Efficiency of French privatizations:
a dynamic vision

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Hervé Alexandre, Professor in Management Science
Université de Bourgogne, Iae Dijon-Latec
Gerard Charreaux, Professor in Management Science
Université de Bourgogne, Iae Dijon-Latec [*]

Contacts: Université de Bourgogne, Iae, Pôle d'économie et de gestion
2, Boulevard Gabriel, BP 26611, 21066 Dijon Cedex, France
Tel. (33) (0)3 39 54 35; Fax. (33) (0)3 39 54 88
Email: herve.alexandre@u-bourgogne.fr; gerard.charreaux@u-bourgogne.fr

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Abstract : The program of French privatizations is one of the principal worldwide programs as for the volume of the equity issues. A reading of the process of privatization through the corporate governance theory resulted in working out a model making it possible to take into account, on the one hand, the time dimension of the process of privatization, on the other hand, the contextual, organizational, governance and strategic variables which influence this process. After having replicated a certain number of traditional tests, we carried out a test of this model on a sample of 19 French privatized firms and on a seven years horizon, which made it possible to obtain the following conclusions. The favorable incidence attributed traditionally to privatizations is not truly confirmed for French privatizations, at least on the horizon considered. Privatization induces a significant positive effect on the performance only for a low number of firms. The importance of the effect, however, is subordinated to some of the suggested variables.

Key words: privatization, static efficiency, dynamic efficiency, corporate governance.

The French program of privatization, which began in 1986, constitutes one of the most significant worldwide programs, as well from the point of view of the number as of the importance of the sales (Megginson, 2000; Jones et al., 1999; Bortolotti et al., 1998) or of the average size of the carried out operations. According to Bortolotti et al. in terms of sales over the period 1977-1996, the French program is at the 3d worldwide rank after Japan and United Kingdom; as for the size, it represents, over the period 1979-1996, nearly 12 % (Levich and Huang, 1998, table 2) and, over the period 1993 to 1999 (partly), nearly 8 % of all the privatizations and more than 11 % of those of the OECD countries (OECD, 2000). Although the reasons and the context of French privatizations are, to a certain extent, specific, these last fall under a general movement on a world level, in particular in the most developed countries. As Megginson and Netter (2001) mention it, the share of the State Owned Enterprises (SOE) in the GNP of these countries moved, in a little more than 15 years, from 8,5 % to less than 5 %, this reduction of the role of the State appearing even more strong in the less developed countries.

The analytic framework used to justify the efficiency of privatizations results mainly from the neoclassical economic theory and its neo-institutional branches[1]. Apart from the macroeconomic aspects of privatization the essence of the argumentation holds in two points. On the one hand, the privately owned firm constitutes, most often, a better solution than the SOE to remedy the market failures. The efficiency of the change of ownership is however contingent on the market structure: privatization will appear all the more effective since the structure of the market is competitive. Furthermore, the corporate governance system – defined in the broad sense like the set of the mechanisms controlling the managers' decisions– associated to privatization would perform better than the corporate governance system of the SOE.

If the literature treating of the efficiency of privatizations is particularly abundant as illustrate some of the articles quoted in Megginson and Netter (2001) and Villalonga (2000), no study specifically devoted to French privatizations seems to be carried out. Of course, the privatized French firms are present in the samples of the multinational studies but, most often, in a very fragmentary way. Because of the problems arising, in particular, due to the diversity of the legal frameworks, the domestic economic characteristics (for example, the level of

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

development or the quality of the public administration[2]), the comparability of the accounting systems, it is useful to supplement the multinational studies by domestic studies which make it possible to avoid, at least partly, these biases.

The objective of this article is to evaluate the efficiency of the privatizations carried out in France. The problematic selected, in particular the justification of the model chosen, is presented in the first part. The second part is devoted to the description of the sample and the tests carried out. The results are exposed and discussed in the third and fourth parts, respectively devoted to the static efficiency and the dynamic efficiency of privatizations. Lastly, the conclusion summarizes the principal aspects of research and comprises some methodological comments.

1. Which problematic to evaluate efficiency?

The analytic frameworks used to evaluate efficiency can be classified according to four principal criteria: (1) the measure of efficiency; (2) the cross-sectional/time serie dimension; (3) the time effects of privatization (static/dynamic); (4) the modeling of the link between privatization and performance. The diversity of these criteria can explain the frequent discordances between the results of the existing studies, even if they conclude very mainly in favor of the efficiency of privatization.

1.1. The measure of efficiency

Most of the studies are based on the indicators used to evaluate the performance of the private companies, and thus retain the objective of the shareholder value maximization. The implicit assumption is that the neo-classical model, which underlies this objective, is relevant. The existence of externalities in particular traditionally resulted in disputing this model. A way of escaping these criticisms is to suppose, in the line of the main current within the neoinstitutional theories, that the adoption of the objective of shareholder value maximization leads *in fine* to a maximum reduction of the efficiency losses and, in the long run, to maximize the welfare from the stakeholders point of view.

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[2] One of the limits of the carried out studies on the efficiency of the privatizations within an international framework is they implicitly suppose the assumption that public management is equally inefficient in the various nations. However, the characteristics of the government services or of the public managers, in terms of competences, honesty, independence on the political power, are very different from one country to another, which can explain that the efficiency of privatizations seems to vary appreciably, for example, according to whether privatizations occur in a country member of OECD or not. D' Souza et al. (2000, p. 19 and table 6) show that the improvement of the performance is appreciably more significant in the countries not members of OECD.

Furthermore, the absence of quotation of the shares of SOEs (with some exceptions) leads to use, either accounting measures representing at best only rough proxies of efficiency for financial investors, or measures of technical efficiency. Certain studies also retain measures as the influence of privatization on the number of employees[3] to try to better measure the allocational dimension, by taking into account, through this variable, the employees' interests.

The accounting measures are, most of the time, used in the existing studies. Independently of the limits related to the accounting principles and standards which are not uniform in the different countries and of the possibilities of manipulating the accounting indicators or of window-dressing, the criteria selected are not free from criticisms, from the only point of view of their economic significance.

From the shareholders' point of view, the only indicator, which is strictly founded, as an accounting proxy, is the *Return on Equity* (ROE), which is based on net income, including extraordinary items. The shortcoming of this last one[4] is to be very sensitive to accounting manipulation, which results in preferring to it a ratio based on net income on ordinary activities. In an almost equivalent way, if we ignore the financial leverage effect, one can substitute to it measures of economic profitability such as the ratio EBIT[5]/(Equity + financial debts), which measures the profitability of the capital invested by the financial investors. These indicators, whatever their limits (biases in accounting information, ignorance of the opportunity cost of capital, or of the unsolvency risk …), are the only ones that can be used as proxies for performance from the shareholders' point of view.

Certain studies (for example, Megginson et al. 1994, p. 422) are based on a series of ratios whose majority, strictly speaking, do not constitute *profitability ratios.* Thus, Megginson et al. propose outside two profitability ratios – *ROE* and *Return one Assets* (ROA) – 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, it is

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In the same way, the results obtained by Dewenter and Malatesta (1997, 2001) appear very contingent on nationality.

[3] 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 being ambiguous on this point.

[4] This indicator, very criticized, is not necessarily the worst. For the private companies, some empirical studies (Biddle et al. , 1997) show, paradoxically, that it constitutes a better predictor of the real performance, measured in terms of stock value, than *Economic Value Added* (EVA).

[5] The EBIT(*Earnings Before Interest and Taxes*) is in particular used by Villalonga (2000) and Dewenter and Malatesta (2001) who relate it to the total assets. It would be more rigorous to relate it to the whole capital brought by financial investors (stockholders' equity plus financial debts).

well known that an increase of these last ratios involves a profitability gain only under quite particular conditions. For example, ROS is equivalent to ROE[6] only if the turnover of equity capital (Sales/Equity) remains constant; in other words, a margin increase can be accompanied by a fall of profitability, in particular in the short run, if rotation decreases, for example, because of a substantial modification of the business portfolio or of a significant effort of investment. As for the ratios based on the number of employees or the investment, they are very sensitive to the structure of the value chain, i.e. to the policy of vertical or horizontal integration. These considerations, usual in financial analysis, are not minor. Thus, for example, if 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, this improvement blurs, even disappears[7] when they retain the rates of return, in particular the ROE.

