus making it possible to measure this impact.

Although in a strict sense only the indicators of profitability (ROE, EBIT/(Equity + Financial Debt) account for the performance, to conduct comparisons with the results of the principal international studies we also test other criteria. However, we consider these other criteria (productivity, financial policy) only on a purely supplementary basis, as elements that make it possible to better understand the structure of the performance through the investment and financing policies.

To better account for the dynamic of the privatization, we apply some supplementary tests (the Wilcoxon test) to the same indicators by successively opposing the extreme years $-3/+3$, then the years $-3/0$ (period of pre-privatization) and, finally, the years $0/+3$ (period of post-privatization). This alternative to the procedure of [Megginson et al. \(1994\)](#) offers two advantages. First, the eventual effect of privatization is likely to be more apparent if it is evaluated by comparing the data of years -3 and $+3$, rather than considering the means of the results for the 3 years before and the 3 years after privatization. Significant changes in performance levels usually, in our opinion, take time to appear in the accounting data.

Second, this series of comparisons allows us to determine if the effect occurred before privatization, after privatization or, gradually over the 7 years of observation. We can thereby hope to roughly highlight the dynamics of the process of privatization.

With the same purpose in mind, we use the two methods to measure the percentage of firms in which the variation of the indicator conforms to the theoretical predictions, and we test (nonparametric test of the sign) to find out if this proportion is statistically significant. This test makes it possible to escape biases that could taint the tests of the means. Even if an indicator varies in the same direction for 80% of the firms, it needs only change with more intensity in the opposed direction for the remaining 20% for the privatization to appear to have no significant effect overall. However, regardless of which method is used, the dynamic effect of privatization cannot be perfectly measured.

In response to this criticism, we used, in a second stage, the procedure suggested by Villalonga (2000). This procedure makes it possible to describe the privatization dynamics more explicitly. We measure, using the first regression model (model 1), the rates of growth of the performance after privatization. We regress the principal measures of performance on three variables: a first variable, time T —the values 1 to 7 indicating the 7 years; —a second variable P (dummy variable) indicating privatization, which is equal to zero when the firm is state-owned and 1 when it is privatized; and a third variable, TP , equal to the product of the variable time and the dummy variable “privatization.”

Taking into account the double dimension of the data, cross-sectional, and time-series, we used the regression for 133 observations (19 firms over 7 years). The coefficients of the variable P of privatization make it possible to measure and test the threshold effect of privatization for each firm. Because of its static character, this test is similar to the test presented in the first procedure. However, it provides information regarding the effect of privatization for each firm. The coefficient of variable TP allows us to measure and test of the effect on each firm’s performance increase during privatization, i.e., over 4 years, the year of privatization and the 3 years that follow.

In the second phase of this procedure (model 2), we regress the performance increase (coefficients of TP) on the three categories of the proposed explanatory variables of the performance (contextual variables, organizational and corporate governance variables, levers of efficiency). Thus, we can measure the effect of these variables on the efficiency of privatization for each firm, rather than on a fictitious representative firm (created from the average or median data).

3. Static efficiency of privatizations

Table 1 presents the results of the tests for the first procedure. For each indicator, the table shows the medians and means (columns 2 and 3). Column 2 shows for the medians (and means) series of 3 years preceding privatization and column 3 the 3 years following privatization. In column 4, we present the results of the nonparametric Wilcoxon test applied to these two series. In columns 5 and 6, we show the results of the test of the sign as applied to the percentage of firms whose increase conformed to the a priori prediction.

If we consider only Table 1, privatizations seem to have a considerable influence on the performance and financial behavior of the firms. The medians or means of the various profitability and productivity ratios improve. This increase is also connected to the effort of investment. However, the increase does not result from the external growth since the Financial Fixed Assets/Total Fixed Assets ratio decreases. This decrease could signify

Table 1

Test of the static efficiency (procedure 1: alternative 1)

Indicators	(2) Median (mean) before	(3) Median (mean) after	(4) Test for difference in medians	(5) % of firms that evolved as predicted	(6) Test of significance of proportion change
<i>Margin and profitability</i>					
Net Income/Sales (ROS)	1.7% (1.4%)	2.7% (3.0%)	2.47* *	73.7	2.06* *
EBIT/(Equity + Financial Debt)	7.6% (7.7%)	7.9% (10.4%)	0.74	57.9	0.69
Net Income on Ordinary Activities/Equity	11.9% (10.6%)	13.1% (17.0%)	0.39	57.9	0.69
Return on Equity	6.7% (3.7%)	7.3% (10.2%)	0.83	68.4	1.61
<i>Productivity</i>					
Sales/Number of Employees	1.6 (3.6)	1.7 (3.0)	0.64	70.6	1.70 *
Net Income/Number of Employees	2.8% (10.7%)	4.5% (15.1%)	1.96* *	82.4	2.67*** *
Total Assets/Number of Employees	1.7 (33.31)	2.74 (41.49)	1.17	94.1	3.64*** *
<i>Investment policy</i>					
Investment/ Total Assets	4.4% (4.8%)	6.0% (5.3%)	0.54	63.2	1.15
Investment/Sales	4.6% (7.9%)	7.8% (11.2%)	1.12	57.9	0.69
Financial Fixed Assets/ Total Fixed Assets	24.2% (36.6%)	19.1% (36.6%)	0.01	57.9	0.69
<i>Employment</i>					
Number of Employees	58 285 (58 513)	51 704 (58 001)	0.12	47.1	0.24
<i>Financing policy</i>					
Financial Debt/Equity	2.3 (13.3)	1.2 (9.9)	0.77	78.9	2.52*** *
Financial Debt/Total Assets	37.0% (48.2%)	31.6% (46.0%)	0.56	78.9	2.52*** *
Cash Flow/Investment	88.5% (164.4%)	124.5% (169.0%)	0.51	61.1	0.94
<i>Dividend policy</i>					
Dividends/Sales	0.4% (0.6%)	0.9% (1.1%)	2.78*** *	84.2	2.98*** *
Dividends/Net Income	25.7% (34.3%)	34.9% (37.8%)	1.19	63.2	1.15

