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Using IFRS to understand the impact of the privatization on the firm's performance: evidence from Europe

Abstract

The aim of this paper is to assess the impact of privatization on the performance of privatized firms. The sample included 56 European firms over the period of 1996-2005. The methodology involved (1) comparing the ratios of privatized firms three years before and after privatization (Megginson et al., 1994) and (2) comparing the ratios of privatized firms with a sample of similar private firms three years before and after privatization (Albouy & Obeid, 2007). The ratios used in the study were consistent with the International Financial Reporting Standards. The results indicate that privatization had a positive impact on the ratios, although the effect was not statistically significant.

Keywords: European privatization, financial performance, IFRS.
JEL Classification: G39, L33, O52.

Introduction

State intervention in the economy has been supported by a number of economic theories, including those developed by Pareto and Walras. However, state intervention in corporate management has been contested by agency theory and property rights theory.

Pareto (1848-1923), Walras (1834-1910), Marx (1818-1883) and Keynes (1883-1946) argued that it was important and necessary for the state to intervene in the economy in order to regulate the failures and imperfections of the 'invisible hand of the market'. By contrast, Shleifer and Vishny (1997) and Vickers and Yarrow (1988) argued that state intervention in public firms results in excessive staff numbers, poor product choices, a lack of investment and poor management incentive plans.

Research on the comparative efficiency of public and private firms has required empirical studies in order to test competing hypotheses. Megginson et al. (1994) developed a widely recognized method aimed at assessing changes in firm performance before and after privatization. Synchronic methods have also been developed to measure the performance of firms with different (i.e. public or private) ownership structures operating on the same market, in the same environment and at the same time.

Based on a global sample of 61 firms in 32 industries over the period of 1961-1990, Megginson et al. (1994) showed that privatization resulted in increased profitability and lower debt levels. Other studies have produced different results. For example, a study by Harper (2001) based on an analysis of 178 Czech companies found that profitability declined immediately after privatization.

In their landmark study 'From state to market', Megginson and Netter (2001) presented a review of the literature in this area. More recently, Bozec (2004) reviewed 89 empirical studies in the field. 56 studies suggested that private firms were more efficient than public firms, while 11 studies found that public firms were more efficient than private firms. 5 studies yielded ambiguous results. Charreaux (1997) questioned whether public firms are 'necessarily less efficient'.

Most empirical studies have highlighted the greater efficiency of private firms compared to public firms. However, the results are too inconsistent to draw any definitive conclusions. The conflicting results of research in this area cannot be ignored.

The contribution of all economic factors to firm performance may appear to undermine attempts to measure changes in firm performance by comparing performance three years before and after privatization. The method used by Albouy and Obeid (2007) on the French market helps to eliminate the effects of these factors. The method involves comparing the performance of public and private firms three years before and after privatization. The differences in the accounting systems used in different countries undermine the results of comparative analyses – hence there is the importance of homogenizing the financial ratios to be compared by using the International Financial Reporting Standards (IFRS).

The aim of this paper is to assess the impact on performance of changes in the ownership and control of European firms. The method used is similar to the approach used by Megginson et al. (1994). The paper compares different financial ratios constructed based on IFRS financial statements. A comparison of the financial performance of public and private firms was also carried out three years before and after privatization.

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The rest of the paper is organized as follows. Section 1 provides an empirical literature review, while Section 2 presents data and methodology. Section 3 provides the results and the final section concludes.

1. Empirical literature review

Megginson & Netter (2001) provided a review of empirical studies on the relationship between privatization and firm performance around the world. Their review highlighted two main types of studies. Some studies are based on a historical approach, while others involve a synchronic approach. Historical studies aim to assess changes in firm performance before and after privatization. Examples of historical studies include Megginson et al. (1994), Boubakri et al. (2005), D'Souza et al. (2005) and Gupta (2005).

By contrast, synchronic tests aim to measure the performance of firms with different ownership structures (i.e. public or private) operating on the same market, in the same environment and at the same time. The purpose of synchronic studies is not to assess the impact of environmental factors on firm performance. However, endogeneity bias may arise when elements of the privatization variable (ownership structure, economic environment, method of privatization) are correlated with other exogenous variables affecting the endogenous variable (performance).