To avoid the skews related to the accounting and financial indicators, certain authors (for example, Gathon and Pestieau, 1996) recommend the use of a measure of technical efficiency founded on the functions of production (of the Cobb-Douglas or the translog types). This solution has the advantage of being based on physical data, quantitative or qualitative, and of allowing to quantify the efficiency of a firm by comparison with the standard represented by the function of production. This kind of approach found many applications to compare the efficiency of firms located within the same sector, in particular in the electricity sector, the airline companies, the insurances and the banking sector. A majority of these studies results in concluding that it is not so much the nature of the ownership that the competitive degree of the activity which determines efficiency. The approach based on the technical productivity seems however rather unfit to the complexity of the activities of the firms (except in some quite particular industries). It supposes a strong homogeneity of the outputs and inputs and relatively simple configurations of the value chains. Moreover, it seems unqualified to compare the performances of the firms, whose business portfolios are very diversified and unstable, and which are located in very heterogeneous industries.

In spite of their many limits, the requirements of the quantification and the concern to compare the efficiency of the program of French privatization with that of the other national programs, led us to retain traditional indicators of accounting nature. The two privileged

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[6] For information, on the sample of 19 privatized firms used in this study, the coefficients of correlation for the year of privatization, between the ROS ratio and the ratios of profitability are respectively 0.23 with EBIT/(Equity + Financial Debt), 0.69 with the ROE ratio and 0.42 with the Net Income on Ordinary Activities/Equity ratio.

[7] The same result is obtained in Dewenter and Malatesta (2001, p. 328).

criteria were the return on financial capital (EBIT/(Equity + financial debts) and the return on equity, with a preference for the first less sensitive to the extraordinary items.

1.2. The cross-section/time series dimension

In the studies of the incidence of the ownership structure on the performance, according to Megginson and Netter (2001), two principal approaches are opposed. The first one is of cross-sectional nature: one compares the performance of the privatized firms with that of a group of not privatized firms or with the performance which they would have carried out if they had remained state-owned (a potential performance). According to the results of the majority of these studies, efficiency appreciably increases with privatization. These studies relate mainly to a low number of industries, often strongly regulated. The methods employed suffer from several limits. Research relying on the potential performance rests on particularly strong and contestable assumptions. As for those, which require a comparison with a sample of private firms, they are confronted with the difficulty in making of such *benchmarks.*

One alternative approach, suggested by Megginson et al. (1994), consists in comparing the data of the privatized companies (by way of public offerings of common stock), before and after privatization, over one seven years period (three years before the year of privatization, the year of privatization and three years afterwards). Its principal advantage is that it allows to compare significant samples of firms of economically significant size, located in heterogeneous industries, various countries and at variable periods. It also has a certain number of limits (Megginson and Netter, 2001). Firstly, there is a selection bias: privatizations mainly relate to the largest companies and, often, the companies that are privatized – in particular, those that are privatized the first – by way of public offerings are in good financial health. Secondly, the measures of performance used usually are the traditional accounting measures or the physical indicators such as the number of employees. These measures being made during non-synchronous periods and within different accounting systems, significant biases are possible. Thirdly, the industrial and macroeconomic conditions change during seven years and differently affect the firms according to their more or less multinational character. Finally and fourthly, the method does not take into account the incidence of the measures of deregulation that, often, accompany privatizations.

If the first two limits are difficult to remove, the two last ones can be if not completely suppressed, at least reduced, by introducing variables of control accounting for the economic situation and the evolution of the regulation. Furthermore, some of the mentioned limits are

less important in a study carrying on firms of the same country. Thus, accounting biases, even if they remain, are less marked when the firms belong to the same national accounting system.

1.3. The time effects of privatization

The method consisting in comparing the performance, before and after privatization (over three years periods), supposes implicitly that the influence of privatization occurs instantaneously, that there is a rupture, a shock, involving a relatively fast recovery of the performance. In fact, on the one hand, in certain firms, there is a restructuring preliminary to privatization (for example, an equity issue or a downsizing), on the other hand, the effects of privatizations can take a long time to occur. The improvement of the performance passes through the evolution of the corporate governance systems, the reconfiguration of organizational architecture and the implementation of a new strategy which can take time, often more than three years, because of the inertia of the organizations[8]. The static method retained by Megginson et al. (1994), which consists in testing if there is a significant change of level of performance (a threshold effect) between the preprivatization period and that of post privatization, does not allow to apprehend the dynamic effects of privatization, i.e. the speed with which the performance recovery occurred.

These dynamic effects were measured in certain studies, based on the econometric analysis pf panel data. The study of Ehrlich et al. (1994), bearing on the criterion of technical efficiency, led to evaluate the effects of privatization by separating the short-run effects (the static approach), from the long run effects (the dynamic approach). This 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 only in dynamic terms, through the growth rates of the productivity or of the costs reduction. Conversely, the short-run or threshold effects, related to the change of ownership appear non-significant. According to the authors (p. 1036), the "age" of the company influences the effects of privatization. More recently, by retaining a measure based on the EBIT, Villalonga (2000) used a similar method.

This method offers several advantages. It allows:

– to increase the number of observations in order to avoid, at least partly, the limits related to the low sample size when one works on privatizations of only one nation.

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[8] For example, Kole and Lehn (1999) studied the adaptation of the structures of governance following the deregulation occurred in the American air transport industry. They show that these structures adapt slowly.

– to evaluate simultaneously the incidence of privatization on the "level" and the evolution of the performance. The efficiency increase is measured based on the variations of the trend of the performance.

– to quantify the incidence of the privatization, for each individual firm, as well in terms of static efficiency as dynamic efficiency.

– to better identify the moment when occur, on average, the effects of privatization. Thus, for the Spanish firms studied by Villalonga, some significant positive effects appear three to four years before privatization, which means that restructurings happen before privatization. However, the most significant effect occurs seven to eight years after privatization, which corroborates the assumption according to which the positive effects of privatization appear only over a long period[9].

1.4. The modeling of the privatization / performance link

Beyond the time aspects that condition the evaluation of the effects of privatization, this evaluation is also subordinated to the way in which one models the link between efficiency and privatization. The studies proposing an explanatory model of the performance are relatively rare. The two principal ones are those of Souza et al. (2000) and of Villalonga (2000). To apprehend the efficiency of French privatizations, we took as a starting point these studies as well as certain theoretical considerations allowing to suppose a link between the modifications of the corporate governance system and efficiency.

Three dimensions, which have a more or less direct connection with the corporate governance theories, can make it possible to better apprehend this link: the context of privatization, the organizational and corporate governance characteristics of the firm and, finally, ways – the levers of efficiency – by which the change of ownership structure is supposed to influence the creation of value[10].

1.4.1. The context of privatization

The context – i.e. the external conditions – of privatization is at the same time economic and political.

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[9] This long term effect seems also confirmed by the results of Dewenter and Malatesta (2001).

[10] The various indicators making it possible to quantify the three categories of explanatory variables – the context of privatization; the organizational and the governance characteristics of the company; the levers of efficiency – are presented in appendix 3.

First of all, the economic context is more or less favorable at the moment of privatization. The additional flexibility offered by privatization can possibly play differently according to the macroeconomic context; thus, one seldom launches a new equity issue in a bear market and 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 exerted by the stock market is supposed to be a function of the economic situation; it is reinforced during the economic depressions. Furthermore, restructurings of the organizations being easier during favorable economic situations, the positive dynamic effect of privatization should be higher for these periods.

This context also depends on the more or less regulated character of the industry. Many authors (Megginson and Netter, 2001) concluded that privatization was truly efficient only if the sector were simultaneously deregulated[11]. From the corporate governance point of view, deregulation influences the discipline exerted by the markets of goods. For the French case, the effect of deregulation is very unequal according to industries. If this effect is particularly substantial in the industry of telecommunications (not present 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 State most often may find it beneficial to launch privatizations in a favorable economic context in order to increase the receipts, the budgetary constraint can be such as it is necessary for it to hasten the process. Lastly, the political and legal context, itself, can raise difficulties. Thus, most often, the State has tendency to privatize in priority the companies for which privatization is easiest. As for the legal framework, it can evolve according to the period.