Table 1 (continued)

Indicators	(2) Median (mean) before	(3) Median (mean) after	(4) Test for difference in medians	(5) % of firms that evolved as predicted	(6) Test of significance of proportion change
<i>Corporate governance</i>					
Number of Directors	18 (16)	15 (15)	1.79 *	73.3	1.81 *
Percentage of Outside Directors	60.2% (59.9%)	71.4% (69.6%)	2.42* **	75.0	1.73 *
<i>International development</i>					
Percentage of Sales Abroad	38.8% (40.1%)	46.9% (43.0%)	0.41	64.7	1.21

* Indicates significance at the 10% level.

** Indicates significance at the 5% level.

*** Indicates significance at the 1% level.

either that privatization is accompanied by a less significant use of this type of growth, or that restructurings of the business portfolio involved more divestments than acquisitions.

The share of the activity carried out abroad also appears as an increase. For employment, if the medians indicate a decrease of more than 10%, the means remain stable, indicating that the effect on employment is ambiguous. The modifications also affect the financing policy. The role of internal financing increases and the share of the financial debts in the financing decreases. The dividend payout ratio also increases.

These first conclusions are arguable, when we consider the resulting differences in medians (and means) and significance tests. Only 5 indicators out of 20 vary significantly following privatization: the ROS, the Net Income/Number of Employees ratio, the Dividends/Sales ratio, the number of directors, and the percentage of outside directors. For the other indicators, the Wilcoxon test does not lead us to reject the null assumption of the absence of effect of privatization.

For the two indicators of performance *stricto sensu*, the ROE and the EBIT/(Equity + Financial Debt) ratio, no significant differences appear. The result is the same for the ratio measuring the investment effort. Furthermore, the significant and positive variations of the ROS or Net Income/Number of Employees ratio do not necessarily mean a performance increase; they can result from minor modifications of the nature of the activity. The decrease of the number of employees (considering the median) does not appear significant.

On the international level, according to the results of Megginson et al. (1994), if the ROS increases significantly, the ROE does not. The increase in the ROA is significant only at the 10% level so the rise in shareholder profitability is thus questionable. However, changes in other indicators, particularly productivity and financing policy, correlate significantly with privatization.

In Megginson et al.'s (1994) international sample, productivity increases and debt decreases after privatization. Megginson et al. (1994) do not test the effect of privatization on the last three indicators that we retained, two of which vary significantly: the size of the board of directors (the size decreases on average from 18 to 15 directors) and its

Table 2
Test of the effect of privatization on the various indicators (alternative 2)

Indicators	(1) Median (mean) in – 3	(2) Median (mean) in 0	(3) Median (mean) in + 3	(4) Test for difference in medians – 3 to 0	(5) Test for difference in medians – 3 to + 3	(6) Test for difference in medians 0 to + 3	(7) % of firms that evolved as predicted	(8) Test of significance of proportion change
<i>Margin and profitability</i>								
Net Income/Sales (ROS)	1.4% (1.3%)	2.2% (2.4%)	3.1% (3.4%)	2.50* *	3.55***	2.03* *	82.4% 63.2%	2.67* * *
EBIT/(Equity + Financial Debt)	7.6% (8.6%)	9.3% (10.8%)	8.5% (11.3%)	0.77	0.63	0.13	58.8% 42.1%	0.73 0.69
Net Income on Ordinary Activities/Equity	13.7% (13.0%)	16.3% (17.5%)	15.3% (17.4%)	1.09	1.21	0.45	64.7% 52.6%	1.21 0.23
Return on Equity	6.8% (5.4%)	8.3% (10.2%)	9.1% (10.9%)	1.68 *	2.09* *	0.89	52.6% 57.9%	0.23 0.69
<i>Productivity</i>								
Sales/Number of Employees	1.6 (3.7)	1.7 (3.0)	1.8 (3.0)	0.71	1.39	1.29	76.5% 70.6%	2.18* * 1.70 *
Net Income/Number of Employees	20.9 (99.7)	39.4 (120.8)	62.3 (162.5)	1.53	2.70***	1.81 *	70.6% 76.5%	1.70 * 2.18* *
Total Assets/Number of Employees	1.6 (31.2)	1.9 (35.2)	2.8 (43.0)	1.21	1.77 *	1.43	100% 93.8%	3.87* * * 3.50***
<i>Investment policy</i>								
Investment/Total Assets	3.6% (4.8%)	4.2% (4.6%)	4.8% (5.1%)	0.74	1.15	0.92	66.7% 52.6%	1.41 0.23
Investment/Sales	4.8% (8.0%)	6.3% (7.7%)	7.7% (9.6%)	1.47	2.03* *	1.18	63.2% 63.2%	1.15 1.15
Financial Fixed Assets/ Total Fixed Assets	23.0% (36.9%)	21.5% (37.8%)	18.6% (37.1%)	0.51	0.36	0.34	57.9% 47.4%	0.69 0.23