Megginson et al. (1994) conducted a comparative analysis of the performance of (partially or entirely) privatized firms. The sample included 18 countries (12 industrialized countries and 6 developing countries). The results showed that after privatization, firms were more profitable and increased their production, their investment spending and their operational efficiency. The study also found that the firms had lower debt levels and that dividend payments increased. There was no evidence of a decline of employment after privatization. The results also highlighted significant changes in the size and composition of the board of directors.

D'Souza and Megginson (1999) replicated the results using a sample of 85 firms from 28 different countries, including 58 firms in 15 developed countries. The firms included in the sample were privatized between 1990 and 1996. The findings confirmed the results of the previous study, but also showed that employment declined after privatization.

Boubakri et al. (2005) assessed the effects of privatization in a study examining privatization in emerging countries. The results showed that privatization had a positive impact on a sample of firms privatized between 1980 and 1997 in Africa, Latin America, Asia and Eastern Europe. The study also showed that performance after privatization may depend on several factors, including the involvement of foreign shareholders. The results indicate that the level of development is an important factor in the success of privatization, especially in terms of efficiency and profitability. The improvement of performance was found to be more significant in countries with higher average income than in countries with lower average income.

The results also showed that firms operating in competitive environments were more efficient than firms operating in a non-competitive environment. The analysis suggested that the composition of the board of directors changed significantly after privatization and that performance improvement was proportional to the scale of the changes.

D'Souza et al. (2005) found that the performance of privatized firms in OECD countries improved significantly in terms of profitability, efficiency, output and investment spending. The study found that the type of shareholder, the level of economic freedom and the level of development of the financial market had a significant impact on post-privatization performance.

The theory developed by Vickers and Yarrow (1991) was confirmed by the results of the empirical study by Shirley and Walsh (2001) since privatization was found to have a positive impact in competitive markets.

Other studies have not confirmed the results predicted by the proponents of privatization. To avoid listing all studies in the field, reference will only be made to a study by Harper (2001) based on a sample of 178 Czech firms. Using methods developed in previous studies, Harper (2001) found that efficiency and profitability decreased immediately after privatization. Parker and Wu (1997) assessed the impact of the privatization of British Steel on firm performance. Performance was assessed based on the return on assets, the productivity of the labor force and multifactor productivity. The authors found that the status of the firm was not a determinant of performance.

Another method for assessing the impact of ownership structure involves comparing the performance of public and private firms based on multiple indicators. Several studies have been carried out using this method. Caves and Christensen (1980) compared the productivity of two competing Canadian railway companies (Canadian National, a public firm, and Canadian Pacific, a private firm) over the period of 1956-1975. The two firms operated on the same market, were of similar sizes, and were subject to

the same competition over the studied period. Using the productivity factor (real output per unit of input) as a measure of technical efficiency, the study found no evidence that the public firm (CN) was less efficient than the private firm (CP). The results are not consistent with the predictions of the literature on property rights. The authors concluded that market competition (and not property) is the main explanatory factor of performance and efficiency. The study by Bishop and Kay (1989) yielded similar results.

Boardman and Vining (1989) reached very different conclusions in a study comparing the 500 largest companies (whether public, private or mixed) of the mining and manufacturing industry outside the United States in 1983. The authors found that public and mixed companies were less profitable and less efficient than private companies. The study also found that mixed companies were less efficient than public companies. The authors concluded that there are differences of performance between private companies even in competitive markets. Taskin and Zaim (1997) and LaPorta and López-De-Silanes (1999) reached similar conclusions. However, taken together, the reviewed studies[1] yielded ambiguous results.

Bozec (2004) reviewed 89 empirical studies. Of these, 56 (63%) found that private firms were more efficient than public firms. By contrast, 11 studies (12%) found that public firms were more efficient than private firms, while 17 studies (19%) found no significant difference. 5 studies (6%) yielded mixed results.