These various aspects resulted in introducing variables in order to control them. We considered thus:

– the growth rate of gross domestic product (GDP) at the time of privatization (variable Cycle0) to characterize the state of the business cycle.

- an indicator of the regulated character of the businesses carried on by privatized firms (belonging or not to the industrial sector; variable Industry). Contrary to the privatizations carried out in some other nations, French privatizations, until 1997, did not relate to businesses strongly regulated like energy or transport. Only the distinction, financial vs non-financial Industries was retained, as well to separate businesses of very different

nature as to take account of the banking environment which is strongly regulated. This does not exclude however that competition between banks is strong.

- a variable accounting for the national budgetary constraint, the year of privatization (the ratio Public expenditures/GDP the year of privatization – variable ExpGDP0 – or, in an alternative way, the amount of the public expenditures the year of privatization – variable Exppub0). In the presence of a loose constraint, the State is supposed more in a position to intervene to facilitate privatization, for example by making easier a new equity issue, and by preserving a part of its stockholdings within the privatized company.

- a dummy variable (Serie1) allowing to know if the privatized company belongs to the first serie of privatizations[12] or not. It is often claimed, that the companies included in the first serie were easiest to privatize, in which case, the recovery of profitability, consecutive with 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 probably condition the success of a privatization. The more complex the firm is, the more long and difficult it will be probably to achieve the process of privatization and to obtain efficiency gains. Complexity was measured by three variables (the capital intensive degree Capint0; the number of employees Effect(0) and the degree of internationalization Internat0, at the time of privatization).

Furthermore, from the dynamic point of view, it is all the more easy to improve the performance that the latter is initially weak. The variable Perf0 measuring initial economic profitability was introduced to measure this effect.

The success of privatization is also constrained by the characteristics of the corporate governance system. Thus, privatization is supposed to imply a more significant discipline of the stock market, a restructurings of the shareholding, a modification of the management and changes in the relations with the shareholders.

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[11] D' Souza et al. (2000, p. 10) find that, whatever the context, privatization leads to a gain of performance but that this gain is more significant in the strongly competitive sectors.

[12] Let us recall that the first wave of privatizations took place in France from 1986 to 1988. It was followed by the "ni-ni" (neither nationalization, nor privatization) period from 1988 to 1993. The second program of privatizations began in 1993. In spite of the comeback of the Socialist Party to the government in 1997, it still currently continues.

(1) The intensity of the discipline related to the stock market was evaluated by considering the inclusion or the company within the French index the CAC40 (variable CAC). This inclusion involves a reinforced attention of the institutional investors (domestic and international) and of the stock exchange authorities and volumes of transaction are most significant for the shares of these companies. This reinforcement of the discipline is supposed to influence favorably dynamic efficiency.

(2) The restructurings carried out at the time of the privatization lead to rather different shareholdings structures. The State keeps a more or less substantial share of equity (see appendix 1). If privatization increases efficiency, the more this share is significant the less the effect of privatization should be favorable. The exerted discipline depends, according to any probability, on the nationality of the investors (for reasons of independence), but also, for incentive reasons, on the share of equity that the employees hold. 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. Furthermore, the capacity to succeed in the privatization process being probably all the more easy as there is a dominating shareholder, a variable measuring the share held by the largest shareholder after privatization (variable Share1) was introduced.

(3) Privatizations were accompanied, except rare exception, of a change of manager. Because of the exceptional character of the stability of the management in the program of French privatization, no indicator of change was retained. In the same way, the boards of directors were deeply reorganized[13]. D'Souza et al. (2000) use a dummy variable to indicate a significant change (renewal with more than 50 %) of the board of directors. Most of the time, only because of the legal modifications concerning in particular the representation of the State and of the employees, the boards of the French privatized companies were modified beyond this threshold and, in fact, a variable measuring the change would not have been discriminating. Consequently, the indicator used by Souza et al. was not used. In spite of the difficulty in measuring the discipline exerted by the board of directors with the only quantitative criteria like, for example, the size of the board or the proportion of outside directors, in order to compare our results with those of other studies, we however led tests on these two indicators.

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[13] According to Megginson et al. (1994, table 7), the boards of directors of the French privatized companies included in their sample were modified in the following proportions (% of directors remaining after privatization): BIMP (14 %); Paribas (8 %); Suez (19 %); CCF (30 %); Elf (15 %); Saint Gobain (0 %); Société Générale (31 %); Sogenal (64 %).

(4) Following privatization, one frequently notes an increase in the dividend payout, sometimes interpreted like a signal of a reinforcement of the discipline exerted by the shareholders. Although the theory aiming at justifying the dividend policy as a disciplinary mechanism truly did not receive empirical corroboration, the link between the efficiency of privatization and the modifications of the dividend policy was tested using the dividend payout ratio (Vardiv).

The possibility of issuing more new equity should mean, all things being equal, a relative decline of the financial debt after privatization. This effect would have, moreover, been reinforced by the rise of the 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 disciplines respectively exerted by the financial creditors and by the shareholders[14]. Also let us recall that if the financial leverage effect is positive, a decrease of the debt involves, all things being equal, a decrease of the ROE, which can explain certain contradictory results of the study of Megginson et al. (1994), considering the indicators of profitability. Conversely, because of the withdrawal of the State and the fall of guarantee towards the creditors that follows, the debt decrease can, by reducing the risk insolvency, have positive effects on the performance, by making the various stakeholders of the firm more confident. The financial policy was apprehended by way of the ratios Financial Debts/Equity and Financial Debts/Total Assets. We also used the ratio Cash Flow/Investment, which makes it possible to better measure the real autonomy of the firms as regards financing.

1.4.3. Levers of efficiency

Without making an exhaustive study of the processes by which privatization influences the performance, one can however pose the assumption that privatization increases efficiency by offering more strategic flexibility. This addition of flexibility can be in particular apprehended through the three following dimensions: the possibility of internationalizing more the business portfolio, that to make new equity issues more easily and that to rely more on external growth. These three dimensions were measured by the following variables: the variation of the sales realized in foreign countries after privatization (Difinter variable); the share of financing made by new equity issue (compared to the stockholders' equity: Issequity variable; and compared to the investment: Issinv variable); the importance of

[14] According to the theory of *Free Cash-flow* such a substitution should involve a decline of the performance.

external growth (measured by the variation of the proportion of financial assets after privatization: Varffa variable).

2. Presentation of the sample and description of the tests

Following the example of Megginson et al. (1994), we chose a time-series study. For each firm, the data relate to a seven years horizon[15] (three years before privatization, the year of privatization and three years afterwards). This option resulted in reducing the population to 23 firms privatized by way of a public offering. On these 23 firms, four are missing because of absent data[16] *In fine,* the study carries on 19 firms[17].

If information comes partly from the Worldscope data base, it originates mainly directly from the annual reports of the companies. This reference to the annual reports proved necessary in order to supplement or to correct for the informations, sometimes erroneous, issued from the database. Certain additional informations also come from the international studies relating to privatizations and from the database created by Megginson (2000).

The final sample, on which the tests were applied, includes seven banks and financial institutions (Paribas, Sogenal, Crédit Commercial de France, Société Génerale, Suez, Crédit Local de France, BNP), one group of insurance (AGF), nine industrial groups (Saint-Gobain, Compagnie Générale d'Électricité, Total, Rhône-Poulenc, Elf, Renault, Seita, Usinor, Pechiney) and two groups of medias (Havas, TF1)[18].

The empirical study was proceeded in two steps corresponding to the two procedures, inspired respectively by the studies of Megginson et al. (1994) and of Villalonga (2000), already presented.