<i>Employment</i>								
Number of Employees	59 772 (59 243)	51 139 (60 253)	48 456 (57 465)	− 0.07	− 0.03	− 0.39	50.0% 47.1%	0.00 − 0.24
<i>Financing policy</i>								
Financial Debt/Equity	1.7 (15.4)	1.5 (10.2)	1.2 (9.9)	0.89	1.18	0.92	78.9% 63.2%	2.52* * * 1.15
Financial Debt/Total Assets	36.9% (48.0%)	31.8% (47.0%)	31.7% (46.1%)	0.89	0.98	0.80	73.7% 52.6%	2.06* * * 0.23
Cash Flow/Investment	91.4% (324.3%)	105.6% (159.3%)	109.2% (164.4%)	0.86	0.83	0.65	52.6% 31.6%	0.23 − 1.61
<i>Dividend policy</i>								
Dividends/Sales	0.3% (0.5%)	0.6% (0.9%)	0.9% (1.2%)	2.81* * *	3.39* * *	1.63	85.7% 68.4%	3.30* * * 1.61
Dividends/Net Income	20.5% (31.7%)	22.5% (29.3%)	34.8% (44.3%)	0.81	2.21* *	2.04* *	61.1% 57.9%	0.94 0.69
<i>Corporate governance</i>								
Number of Directors	18 (17)	14 (14)	15 (15)	2.94* * *	2.11* *	0.60	57.1% 14.7%	0.53 − 2.67
Percentage of Outside Directors	60.0% (59.5%)	71.4% (70.3%)	71.0% (68.1%)	2.19* *	2.54* * *	0.06	70.0% 16.7%	1.26 − 2.31
<i>International development</i>								
Percentage of Sales Abroad	38.0% (40.6%)	27.8% (36.3%)	52.0% (44.9%)	0.11	1.11	1.88 *	77.8% 82.4%	2.36* * * 2.67* * *

For columns 8 and 9, the first line for each indicator corresponds to the test conducted between year −3 and year +3, the second line corresponds to the test conducted between year 0 and year +3.

* Indicates significance at the 10% level.

* * Indicates significance at the 5% level.

* * * Indicates significance at the 1% level.

composition (the percentage of outside directors increases). In France, the boards of directors of both public companies and privatized companies are subject to differing rules. (Charreaux, 1997). Therefore, although these variations could improve performance, they result from the firms' change in mandated legal regimes, rather than to a deliberate intention to adapt the board of directors after the firm is privatized.

When we analyze the proportion of firms (Table 1, column 6) that have changed as predicted, the ratios of profitability remain nonsignificant for French companies but are significant in the wider international sample. The ratio of the investment effort and the variation of the number of employees remain nonsignificant; the ROS and Dividends/Sales ratios remain significant. Furthermore, the ratios of financial structure and productivity are now significant. This finding agrees with the results of those of Megginson et al. Following the example of international privatizations, we see that French privatizations are accompanied by increasing productivity and decreasing debt. However, once again, profitability does not improve significantly.

The effects of privatization on performance appear less distinct for the French privatized companies than for the international sample. We cannot conclude that there is a significant improvement in profitability and investment effort for the French firms. The significant effects connected to the margin, productivity, and financing policy do not lead to a gain in profitability gain during the 7-year time horizon.

However, our analysis has two limitations. We conduct tests on triennial means, which leads to smoothing the effect of privatization. Further, our tests cannot establish if the variation of the indicator comes prior to privatization (via restructurings or window dressing) or after (as a real effect of private management).

When we apply the test to -3 , 0 and $+3$ years, we can better identify the effects over time (Table 2). This more elaborate test—which is also more favorable a priori to the assumption of a positive effect of privatization because it over-weights the end-years-highlights additional significant variations. However, to be able to ascribe the recorded variations to privatization, the ratios must be significant over the period $0/+3$, and it rarely happens.

The increase in ROE apparently indicates improved results for the shareholders. However, ROE varies significantly only before privatization. We suppose that either the recovery took place before privatization, under the control of the state, or that the accounting was “window dressed” to facilitate the public offering of the state-owned enterprise. In their international sample, Dewenter and Malatesta (2001) also find that performance improves before privatization. They reject the assumption of accounting manipulation. Moreover, the increase in the capital intensity ratio, which is significant when describing the variation over $-3/+3$, loses significance over the $0/+3$ post-privatization period.

Only the productivity Net Income/Number of Employees ratio shows a significant variation at the same time over the two periods $-3/+3$ and $0/+3$. Overall, we cannot conclude that privatization significantly and positively affects performance.

The increase in the investment effort, significant over $-3/+3$, also loses significance over the $0/+3$ post-privatization period. The reduction of the proportion of the financial fixed assets on the balance sheet is not significant, no matter what comparison period we use. The only characteristic of development policy that varies significantly with privatization is the proportion of sales made abroad. This proportion increases appreciably in the

0/+3 period. Privatization might facilitate the international agreements as well as the financing of these sales.