The first step made it possible mainly to test the static efficiency, by evaluating the impact of privatization on the variables of performance calculated firm by firm and, on average, over some three years periods, before and after privatization. Tests of differences in

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[15] For reasons of availabilities of data as of homogeneity of the horizons, the study dealt with a common horizon of seven years. It would have been possible to obtain data on more years for certain firms. However, if the choice of unequal horizons allows to get additional observations and to identify possible time effects over longer periods, conversely, this option can involve skews in the evaluation of these effects, as well for economic as econometric reasons.

[16] UAP that was acquired by AXA less than three years after its privatization was excluded of the sample. In the same way, fault of getting the annual reports we did not consider either the BTP, the BIMP and the Matra Group. It is however necessary to specify that two of the missing companies are banks (BTP – Banque du Bâtiment et des Travaux Publics, BIMP – Banque Industrielle et Mobilière Privée) whose importance is very marginal.

[17] This number that can appear small is of the same order that the numbers considered in the studies employing a similar methodology, Ehrlich et al. (1994) used a sample of 23 firms and Villalonga (2000) carried out her tests on 24 firms, even on 22 firms (model 2).

[18] Some informations relating to these firms are provided in appendix 1.

median (test of Wilcoxon) applied to the two series of means, calculated before and after privatization, made it possible to measure this impact. Although in a strict sense, only the indicators of profitability (ROE, economic rate of return) account for the performance, in order to carry out comparisons with the results of the principal international studies, the other criteria which they used also were the subject of tests. However, these other criteria (productivity, financial policy …) are to be considered only on a purely complementary basis, as elements making it possible to better understand the making of the performance, for example, through the investment and financing policies.

In order to better account for the dynamic of the privatization, some complementary tests (test of Wilcoxon) were applied on the same indicators by successively opposing the extreme years 3/+3 –, then the years –3/0 (period of preprivatisation) and, finally, the years 0/+3 (period of postprivatisation). This alternative of the procedure of Megginson et al. (1994) offers two advantages. Firstly, the possible effect of privatization is rather likely to be more accentuated and apparent, if it is evaluated by opposing the data of years –3 and +3, than considering the means before and after privatization. The changes of levels of performance take usually a certain time to appear to a significant degree through the accounting data. Secondly, this alternative makes it possible to know if the effect occurred before privatization, after privatization or, gradually, during the seven years under observation. In this way, one can highlight, at least in a coarse way, the dynamics of the process of privatization. Always in the same purpose, we then measured, for the two methods, the percentage of firms for which the variation of the indicator was in conformity with the theoretical predictions, and we tested (non parametric test of the sign) if this proportion was statistically significant. This test makes it possible to escape biases which affect the tests carried out on the means; even if an indicator varies in the same direction for 80 % of the firms, it is enough that it evolves with more intensity, in the opposed direction, for the remaining 20 %, so that privatization does not seem, overall, to have any significant effect. However, whatever the adopted method, the dynamic effect of privatization is measured only very imperfectly.

To answer this criticism, we used, in a second step, the procedure suggested by Villalonga (2000), which makes it possible to describe in a more explicit way the privatization dynamics. We measured, by way of a first regression (model 1), the rates of growth of the performance after privatization. The principal measures of performance were regressed on three variables: a first variable, time T – the values 1 to 7 indicating the seven years – a second variable P (dummy variable) indicating privatization – being worth 0 when the firm is

state-owned and 1 when it is privatized – and a third and last variable, named 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, the regression applied to 133 observations (19 firms over seven years). The precise form of the model is presented in appendix 2.

The coefficients of the variable P of privatization make it possible to measure and test, for each firm, the threshold effect of privatization. This test, by its static character, remains rather close, in its meaning, of the test presented in the first procedure; it however provides information on the effect of privatization for each firm. The coefficient of variable TP allows to measure and test the effect over the performance increase during privatization – i.e. over four years, the year of privatization and the three years that follow – for each firm.

The second phase of this procedure (model 2) consists in regressing the performance increase (coefficients of TP) on the three categories of supposed explanatory variables of the performance (contextual variables, organizational and corporate governance variables, levers of efficiency). One can thus measure the effect of these variables on the efficiency of privatization, for each firm, rather than globally on a representative and fictitious firm (average or median).

3. Static efficiency of privatizations

In table 1, the results of the tests for the first procedure are presented. For each indicator, the medians and means, based on the series of three years means preceding privatization are indicated (column 2), then those based on the three years following privatization means (column 3). In the fourth column, we present the results of the nonparametric test of Wilcoxon applied to these two series. Lastly, in the two last columns (columns 5 and 6), appears the result of the test of the sign, applied to the percentage of firms whose evolution was in conformity with the *a priori* prediction.

If we only consider rough figures, privatizations seem to have a notable influence on the performance and the financial behavior of the firms. The various profitability ratios as well as the ratios of productivity improve either for the means or for the medians. This increase also relates to the effort of investment; however, the investment based on external growth does not appear more important since the ratio Financial Fixed Assets/Total Fixed Assets decreases, which could mean, either that privatization is accompanied by a less significant use of this type of growth, or more probably, that restructurings of the business portfolio involved more divestments than acquisitions. The share of the activity carried out

abroad also increases. As for employment, if the medians indicate a decrease higher than 10 %, the means remain stable: the employment effect is thus ambiguous. The modifications also affect the financing policy. The role of internal financing increases and the share of the financial debts in the financing is reduced. Lastly, the dividend payout ratio is also increasing.

These first conclusions are however to moderate, even to dispute, when we consider the results of the differences in medians (and means) and significance tests. Only five indicators out of twenty varied 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 test of Wilcoxon does not lead to reject the null assumption of the absence of effect of privatization.

Concerning the two indicators of performance stricto sensu the ROE and the ratio EBIT/(Equity + Financial debts), no significant differences appear; the conclusion is the same for the ratio measuring the investment effort. The significant and positive variations of ratios ROS or Net Income/Number of Employees do not mean necessarily a performance increase; they can result from simple modifications of the nature of the activity. Lastly, the decrease of the number of employees (considering the medians) 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 and the increase in ROA is significant only at the 10% level; the increase in profitability is thus questionable, at least from the point of view of the shareholders. However, some other indicators show a significant effect of privatization, in particular the ratios of productivity and financing policy. On the international level, there are simultaneously an increase in productivity and a reduction in the debt level after privatization. Megginson et al. (1994) did not test the effect of privatization on the last three indicators that we retained and of which two vary significantly: the size of the board of directors (the size decreases on average from 18 to 15 directors) and its composition (the percentage of outside directors increases). These variations are due to the legal modifications, related to the privatization[19] rather than with an intention to adapt the board of directors to the requirements of private management.

[19] In France, the boards of directors of the public companies are subject to particular rules. It is the same for the privatized companies (Charreaux, 1997).

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

Indicators	Median (Mean) Before	Median (Mean) After	Test for Difference in Medians	% of firms that changed as predicted	Test of significance of proportion change
Margin and profitability					
Net Income/Sales (ROS)	1.7% (1.4%)	2.7% (3.0%)	**2.47 ****	73.7%	**2.06 ****
EBIT/(Equity + Financial debts)	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
Productivity					
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 *****
Investment Policy					
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
Employment					
Number of Employees	58 285 (58 513)	51 704 (58001)	0.12	47.1%	0.24
Financing Policy					
Financial Debts/Equity	2.3 (13.3)	1.2 (9.9)	0.77	78.9%	**2.52 *****
Financial Debts/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
Dividend Policy					
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
Corporate Governance					
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 ***
International development					
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.

When one analyzes the proportion of firms (column 6) having changed as predicted, the ratios of profitability, remain non-significant, whereas they are significant on the international level. The ratio of investment effort as well as the evolution of the number of employees remain non-significant and the ratios ROS and Dividends/Sales, significant. Furthermore, the ratios of financial structure and productivity are now significant, which brings closer the results with those of Megginson et al. Following the example of international privatizations, French privatizations are accompanied by productivity gains and of a fall of the debt, however, again, there is no significant improvement of profitability.

Apparently, the effect of privatization on performance appears less marked for the French privatized companies. In particular, one cannot show a significant improvement of profitability and effort on investment. The significant effects carrying on margin, productivity and financing policy do not lead to a profitability gain, at least on the selected horizon.