We note the effect of privatizations on employment, because privatization is often associated with downsizing. The most important parts of the adjustment (on the medians) occurred before privatization. This result confirms that the state is often in the best position to negotiate downsizing as a prelude to privatization. However, generally, no significant effect appears.

With the exception of the Cash Flow/Investment ratio, if we find a significant increase of the ratios of the financing policy for the overall $-3/+3$ period, this significance disappears for the shorter 0/+3 post-privatization period.

Note the increase of the Cash Flow/Investment ratio, the best measure of evaluating financial autonomy. True, the increase is not statistically significant. Since the effort of investment was greater, we conclude that the increase in cash flow was higher. Most improvement occurred before privatization. We also note that the privatized firm's cash flow exceeded the total new investment in the year of its privatization. Thus, the privatized firm's financial autonomy was high.

The Dividends/Sales ratio indicates that the firm modified its dividend policy, but this change also occurs primarily before privatization. However, it is preferable to examine the dividend payout ratio, whose increase is significant for both $-3/+3$ and 0/+3. If we assume that this ratio measures the discipline exerted by the private shareholders, it seems to increase after privatization. However, we note that the payout ratio increase correlates with the concentration of private ownership.

Except for the dividend policy, we cannot conclude that privatization involves a significant modification of the financing policy.

The tests on the indicators of corporate governance for the size and the composition of the board of directors confirm the association of these changes with a change in mandated corporate rules. The significant modifications take place just before privatization. A closer analysis of the data shows that they occurred during the year of privatization, so they come a priori from the necessity to comply with the new corporate statutes. After privatization, no significant further transformation appears.

On the whole, the significant variations ascribable to privatization are rare. The variations relate only to the ROS, the net income by employee, the payout ratio, and the proportion of sales made abroad. The payout ratio can mean an increase in the discipline exerted by the shareholders after privatization. The proportion of sales made abroad indicates greater latitude for management in the area of international development.

If this second test applied to -3 , 0 and $+3$ years results in a clearer perception of the effects of privatization, nevertheless, it gives only a fuzzy view of its dynamics. Moreover, since it is applied to a fictitious median firm, it does not permit individual results, firm by firm. For this reason, we extend the empirical study by using dynamic analysis.

4. Dynamic efficiency of privatization

The explicit integration of time renews the more traditional analyses. This integration is justified by the fact that in large complex organizations whose business portfolio is often

highly diversified, the effect of privatization on the performance is rarely immediate. To better measure this effect, it is necessary to evaluate the possible performance gain in a progressive way, not just through one leap that occurs on the date of privatization. The procedure that we now apply has two steps. In model 1, we measure the dynamic gain (or loss) of performance, due to privatization. In model 2, we test the relevance of the variables that we hypothesized could explain this gain.

4.1. Model 1: the evaluation of dynamic efficiency

Our first regression model relates to the variables of profitability. Its form is:

$$\text{PERF}_{it} = \alpha_i + \beta_1^* T_{it} + \beta_2^* P_{it} + \beta_3^* TP_{it} + \beta_4^* \text{size}_{it} + \beta_5^* \text{cycle}_{it} + \varepsilon_{it} \quad (1)$$

with: PERF_{it} the variable measuring the performance on the year t for firm i ; T_{it} time t for firm i ($t = 1, 2, \dots, 7$). P_{it} a dummy variable for privatization, which takes value 1 when firm i is privatized, and 0 before privatization. TP_{it} a variable that accounts for the interaction between the two preceding variables. size_{it} the size (measured by the sales turnover) of firm i at time t . cycle_{it} the growth rate of the GDP, for year t for firm i .

Following the example of Villalonga (2000), we implicitly assume that size and cycle are external factors, not implied by privatization. This model implies that size and business cycle effects on the performance are common to all firms. Chow's specification test supports this assumption, at the 1% level for this sample of 19 firms. The values obtained are, respectively: 4.98 for cycle and 3.82 for size with EBIT/(Equity + Financial Debt) as the variable explained. For the ROE, these values were 5.83 for cycle and 4.68 for size. This construction of the model makes it possible to obtain a single coefficient for the size effect and for the cycle effect, for all of the sample firms.

On the other hand, the effects of the variables T , P and TP are specific to each firm. Chow's specification test resulted in the rejection of the assumption, at the 1% level, that the coefficients for the constant and the variables T , P and TP are common to all the firms in the sample. The values obtained were respectively: 32.98 for the constant; 16.52 for the variable T ; 11.56 for the variable P and 9.85 for the variable TP , with EBIT/(Equity + Financial Debt) as the variable explained. For the ROE, these values were: 29.27 for the constant; 14.73 for the variable T ; 14.00 for the variable P and 11.89 for the variable TP .

Just as Villalonga (2000, p. 57, note 16), we also consider that the effects are fixed, i.e., so that we can retain a model of covariance with nonrandom individual effects, for the same two reasons: (1) If we suppose that the effects are random, this assumption implies that we consider the sample selected as a random sample drawn from a broader population from which we seek to estimate the parameters. The specificity of the privatization process in France, during the period considered and for the way in which we select our sample results in rejection of this assumption. (2) The error components model assumes that the individual effects are random and that these effects and the explanatory variables are independent, but, there is no economic basis to accept this strong assumption a priori.