This analysis, however, presents two limits. First of all, the tests are carried out on triennial means that leads to smooth the effect of privatization. Then, they do not make it possible to know if the variation of the indicator is former to privatization (restructurings or window dressing) or posterior with the latter (real effect of private management). The application of the test to years –3, 0 and +3 allows to better identify the time effects (table 2).

This test, more elaborate – and also a priori more favorable to the assumption of a positive effect of privatization – results in highlighting additional significant variations. However, to be in a position to to ascribe the evolution noted to privatization, it is necessary that the ratio be significant over period 0/+3.

The evolution of the ROE indicates apparently an improvement of the performance for the shareholders. However, it varies significantly only before privatization what results in supposing, either that the recovery took place before privatization, under the control of the State, or that there was a window dressing[20] in order to facilitate the public offering of the SOE. The increase in the ratio of capital intensity, significant to describe the evolution of –3/+3, is not significant any more for 0/+3. Only the ratio of productivity Net Income/Number of Employees shows a significant evolution at the same time over the two periods–3/+3 and 0/+3. Overall, one cannot show a positive significant effect of privatization on the performance.

[20] Dewenter and Malatesta (2001) on their international sample also find that the improvement of the performance occurs before privatization. They reject the assumption of accounting manipulation considering the results they obtain on the long-term performance of privatized firms.

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

Indicators	Median (Mean) in -3	Median (Mean) in 0	Median (Mean) in +3	Test for Difference in Medians -3 to 0	Test for Difference in Medians -3 to +3	Test for Difference in Medians 0 to +3	% of firms that changed as predicted	Test of significance of proportion change
Margin and profitability								
Net income / Sales (ROS)	1.4%	2.2%	3.1%	**2.50 ****	**3.55 *****	**2.03 ****	82.4%	**2.67 *****
	(1.3%)	(2.4%)	(3.4%)				63.2%	1.15
EBIT/(Equity+Financial Debts)	7.6%	9.3%	8.5%	0.77	0.63	0.13	58.8%	0.73
	(8.6%)	(10.8%)	(11.3%)				42.1	0.69
Net Income on Ordinary	13.7%	16.3%	15.3%	1.09	1.21	0.45	64.7%	1.21
Activities/Equity	(13.0%)	(17.5%)	(17.4%)				52.6	0.23
Return on Equity	6.8%	8.3%	9.1%	**1.68 ***	**2.09 ****	0.89	52.6%	0.23
	(5.4%)	(10.2%)	(10.9%)				57.9	0.69
Productivity								
Sales / Number of Employees	1.6	1.7	1.8	0.71	1.39	1.29	76.5%	**2.18 ****
	(3.7)	(3.0)	(3.0)				70.6%	**1.70 ***
Net Income /	20.9	39.4	62.3	1.53	**2.70 *****	**1.81 ***	70.6%	**1.70 ***
Number of Employees	(99.7)	(120.8)	(162.5)				76.5%	**2.18 ****
Total Assets /	1.6	1.9	2.8	1.21	**1.77 ***	1.43	100 %	**3.87 *****
Number of Employees	(31.2)	(35.2)	(43.0)				93.8%	**3.50 *****
Investment Policy								
Investment / Total Assets	3.6%	4.2%	4.8%	0.74	1.15	0.92	66.7%	1.41
	(4.8%)	(4.6%)	(5.1%)				52.6%	0.23
Investment/Sales	4.8%	6.3%	7.7%	1.47	**2.03 ****	1.18	63.2%	1.15
	(8.0%)	(7.7%)	(9.6%)				63.2%	1.15
Financial Fixed Assets	23.0%	21.5%	18.6%	0.51	0.36	0.34	57.9%	0.69
/ Total Fixed Assets	(36.9%)	(37.8%)	(37.1%)				47.4%	0.23
Employment								
Number of Employees	59 772	51 139	48 456	-0.07	-0.03	-0.39	50.0%	0.00
	(59 243)	(60 253)	(57 465)				47.1%	-0.24
Financing policy								
Financial debts / Equity	1.7	1.5	1.2	0.89	1.18	0.92	78.9%	**2.52 *****
	(15.4)	(10.2)	(9.9)				63.2	1.15
Financial Debts/Total Assets	36.9%	31.8%	31.7%	0.89	0.98	0.80	73.7%	**2.06 ****
	(48.0%)	(47.0%)	(46.1%)				52.6%	0.23
Cash Flow /	91.4%	105.6%	109.2%	0.86	0.83	0.65	52.6%	0.23
Investment	(324.3%)	(159.3%	(164.4%				31.6%	-1.61
Dividend Policy								
Dividends/Sales	0.3%	0.6%	0.9%	**2.81 *****	**3.39 *****	1.63	85.7%	**3.30 *****
	(0.5%)	(0.9%)	(1.2%)				68.4%	1.61
Dividends/Net Income	20.5%	22.5%	34.8%	0.81	**2.21 ****	**2.04 ****	61.1%	0.94
	(31.7%)	(29.3%)	(44.3%)				57.9	0.69
Corporate Governance								
Numbers of directors	18	14	15	**2.94 *****	**2.11 ****	0.60	57.1%	0.53
	(17)	(14)	(15)				14.7	-2.67
Percentage of Outside Directors	60.0%	71.4%	71.0%	**2.19 ****	**2.54 *****	0.06	70.0%	1.26
	(59.5%)	(70.3%)	(68.1%)				16.7	-2.31
International development								
Percentage of Sales abroad	38.0%	27.8%	52.0%	0.11	1.11	**1.88 ***	77.8%	**2.36 ****
	(40.6%)	(36.3%)	(44.9%)				82.4%	**2.67 ****

* Indicates significance at the 10 % level.

** Indicates significance at the 5 % level.

*** Indicates significance at the 1 % level.

For columns 8 and 9, the first line for an indicator corresponds to the test carried out between year –3 and year +3, the second line corresponds to the test carried out between year 0 and year +3

The increase in the effort of investment, significant on –3/+3 is not any more on 0/+3, and the reduction of the proportion of the financial fixed assets in the balance sheet is not significant, whatever the comparison carried out. The only characteristic of the development policy that seems to evolve significantly with privatization is that of the proportion of sales carried out abroad that increases appreciably between 0/+3. The private character facilitates probably the international agreements as well as the financing of this development.

The effect of privatizations on employment must be particularly mentioned because one often associates privatization to downsizing. Considering the rough figures, most part of the adjustment (on the medians) occurred before privatization, which would confirm that the State is often in a strong position to negotiate downsizing. However, no general significant effect appears.

If, except for the ratio Cash Flow/Investment, one finds a significant evolution of the ratios of the financing policy for –3/+3, this significance also disappears for 0/+3. The evolution of the ratio Cash Flow/Investment, more adapted to evaluate the financial autonomy, even if it is not significant, deserves a particular comment. The greater part of the improvement again occurred before privatization. It will be noticed that the investment is covered with more than 100% as early as the year of privatization what means a very good financial autonomy. Like the effort of investment was increased, one deduces that the increase in cash flow was still more significant.

The dividend policy appears modified in view of the Dividends/Sales ratio, but the significant evolution occurs before privatization. This ratio being not very relevant however, it is preferable to turn to the dividend payout ratio, whose evolution is significant both for –3/+3 and 0/+3. If we suppose that this ratio measures the discipline exerted by the shareholders, this one seems to increase after privatization. It will be noticed, however, that the payout ratio all the more increased that the shareholding is concentrated.

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

The tests on the indicators of corporate governance, concerning the size and the composition of the board of directors, confirm the legal character of the evolutions. The significant modifications take place before privatization and a more precise analysis of the data shows than they occurred the year of privatization; they thus come *a priori* from the necessity to comply with the new corporate statutes. After privatization, no significant transformation appears.

On the whole, the significant variations, ascribable to privatization, are rare. They only relate to the ROS, the net income by employee, the payout ratio and the proportion of sales carried out abroad. For these last two ratios, the first can mean an increase in the discipline exerted by the shareholders after privatization and, the second, a greater discretion for the management as regards international development.