In our model, β_k ($k=1, \dots, 19$) is the sub-vector of coefficients specific to the firm k . This construction allows for representation of the panel data structure. Such a representation requires a correction of the heteroskedasticity appearing in the structure of the covariance matrix. We then used the Seemingly Unrelated Regression (SUR) method suggested by Zellner (1962). Relying on the SUR method is justified in the presence of a particular structure of errors. It is simultaneously necessary that there be, on the one hand, no autocorrelation, and on the other hand, heteroskedasticity (see Maddala, 1977). The small sample size does not allow us to test for autocorrelation and heteroskedasticity. So, following Villalonga (2000), we can claim that the absence of autocorrelation is explained by the introduction of the cycle as a common variable of control. In the same way, we can also regard the assumption of heteroskedasticity as plausible according to several arguments: (1) the difference between the sizes of the residual variances; (2) the probable presence of industrial effects related in particular to the companies belonging to the banking environment; (3) the alignment of the temporal observations of each firm with the date of privatization, which implies that year 0 can correspond to different dates according to the firm. Such an alignment results in supposing that any unobservable factor due to privatization will affect the various firms in a connected manner.

Table 3 presents the results obtained for the EBIT/(Equity + Financial Debt) ratio, the variable that we consider as best representing performance.⁴

Before interpreting the individual data, we note that the variables Size and Cycle both have a significant positive effect on profitability. This positive effect agrees with the usual predictions. We see the positive effect of both in the Villalonga (2000) study and we also see the positive effect of cycle in Dewenter and Malatesta (2001). Considering these two variables as common factors implies that interpretations relate to coefficients for which these effects were neutralized.

For the reader to better understand Table 3, we use the example of Usinor, a firm for which all the coefficients are significantly different from zero. The positive coefficient for the variable T shows that the firm's profitability increased over the 7-year period. The coefficient of the variable P , also positive, represents a rise of profitability at the time of privatization (reflecting the threshold effect).

The negative coefficient of TP shows that the recovery of profitability occurred less quickly after privatization (during the period from year 0 to +3). Therefore, dynamic efficiency dropped after privatization. The interpretation of the sign of TP is a function of the sign of T . If T has a negative sign, i.e., performance decreased; a negative sign for TP indicates that after privatization efficiency decreases less than before privatization. If T is positive, performance improved, and a positive sign for TP means that after privatization efficiency grew more than before privatization.

The coefficient of the variable P provides information on static efficiency. The effect of privatization appears positive for 12 of the 19 firms. However, even if the threshold effect

⁴ This variable is less easy to manipulate than the ROE and, in principle, is not sensitive to financial leverage. We conduct also the tests for the ROE, the Net Income on Ordinary Activities/Equity ratio and the ROS. The results are close to those obtained for the EBIT/(Equity + Financial Debt) ratio. They can be acquired from the authors.

Table 3

Test of the dynamic effect of privatization (model 1) on the EBIT/(Equity + Financial Debt) ratio

	Size	Cycle	Adjusted R^2	
	2.16e – 06	1.19	0.922	
	4.42***	3.57***		
	Constant	T	P	TP
Saint-Gobain	– 0.02	0.01	0.01	– 0.01
	– 0.57	0.54	0.12	– 0.29
Paribas	– 0.13	0.00	0.09	– 0.02
	– 2.86***	– 0.24	0.96	– 0.96
Sogenal	0.05	– 0.01	– 0.07	0.02
	0.35	– 0.14	– 0.23	0.21
Compagnie Générale d'Électricité	– 0.13	– 0.01	– 0.14	0.01
	– 2.73***	– 0.71	– 2.07**	0.70
Crédit Commercial de France	0.04	– 0.01	– 0.02	0.01
	0.57	– 0.37	– 0.12	0.21
Havas	0.03	– 0.01	0.07	0.00
	0.28	– 0.12	0.37	– 0.05
Société Générale	– 0.12	0.00	0.06	– 0.02
	– 2.35**	– 0.06	0.79	– 0.91
TF1	– 0.31	0.07	0.10	0.02
	– 1.65*	0.70	0.25	0.20
Suez	0.04	– 0.02	0.33	– 0.09
	0.76	– 0.84	2.72***	– 2.44**
Crédit Local de France	– 0.02	0.00	0.03	– 0.01
	– 0.25	0.13	0.35	– 0.25
Total	0.03	– 0.07	– 0.23	0.06
	0.46	– 3.32***	– 3.19***	2.92***
Rhône-Poulenc	0.01	– 0.01	0.04	– 0.01
	0.18	– 0.26	0.64	– 0.41
Banque Nationale of Paris	– 0.31	– 0.02	– 0.08	0.03
	– 4.18***	– 1.00	– 1.80*	1.74*
Elf Aquitaine	– 0.25	– 0.05	– 0.14	0.06
	– 2.56***	– 8.88***	– 2.62***	5.79***
Renault	– 0.19	– 0.05	– 0.04	0.02
	– 2.38**	– 7.93***	– 1.02	2.03
Seita	0.09	0.04	0.18	– 0.05
	0.83	0.77	1.06	– 0.97
Usinor	– 0.35	0.07	0.51	– 0.12
	– 5.98***	3.61***	6.54***	– 5.02***
Pechiney	– 0.04	– 0.03	0.08	0.00
	– 0.65	– 1.50	0.96	0.15
AGF	– 0.12	– 0.01	0.08	– 0.01
	– 3.05***	– 0.98	1.67*	– 0.67

The figure on the first line is the coefficient and, that on the second line, the T of Student.