This test, if it results in more clearly perceiving the effects of privatization, gives however only a rough vision of its dynamics. Moreover, applied to a fictitious median firm, it does not make it possible to obtain individual results, firm by firm. For this reason, the empirical study was completed by a dynamic analysis.

4. Dynamic efficiency of privatization

The explicit integration of time renews the more traditional analyses. It is justified by the fact that it is not very probable that the effect of privatization on the performance is immediate in complex organizations, of big size and whose business portfolio often is very diversified. For better measuring this effect, it is necessary to evaluate the possible performance gain in a progressive way and not only through one quantitative jump occurring at the date of privatization. The procedure that we apply now includes two steps. It is first of all a question (model 1) of measuring the dynamic gain (or the loss) of performance, due to privatization, before testing the relevance of the variables considered as well-suited to explain this evolution (model 2).

4.1. Model 1: the evaluation of dynamic efficiency

The first model of regression relates to the variables of profitability. Its general form is as follows:

$$PERF_{it} = \alpha_i + \beta_{1i} * T_{it} + \beta_{2i} * P_{it} + \beta_{3i} * TP_{it} + \beta_4 * taille_{it} + \beta_5 * cycle_{it} + \varepsilon_{it} \qquad (1)$$

with:

$PERF_{it}$ the variable measuring the performance at the year t for firm i

T_{it} time t for firm i (value going from 1 to 7).

P_{it} a dummy variable for privatization taking value 1 when firm i became privatized, and 0 before privatization.

TP_{it} a variable taking into account the interaction between the two preceding variables.

$taille_{it}$ size (measured by the sales turnover) of firm i at time t.

$cycle_{it}$ the growth rate of the GDP, the year t for firm i

Let us specify that this model supposes that the effects of the size and of the business cycle on the performance are identical whatever the firm; following the example of Villalonga (2000), we thus make the implicit assumption that the factors size and cycle[21] escape control from the firms and that there is no direct connection between the incidence of privatization on the performance and the size. The effects of the variables T, P and TP are, on the other hand, specific to each firm[22] and supposed fixed[23]. Table 3 contains the results obtained for the ratio EBIT/(Equity + Financial Debt), the variable that we consider most representative of the performance[24].

Before interpreting the individual data, it should be mentioned that the variables Size and Cycle have, both, a significant positive effect on profitability. This positive effect complies with usual predictions. It is present in the study of Villalonga (2000) and, only for the cycle, in that of Dewenter and Malatesta (2001). Considering these two variables as common factors implies that interpretations relate to coefficients for which these effects were neutralized.

For better understanding the contents of table 3, let us take the example of Usinor, a firm for which all the coefficients are significantly different from 0. The coefficient related to the variable T is positive meaning, on average, a rise of the profitability on the seven years period. The coefficient of the variable P, also positive, represents a rise of profitability at the time of privatization (threshold effect). Lastly, the negative coefficient of TP, means that the recovery of profitability occurred less quickly, on average, after privatization (year 0 to +3), therefore that dynamic efficiency dropped after privatization[25].

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[21] Just as Villalonga (2000, p. 58, note 17) and for the same reason, i.e. the low number of firms included in the sample, the constant was not replaced by a transformed variable equal to the deviation from individual mean, according to the common practice in the estimation of fixed effects models in large samples.

[22] The test of specification of Chow resulted in rejecting the assumption that the coefficients for the constant and the various variables are common to all the firms included in the sample. The values obtained were respectively: 58.28 for the constant ; 29.19 for the variable T; 20.43 for the variable P and 17.40 for the variable TP, with EBIT/(Equity + Financial Debt) as explained variable. For the return on equity, these values were : 51.73 for the constant ; 26.02 for the variable T ; 24.73 for the variable P and 21.02 for the variable TP.

[23] Just as Villalonga (2000, p. 57, note 16), we chose to consider that the effects are fixed – i.e. to retain a model of covariance with individual effects and for the two same reasons: (1) If we suppose that the effects are random, that implies we consider the sample selected as a random sample drawn from a broader population of which one seeks to estimate the parameters. The specificity of the process of privatization in France, during the period considered and the mode of selection of the sample result in rejecting this assumption. (2) The error components model supposes the assumption that the individual effects are random and that there are independent on the explanatory variables, but, there is no economic reason that allows accepting a priori this strong assumption.

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

[25] The interpretation of the sign of TP is a function of the sign of T. If T has a negative sign (decrease of the performance), a negative sign for TP means that after privatization efficiency decrease less, and conversely. If T

Table 3. Test of the dynamic effect of privatization (model 1)

on the ratio EBIT/(Equity + Financial Debt)

	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'Electricité	**-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

Note: The figure of the first line is the coefficient and, that of the second line, the T of Student

has a positive sign (growth of the performance), a positive sign for TP means that after privatization the efficiency grows more and conversely.

* Indicates significance at the 10 % level.
** Indicates significance at the 5 % level.
*** Indicates significance at the 1 % level.

The coefficient of the variable P provides information on static efficiency. The effect of privatization appears positive for 12 firms out of 19 of the sample[26]. However, even if the threshold effect appears favorable for a majority of privatized firms, it is positive and significant only for three firms. Conversely, it is negative and significant for four firms. These results make it possible to better understand why the tests carried out on the means did not allow to conclude clearly on the incidence of privatization.

The evaluation of the coefficient of P only makes it possible however to determine the static, threshold effects, of privatization. To evaluate the dynamic efficiency, i.e. the evolution of the performance after privatization, it is necessary to consider the coefficients of variable TP. If they are positive for 10 firms out of 19 of the sample[27], they are positive and significant only for four firms; conversely, they are negative and significant for two firms. Considering the dynamic efficiency, the favorable effect attributed to privatization is far from being systematically confirmed for the privatized French firms on the selected horizon[28].

If the other indicators of performance induce similar conclusions, it should be specified that the indicator that evolves more following privatization (for P and TP) remains the same one as when one applies the test for difference in medians: the ratio of margin ROS. Privatization probably led to a restructurings of the business portfolio and of the structure of costs, followed by a margin increase. This improvement is not present however in profitability, at least on the selected horizon, which means that the supplement of margin was accompanied by an at least equivalent growth of the invested capital, due to a higher effort of investment, as the rise of the Investment/Sales ratio proves it. The selected horizon is probably too short in order that the dynamic efficiency gains related to privatization, if they exist, had enough time to occur. This interpretation is plausible considering the results of Villalonga (2000, p. 62, table 7), according to which the positive effect does appear for the

[26] The results are as follows for the other indicators: 11 times out of 19, including 5 significant cases, if the indicator is Net Income on Ordinary Activities/Equity; 12 times out of 19, including 3 significant cases, if the indicator is the ROE; 13 times out of 19, including 3 significant cases, if the indicator is the ROS.
[27] The results are as follows for the other indicators: 8 times out of 19, including 4 significant cases, if the indicator is Net Income on Ordinary Activities/Equity; 8 times out of 19, including 2 significant cases, if the indicator is the ROE; 11 times out of 19, including 3 significant cases, if the indicator is the ROS.
[28] Villalonga (2000, p. 60) obtains similar results on her sample of 24 Spanish firms; she obtains only 8 positive and significant results.

Spanish firms, to a significant degree, only seven to eight years after privatization[29]. In a certain way, this result, even if it can imply disputing the conclusions of the majority of the studies relating to privatization, is rather plausible. According to many works in organization theory, the large companies are relatively rigid organizations, with strong inertia; it takes time in order that the new strategic orientations, the modifications of organizational structure or of the corporate governance system, which follow upon a privatization, produce effects.

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

Even if the dynamic effects of privatization are seldom significant, it is still interesting, for better understanding them, to measure the influence of the variables (contextual, organizational and corporate governance, strategic levers) on the dynamic efficiency, by proposing a second model of regression in which it constitutes the dependent variable. The introduction of this variable, measured by the estimates of the coefficients of the variable PT, for each firm, estimated through the model 1, leads to use a model of regression being estimated with the weighted least squares (WLS) method (appendix 2). For each firm, each observation is weighted on all variables by the inverse of the estimated standard error of the dependent variable (Saxonhouse, 1976).