* Indicates significance at the 10% level.

** Indicates significance at the 5% level.

*** Indicates significance at the 1% level.

appears favorable for the majority of privatized firms, it is significant for only 3 of these 12 firms, but negative and significant for 4 of the remaining 7 firms. These results make it possible to better understand why the tests conducted on the means do not allow for a clear conclusion as privatization's effects.

However, the evaluation of the coefficient of P makes it possible to determine only the static, threshold effects of privatization. To evaluate the dynamic efficiency, i.e., the change in the performance after privatization, we must consider the coefficients of variable TP . Although they are positive for 10 firms out of 19 in the sample, they are significant for only 4 of those firms. Moreover, they are negative and significant for 2 of the remaining firms. Thus, the favorable effect attributed to privatization on dynamic efficiency is far from being systematically confirmed for the French privatized firms.

The other indicators of performance lead to similar conclusions. The indicator that varies the most following privatization (for P and TP) remains the same when we apply the test for difference in medians: the net margin ROS ratio. For P , the results for the other indicators are as follows: positive in 11 times out of 19, including 5 significant cases for Net Income on Ordinary Activities/Equity; positive 12 times out of 19, including 3 significant cases, for ROE; positive 13 times out of 19, including 3 significant cases, for ROS. For TP : positive 8 times out of 19, including 4 significant cases, for Net Income on Ordinary Activities/Equity; positive 8 times out of 19, including 2 significant cases, for ROE; positive 11 times out of 19, including 3 significant cases, for ROS.

In all probability, privatization led to a restructuring of the business portfolio and of the cost structure that led to the margin increase. However, we do not see the same improvement in profitability across the 19 firms in the sample, at least not within the selected horizon. We conclude that the margin supplement is accompanied by at least an equivalent growth of the invested capital, due to a higher effort of investment, as we see from the rise of the Investment/Sales ratio. If the dynamic efficiency gains related to privatization, exist, our selected horizon is most probably too short for the gains to occur.

4.2. Model 2: explanation of the dynamic effects of privatization

Even if the dynamic effects of privatization are seldom significant, to better understand what influences these effects, we measure the influence of the variables (contextual, organizational and corporate governance, strategic levers) on dynamic efficiency. We do so with a second model of regression that considers dynamic efficiency TP as the dependent variable. However, a problem afflicts this approach: the values of the dependent variable come from the estimators of the coefficients of the variable TP in model 1. The inaccuracy of this measure requires correction. We correct by using Weighted Least Squares (WLS). For each firm, we weight each observation on all variables by the inverse of the estimated standard error of the dependent variable (Saxonhouse, 1976).

We write model 2 as follows:

$$\text{VARPERF}_i = \alpha + \sum_{k=1}^{19} \beta_k V_{ik} + \varepsilon_i \quad (2)$$

$VARPERF_i$ is the value of the coefficient of variable TP estimated from model 1, for firm i . V_{ik} is the value of the k th independent variable for firm i . β_k is the coefficient associated with the k th independent variable.

Our first result eliminated some contextual variables such as Cycle0, Serie1, Industry or CAC, either because they were insignificant, or because they were afflicted with serious multicollinearity. However, we could not highlight any significant effect of these variables on profitability except for the variable related to the public deficit. After eliminating the main multicollinearity, we obtain the following model (Table 4), which confirms the dependence of the dynamic efficiency on some of the suggested variables.

The highest coefficient of correlation between the variables present in the model is -0.42 , that between *Issequity* and *Foreign0*. The coefficients of tolerance are quite different from zero, and the sweep matrix does not show any serious multicollinearity. The Ridge regression (with lambda coefficients of 0.001 and 0.005) does not appreciably modify our results.

Even if the Kolmogorov–Smirnov test failed to reject the assumption of the normality of the distribution of the residuals, without making this assumption, we perform a bootstrap test to evaluate the reliability of the coefficients of the independent variables. The bootstrap technique (Efron, 1979) substitutes an empirical distribution based on a replicated sample obtained from a random sampling with replacement (5000 samples), for the supposed theoretical distribution. We find that all variables significantly differ from zero at the 5% level, except *Issequity*, which is significantly different from zero at the 10% level. In addition, at the 5% level, the traditional Wu–Hausman test (Wu, 1973; Greene, 2000) failed to detect a simultaneity bias.

When the public deficit is significant, the privatized firms encountered more difficulties recovering their profitability. Considering the strong negative correlation between this indicator and the growth rate of the GDP, a first explanation would be that this inferior

Table 4
An explanatory model of the dynamic efficiency (EBIT/(Equity + Financial Debt))

Observations	$F(5,13)$	R^2
		Adjusted R^2
19	5.865	0.693
	$p < 0.0047^{***}$	0.575
Constant	0.5197	2.51***,##
Share1	0.0013	4.19***,##
Foreign0	0.1292	3.62***,##
ExpGDP0	-0.0259	$-2.77***,##$
Issequity	0.0365	3.23***,#
Difinter	-0.1266	$-2.39***,##$

** Indicates significance at the 5% level.

*** Indicates significance at the 1% level.

Indicates significance at the 10% level-bootstrap.

Indicates significance at the 5% level-bootstrap.

efficiency is explained by the time within the business cycle that privatization took place. However, this explanation does not hold, because the measure of dynamic efficiency is based on a regression for which the effects of the business cycle have been eliminated. We propose a second explanation: During these periods, the state contributes less to the external financing of the firms.

If the initial level of performance ($Perf_0$) does not appear in the regression, we note that, considered separately, it significantly and negatively affects dynamic efficiency. The higher the initial level of performance, the more the firm has difficulty improving its performance.

After privatization, the increase in profitability seems to depend to a significant degree on the percentages of equity held by the principal shareholder and the foreign shareholders. According to usual theories of corporate governance, these results do not seem surprising, since they are based a priori on the positive effects of the discipline exerted by dominant or foreign shareholders. However, the fact that the principal shareholder often remains the state refutes the assumption of the systematically harmful influence of the state on the performance. D'Souza et al.'s (2000) results corroborate this. Privatizations that are accompanied by a progressive disengagement of the state have a better potential for profit recovery. The favorable influence of the foreign shareholders can be due to the constraints of governance traditionally related to internationalization, i.e., the adoption of the international standards of corporate governance as much as due to the shareholders' direct actions inside the firm.

Once privatized, the firms should have greater strategic latitude, enabling them to be more competitive. Among the levers of efficiency, increased possibilities to solicit the stock market appear as the firm launches new equity issues and expands its activity abroad.

The *Issequity* variable, which accounts for the importance of the new equity issues compared to total equity, favorably influences the variation of profitability, in all probability connected to the flexibility provided by this type of financing.

However, the coefficient of the *Difinter* variable, which is associated with the international growth, is negative. The more a firm increases the share of its sales abroad, the more it seems to encounter difficulties increasing its profitability. This counterintuitive result—the possibility of international growth should indicate increased competitiveness—can have several explanations. It may reflect the significant investment effort often needed for this growth. If so, the negative sign would be provisional—the horizon covers only 3 years after privatization—and would originate in the slowness of the new investment in generating cash flow. However, a strong international development can indicate that the market of the considered firm is worldwide and very competitive. This intensity of competition would imply a lower long-run profitability.

The fact that many variables that are likely to influence dynamic efficiency do not appear in the final model does not mean that they are economically irrelevant. Because of the economic and financial connections linking certain variables, there are overlapping and correlation effects, which lead us to exclude some variables of the regression model. Thus, the variable representing the dividend policy (*Vardiv*) is correlated at 0.7 with the *Share1* variable and at -0.51 with the *Foreign0* variable. Ownership structure seems to have a strong influence on this policy.

Table 5

An explanatory model of the dynamic efficiency (Net Income on Ordinary Activities/Equity)

Observations	$F(4,14)$	R^2
		Adjusted R^2
19	7.28	0.675
	$p < 0.0022^{***}$	0.582
Constant	1.2606	2.94***,##
Share1	0.0026	2.87***,###
Foreign0	0.2471	2.19***,#
ExpGDP0	−0.0612	−3.21***,###
Difinter	−0.3055	−1.92*,##

* Indicates significance at the 10% level.

** Indicates significance at the 5% level.

*** Indicates significance at the 1% level.

Indicates significance at the 10% level-bootstrap.

Indicates significance at the 5% level-bootstrap.

Indicates significance at the 1% level-bootstrap.

To appreciate the strength of the results, we apply the same analysis to the Net Income on Ordinary Activities/Equity ratio. Table 5 provides the results obtained for this second indicator, also after having eliminated the variables generating strong multicollinearity. To do so, we replicate the tests conducted for EBIT/(Equity + Financial Debt). The tests confirm the robustness of our results. In particular, at the 5% level, the traditional Wu–Hausman test also failed to detect a simultaneity bias.

The variables are identical to those that appear in the preceding model (except for the Issequity variable). Although the signs are the same, the coefficients are higher, indicating that the Net Income on Ordinary Activities/Equity ratio reacts more severely in dynamic settings to variation of the selected variables. However, for this indicator of performance, the privatized firms of Serie1 have a dynamic efficiency that is significantly weaker (the coefficient of the Serie1 variable has a negative sign), which would confirm the presumption that the most profitable companies were privatized first.

5. Conclusion

Can we conclude that privatization improved performance of the privatized French firms?

At first, the superficial examination of the principal indicators, based on means and medians, shows substantial change. On average, the privatized companies show an increase in their economic and financial profitability, their ROS, and their productivity. Furthermore, they make significant efforts in investment and direct their financing policies more towards internal financing and reducing debt. They also hold the number of employees stable and increase the share of international activity in their business activity. The shareholders received a higher share of the result.

However, a thorough and more critical examination of these results shows that most of them are not significant. Moreover, some results actually occurred *before* privatization.