Model 2 is written as follows:

$$VARPERF_i = \alpha + \sum_{k=1}^{K} \beta_k V_{ik} + \varepsilon_i \qquad (2)$$

with

$VARPERF_i$ the value of the coefficient of variable PT estimated from model 1, for firm i.

V_{ik} the value of the K^{th} independent variable for firm i.

β_k the coefficient associated with the K^{th} independent variable.

The first exploratory work resulted in eliminating some contextual variables such as variables Cycle0, Serie1, Industry or CAC, either because they were not significant, or because they involved serious problems of multicolinearity. Let us specify, however, that one could not discover any significant effect of these variables on profitability, except for the

[29] If we apply the test carried out by Villalonga on the French data, we find no significant time effect for years –3 to +3. If this effect occurs, it does after year +3.

variable related to the public deficit. After having eliminated the main problems due to multicolinearity, we obtained the following model that confirms the dependence of the dynamic efficiency on some of the suggested variables[30].

Table 5 – An explanatory model of the dynamic efficiency (EBIT/(Equity + Financial Debt)

Observations	F(5,13)	R^2 Adjusted R^2, note 31
19	5.865 p < 0.0047 ***	0.693 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 10 % level.
** Indicates significance at the 5 % level.
*** Indicates significance at the 1 % level.

The privatized firms, when the public deficit was significant, seem to have met more difficulties recovering their profitability. A first explanation would be to claim, considering the rather strong negative correlation between this indicator and the growth rate of the GDP, that this inferior efficiency is explained by the time positioning of privatization inside the cycle. However this explanation cannot be kept because the measure of the dynamic efficiency was based on a regression for which the effects of the cycle had been eliminated. A possible explanation can be possibly found by supposing a less significant contribution of the State as shareholder during these times.

If the initial level of performance (Perf0) does not appear in the regression, it should be specified that it exerts, considered separately, a significant and negative effect on the dynamic efficiency. In accordance with the intuition, the more the initial level of performance is high, the more the firm has difficulties in improving its performance.

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[30] The highest coefficient of correlation between the variables present in the model is –0.42 between Issequity and Foreign0. The coefficients of tolerance are rather different of 0 and the *sweep* matrix does not reveal serious problems of multicolinearity. The *Ridge* regression (with lambda coefficients of 0.001 and 0.005) does not appreciably modify the results obtained. In addition, a study based on the Cook statistic did not identify outliers, according to the usual standards. These tests also carried out for the model of regression using the ROE as dependent variable did not give different results.

[31] The R^2 indicated are those calculated by the Statistica software, which applies a correction to the R^2 resulting directly from the WLS method, this one leading to inflate the coefficient. Villalonga (table 6, note i) recommends another method to rectify the R^2. This latter consists in obtaining them from regressing the untransformed dependent variable on the values predicted by a regression model based on the coefficients of

The increase in profitability, after privatization, seems to depend to a significant degree on the percentages of equity held by the principal shareholder and the foreign shareholders. If, according to the theory of corporate governance, these results are standard, since they are *a priori* based on the positive effects of the discipline exerted by a concentrated shareholding or a foreign shareholding, the fact that the principal shareholder often remains the State – what corroborates the result found by Souza et al. (2000) according to which this presence leads to a more significant growth in performance after privatization[32] – refutes the assumption of the systematically harmful influence of the State as a shareholder on the performance. Privatizations that would be accompanied by a progressive disengagement of the State would have a better potential of recovery. The favorable influence of the foreign shareholding can possibly be due to the constraints of governance traditionally related to internationalization (adoption of the international standards of corporate governance).

Once privatized, the firms are supposed to have a higher strategic latitude enabling them to be more competitive. Among the levers of efficiency appear, in particular, increased possibilities to solicit the stock market, while launching new equity issues and to expand the activity abroad. The Issequity variable, which accounts for the importance of the new equity issues compared to total equity, has a favorable influence on the evolution of the profitability, probably in connection with the flexibility brought by this type of financing.

On the other hand, the coefficient of the Difinter variable, 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 international growth possibility is supposed being a factor of competitiveness – can receive several explanations. On the one hand, it is possible that this result is associated with the significant effort of investment often necessary to this growth. In this case, the negative sign would be only provisional – the horizon considered is only three years after privatization – and would come from the inertia of the investment to generate cash flow. On the other hand, a strong international development can mean that the market of the firm is global and very competitive. This intensity of competition would imply a lower profitability.

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regression resulting from the weighted regression and on the untransformed independent variables. With this method of estimation, the R^2 would be 0.340 and the adjusted R^2 0.301.

[32] D' Souza et al. (2000, p. 20 and table 11) find that 1 % of additional state ownership led to an increase in the profitability of 1,62 %. Verbrugge et al. (1999, p. 31) also find that the performance, in the banking sector, improves even if the State keeps a significant shareholdings after privatization. Conversely, Ehrlich et al. (1994) show that a gain of productivity appears only if privatization is complete in the air transport sector.

The fact that many variables, supposed to influence the dynamic efficiency, do not appear in the model, does not mean that they are not economically relevant. Because of the economic and financial connections linking certain variables, there are overlapping and correlation effects, which lead to exclude some variables of the regression model[33]. Thus, the correlation coefficient between the variable representing the dividend policy (Vardiv) is 0.70 and the Share1 variable and –0.51 with the Foreign0 variable; the structure of the shareholding strongly seems to condition this policy.

In order to appreciate the robustness of the results, the same analysis was applied to the ROE. Table 6 provides the results obtained for this second indicator, after also eliminating the variables generating a too strong multicolinearity.

Table 6: An explanatory model of the dynamic efficiency (ROE) [34]

Observations	F(4,14)	R^2 Adjusted R^2 [35]
19	7.28 p < 0.0022 ***	0.675 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.

The variables are identical[36] with those that appear in the preceding model (except for the Issequity variable). If the signs are the same, the coefficients are higher what indicates than the ROE reacts more in dynamics, to the variations of the selected variables.

Conclusion

[33] However, the evaluation of Spearman rank correlations on the variables considered to be economically relevant did not reveal significant correlations except for a significant (with a 10% significance level) positive correlation (0.437) between the indicator of dynamic efficiency and Share1 after privatization.

[34] The results are similar with the ROE (R^2 0.717; adjusted R^2 0.636; Constant 0.349 (1,58); Foreign0 0.314 (3.534); Share1 0.0035 (4.12), Difinter –0.393 (-2.834); ExpGDP0 – 0.020 (-2.158))

[35] The R^2 recomputed to eliminate the incidence of WLS are as follows: R^2 0.474; adjusted R^2 0443 (see note 31).

[36] Let us specify that for this indicator of performance, the privatized firms of Serie 1 have a dynamic efficiency significantly weaker (the coefficient of the Serie1 variable has a negative sign), which would confirm the presumption according to which the most profitable companies were privatized in first.

At the end of these developments, can we conclude that privatization made it possible to improve the performance of the French firms? At first view, the superficial examination of the principal indicators, based on means and medians, reveals substantial evolutions. The privatized companies saw, on average, their economic and financial profitability, their ROS and their productivity increasing. Furthermore, they made significant efforts of investment and their financing policy was directed towards more internal financing and a reduction of the debt. If the number of employees can be regarded as stable on average, the share of the international activity increased. Lastly, the shareholders received a higher share of the result. A thorough and more critical examination of these results shows, however, than the majority of these evolutions *are not significant* in particular in terms of profitability and than moreover, some of them occurred before privatization.

The ambiguity of these results was strengthened by the results obtained from the study of the static and dynamic effects of privatization for each firm. Privatization had a favorable effect on the performance only for one very weak minority of the privatized firms. Most often, the effect is not significant and if it is, it results as much in concluding that privatization involves a loss of efficiency that the reverse. The results obtained for the various explanatory models of the dynamic efficiency confirm, at least partly, the assumptions advanced to try to understand the process of privatization. It seems in particular that the structure of ownership (the percentage owned by the principal shareholder, or by the foreign shareholders), and modifications of the strategy allowed by privatization affect the evolution of profitability. These results are however to take cautiously because of the low size of the sample and the residual multicolinearity that can affect them.