The ambiguity of these results is deepened by the results obtained from our study of the static and dynamic effects of privatization for each firm. Privatization has a favorable effect on the performance for only a very small minority of the privatized firms. Most often, the effect is not significant. Of those results that are significant, about as many involve a *loss* of efficiency as the contrary. The results we obtain for the various explanatory models of the dynamic efficiency confirm, at least in part, the assumptions put forth to explain the process of privatization. In particular, it seems that the structure of ownership (the percentage owned by the principal shareholder, or by the foreign shareholders) and the modifications of the strategy allowed by privatization affect the variation of profitability. However, because of the small size of the sample and the residual multicollinearity that can affect them, these results must be taken cautiously and, of course, being for France, may not be generalizable.

Do these results lead to a dispute of the theoretical foundation of the various privatization programs undertaken on the international level, in particular the French one? Do they lead to reject the traditional justifications of privatizations, based in particular, on the usual thinking about corporate governance? We do not think so.

It is more difficult to improve the performance of the firms privatized in the developed countries where public management that could be described as relatively efficient, as shown by the ambiguous performance of the French SOEs. So, it is probable that it is not so much the relevance of the privatization programs and the theories that justify them that must be suspected, but rather the instruments used to measure their effects. It is hard to deny that it is necessary, in a global competitive environment, to give the firms the same strategic tools that their foreign competitors possess. This necessity was recognized by the majority of the managers of the French SOEs before privatization. It is also hard to deny, considering the crises that certain SOEs were confronted with, that the public system of governance probably experiences more dysfunctions because of interference coming from the political sphere and with the character, often not very elaborate and confused, of the monitoring state shareholding induces. In France, these deficiencies are well illustrated by the example of the Crédit Lyonnais debacle (Charreaux, 1997).

Thus, the ambiguity of the results seems to come from the methods used to measure the effect of privatization on the performance. In particular, it seems that the traditional quantitative studies have difficulty measuring this effect. In addition to the problems of relevance and reliability of the measures of performance, these studies face many difficulties related to the complex process of privatization, since privatization has a temporal dimension that often exceeds the studies' horizons. Privatization also has a contingent character in the economic, political, or legal context of the SOE before privatization. The structure of the board often must be changed when the firm privatizes, and this change can affect results. The overlapping of the variables, the probable existence of threshold effects (or more generally of nonlinear phenomena), even if some methods exist that can correct these effects or take them into account, result in giving us at best limited confidence in the results of the existing traditional econometric studies.

Because of these reservations, to test theories of privatization and to better understand their effects on the performance, we must, at least as a supplement, turn to qualitative clinical studies. Such studies seem better suited to analyze variation in the mechanisms influencing performance. Such studies, currently in use in certain fields of organization theory, can help to better evaluate the incidence of contextual effects, and to better understand how modification of corporate governance systems and adaptation of organizational architecture associated with privatization can improve performance.

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Appendix A

Table 6

List of privatized companies included in the sample and their principal characteristics

	Privatization date	Issue size (in millions FRF)	State ownership before privatization (%)	State ownership after privatization (%)
Saint-Gobain	November 1986	13 500	100	0
Paribas	January 1987	17 500	100	0
Sogenal	March 1987	1500	100	0
Compagnie Générale d'Électricité	May 1987	11 560	100	0
Crédit Commercial de France	April 1987	4400	100	0
Havas	May 1987	2410	100	0
Société Générale	June 1987	21 500	100	0
TF1	June 1987	1240	100	0
Suez	October 1987	15 641	100	0
Crédit Local de France	June 1993	2040	51	20
Total Sa	July 1992	5400	34	15
Rhône-Poulenc	November 1993	564	43	0
Banque Nationale de Paris	October 1993	4920	100	40
Elf	February 1994	40 500	51	13
Renault	November 1994	14 000	80	50
Seita	February 1995	6500	100	13
Usinor	July 1995	23 500	100	8
Pechiney	December 1995	8000	100	44
AGF	May 1996	10 000	100	0

Appendix B. Measures of the explanatory variables of model 2

Context of privatization	
Growth rate of the GDP the year of privatization	Cycle0
Association to the first or the second series of privatization	Serie1
The public expenditures/GDP ratio the year of privatization	ExpGDP0
The amount of the public expenditures the year of privatization	Exppub0
The nature of the industry: industry compared to banks—insurance	Industry
Organizational and governance characteristics of the company	
The initial performance of the company (EBIT/(Equity + Financial Debt))	Perf0
Capital intensity at the time of privatization (Total Assets/Number of Employees)	Capint0
The organizational complexity measured by: the initial number of employees the degree of internationalization	EmplNum0
	Interna0
The state shareholdings after privatization	State0
The foreign investors' shareholdings after privatization	Foreign0
The employees' shareholdings after privatization	EmpShare0
The share of the largest shareholder after privatization	Share1
Inclusion in the CAC40 index between 0 and +3	CAC
Payout ratio (Dividend/Net Income)	
In absolute variation	Vardiv(Div/Ni0 – Div/Ni3)
Levers of efficiency	
The internationalization of the sales turnover after privatization (% of the sales abroad)	
In absolute variation	Difinter(Interna3 – Interna0)
The use of new equity issue in financing (from 0 to +3) compared to the amount of the stockholders' equity compared to investment	Issequity
	Issinv
The importance of external growth (Financial Fixed Assets/Total Fixed Assets)	
In absolute variation	Varffa(Ffa3 – Ffa0)

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