Do these results, very unclear, lead to dispute the theoretical foundations of the various programs of privatizations undertaken on the international level, and more specifically the French one and, consequently, to reject the traditional justifications of privatizations, based, in particular, on the corporate governance theory? We do not think it.

Even if it is more difficult to improve the performance of the firms privatized in the developed countries where public management, even if it knew certain failures, could be described as relatively efficient, as testifies the ambiguous performance of the French SOE, it is probable, than it is not so much the relevance of the programs of privatization and the theories which justify them which must be suspected, that the instruments used to measure their effects. It is hardly questionable that it is necessary, in a global competitive environment, to give the firms the strategic possibilities available to their foreign competitors and this necessity was recognized by the majority of the managers of the French SOE before

privatization. It is also hardly questionable, considering the crises with which were confronted certain SOE that the public system of governance knows, probably, more dysfunctions because of the interferences with the political sphere and of the character often not very elaborate and confused of the monitoring which it allows, as illustrated in France, through the example of the Crédit Lyonnais (Charreaux, 1997).

The ambiguity of the results thus seems to come from the methods employed to measure the effect of privatization on the performance. It seems, in particular, that the traditional quantitative studies have difficulties measuring this effect. In addition to the problems of relevance and reliability of the measures of performance, these studies are confronted with multiple difficulties related to the complexity of the process of privatization, with its temporal dimension which often exceeds the horizons retained and with its contingency to the economic, political or legal context, even with the even public statute – the public character being more or less pronounced – of the SOE before privatization. The overlap of the variables, the probable existence of threshold effects or more generally of non linear phenomena, even if some methods may correct for or take into account these effects, result in granting only one limited confidence to the results of the traditional econometric studies.

According to these criticisms, it seems that in order to test the theories of privatization and to better understand the effects of this operation on the performance, it is necessary, at least in a complementary way, to turn to qualitative clinical studies that seem better suited to analyze the variations of the processes conditioning the performance building. Such studies, of current use in certain fields of the organization theory, can probably make it possible to better evaluate the incidence of the contextual effects and to better understand how the modifications of the corporate governance systems and the adaptations of organizational architecture associated with privatization allow to improve the performance.

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Appendix 1: List of privatized companies included in the sample and of their principal characteristics

	Privatization Date	Issue Size (in millions FRF)	State Shareholdings Before Privatization (%)	State Shareholdings After Privatization (%)
Saint-Gobain	November 1986	13 500	100	0
Paribas	January 1987	17 500	100	0
Sogenal	March 1987	1 500	100	0
Compagnie Générale d'Électricité	May 1987	11 560	100	0
Crédit Commercial de France	April 1987	4 400	100	0
Havas	May 1987	2 410	100	0
Société Générale	June 1987	21 500	100	0
TF1	June 1987	1 240	100	0
Suez	October 1987	15 641	100	0
Crédit Local de France	June 1993	2 040	51	20
Total Sa	July 1992	5 400	34	15
Rhône-Poulenc	November 1993	564	43	0
Banque Nationale de Paris	October 1993	4 920	100	40
Elf	February 1994	40 500	51	13
Renault	November 1994	14 000	80	50
Seita	February 1995	6 500	100	13
Usinor	July 1995	23 500	100	8
Péchiney	December 1995	8 000	100	44
AGF	May 1996	10 000	100	0

Appendix 2: Econometric aspects

Method of estimation of model 1 SUR (*Seemingly Unrelated Regressions*)

The form of the model 1 is:

$$PERF_{it} = \alpha_i + \beta_{1i} * T_{it} + \beta_{2i} * P_{it} + \beta_{3i} * TP_{it} + \beta_4 * taille_{it} + \beta_5 * cycle_{it} + \varepsilon_{it} \qquad (1)$$

This construction of the model (1) makes it possible to obtain a single coefficient for the size effect (γ_1), and for the cycle effect (γ_2) whatever the firm. We supposed that the effects associated with the size and the business cycle are identical for all the firms. A contrario, the effects T, P and TP are specific to each firm and β_k ($k = 1,...,19$) is the vector of coefficients specific to the firm K. This construction allows to represent the panel data structure. Such a representation leads to correct for the heteroscedasticity appearing in the structure of the covariance matrix. In this case, the estimators of the coefficients of the explanatory variables are obtained by means of the fixed effects model that provides a specific intercept and a coefficients vector for each firm. We then used the SUR[37] (*Seemingly Unrelated Regression)* method suggested by Zellner (1962), which consists in calculating double least squares estimators. According to this method, one initially estimates the model (model 1) by Ordinary Least Squares. The OLS residual vector is then calculated. It is of the following form:

$$E = \begin{bmatrix} \varepsilon_1 \\ ... \\ \varepsilon_{19} \end{bmatrix} \text{ where } \varepsilon_i = \begin{bmatrix} \varepsilon_{i,1} \\ ... \\ \varepsilon_{i,7} \end{bmatrix} (i = 1..., 19)$$

The covariance matrix is then built in the following way:

The diagonal elements are of the form: $s_{ii} = \frac{\varepsilon'_i \varepsilon_i}{n - k_i}$

The non-diagonal elements are of the form: $s_{ij} = \frac{\varepsilon'_i \varepsilon_j}{\sqrt{(n - k_i)}\sqrt{(n - k_j)}}$

[37] Relying on the SUR method is justified in the presence of a particular structure of errors. It is simultaneously necessary that there is, on the one hand, no autocorrelation and, on the other hand, presence of heteroscedasticity (see Maddala, 1977, p. 331). The sample size does not allow to make a significant test of autocorrelation and heteroscedasticity. As Villalonga (p. 58, note 18), it is however possible to claim that the absence of autocorrelation can be explained through the introduction of the cycle as a common variable of control. In the same way, one can also regard the assumption of heteroscedasticity 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 respect to 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 inobservable factor due to privatization will affect the various firms in a related way.

The GLS (*Generalized Least Squares*) estimator can then be calculated with the assistance, inter alia, of the estimated covariance matrix. It is possible, moreover, to correct the diagonal elements for heteroscedasticity by using an additional weighting.

Method of estimation of model 2 WLS (Weighted Least Squares)

Model 2 is of the form:

$$VARPERF_i = \alpha + \sum_{k=1}^{K} \beta_k V_{ik} + \varepsilon_i \qquad (2)$$

The matrix representation of this model is traditional and does not present any particular difficulty. The problem, here, lies in the fact that the values of the dependent variable come from the estimators of the coefficients in model 1. The inaccuracy of this measure – the accuracy varying according to observations – requires a correction that is carried out by Weighted Least Squares (Saxonhouse, 1976).

The WLS method can be implemented in two different ways:

(1) The division of all the variables (dependent and explanatory), as well as the intercept, associated with the same observation (firm) i by the estimated standard deviation of the residuals corresponding to this firm in model 1.

(2) The weighting of the diagonal elements of the covariance matrix by the estimated variance of the corresponding residuals. The i^{th} element of the diagonal is equal to the variance of the residuals of the i^{th} firm in model 1.

Appendix 3: 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 serie of privatization	Serie1
The ratio public expenditures / GDP the year of privatization	ExpGDP0
The amount of the public expenditures the year of privatization	Exppub 0
The nature of the industry: industry - medias versus insurance - banks	Industry

- **organizational and governance characteristics of the company**

The initial performance of the company (EBIT/(Equity + Financial Debt)	Perf0
Capital intensive intensity at the time of privatization (Total Assets / Number of Employees)	Capint0
The organizational complexity measured by:	
- the initial number of employees	EmplNum0
- the degree of internationalization	Interna0
The State shareholdings of the State 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
Included 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		Issequity
Compared to the investment		Issinv
The importance of external growth (Financial Fixed Assets / Total Fixed Assets)		
In absolute variation	Varffa (Ffa3 - Ffa0)	