The economic efficiency of privatization was the focus of studies by Villalonga (2000) and Alexandre and Charreaux (2004) on Spanish and French privatization programs. Alexandre (2005) found that efficiency depends on several factors, including environmental variables such as the economic environment at the time of privatization, the desire of some governments to remain in control of privatized firms and the organizational characteristics of firms before and after privatization. The study found that a transfer to private ownership provides greater financial and strategic flexibility.

Charreaux (1997) considered whether a public firm is 'necessarily less efficient'. Although most empirical studies have shown that private firms are more efficient than private firms, the results are too ambiguous to draw any definitive conclusions. The conflicting results of research in this area highlight the significance of this unprecedented empirical study of European privatized firms.

2. Data and methodology

2.1. Data. The sample potentially included all European firms privatized over the period of 1996-2005, but also incorporated private firms for comparative purposes (i.e. the same period of observation, the same sector, similar revenue, and similar staff numbers). The financial data are from two sources: Infinancials and Thomson ONE Banker. When necessary, the data were corrected to be consistent with the IFRS.

There were almost 200 privatizations in Europe between 1996 and 2005 (figure reduced to 56 – see Table 1). This reduction is explained by the fusion/acquisition operations of several firms during the transfer to private ownership or by a lack of data, particularly in the case of firms that had been privatized for some time. Since research on the performance of banks and financial institutions differs from the study of industrial and commercial firms, the banking and financial sector was not examined. The final sample included 112 industrial and commercial firms, including 56 privatized firms and 56 private firms.

Table 1. Descriptive statistics of the sample by country, sector and year

Country	N	Volume	%	Sector	N	Volume	%	Year	N	Volume	%
France	13	34329.28	42.61%	Electricity	9	21863.01	27.14%	2005	8	21451.58	26.63%
Italy	10	19266.33	23.92%	Telecomm.	9	15661.34	19.44%	2004	17	30136.64	37.41%
Germany	8	10740.31	13.33%	Transport	7	13041.06	16.19%	2003	4	2279.69	2.83%
Finland	5	2845.90	3.53%	Aerospace	5	4305.11	5.34%	2002	7	11188.23	13.89%
Spain	5	2301.12	2.86%	Gas distribution	3	5128.41	6.37%	2001	2	3466.56	4.30%
Greece	4	3506.91	4.35%					2000	5	5489.73	6.81%
Austria	4	2060.39	2.56%	Petrol gas	3	4577.13	5.68%	1999	2	633.80	0.79%
Netherlands	3	4534.35	5.63%	Service distribution	2	3805.52	4.72%	1998	4	1065.70	1.32%
Belgium	1	684.60	0.85%					1997	4	4033.40	5.01%
UK	1	117.80	0.15%	Other	18	12179.29	15.12%	1996	3	815.54	1.01%
Denmark	1	98.60	0.12%	Total	56	80560.87	100%	Total	56	80560.87	100%
Ireland	1	75.28	0.09%								
Total	56	80560.87	100%								

[1] The following studies are also relevant: Kim (1981), Borkholder, Friesen and Yoder (1991), Pollitt (1995), and Eckel, Eckel and Singal (1997).

2.2. Methodology. The method is based on the approach used by Megginson et al. (1994), which involved comparing the ratios of privatized firms three years before and after privatization. The ratio method is useful for eliminating the impact of firm size (Lev, 1969; and Whittington, 1980).

First, the performance indicators of privatized firms three years before and after privatization were compared. Second, the environmental factor was taken in to account. Since privatization is not the only factor affecting the performance of privatized firms, and in order to mitigate the issues outlined above (especially those relating to the impact of the economic environment on firm performance), the paper will compare the performance of privatized firms with a sample of private firms three years before and after privatization. Since the chosen date is the date of privatization, the increase or decrease of performance can only be explained by privatization since the two samples were subject to the same market conditions.

The originality of the study is that it uses the IFRS as the unique framework of accounting standards. The IFRS can be used to homogenize the data produced by European firms and to conduct objective analyses and comparisons.

Although the theoretical approach generally posits that the public sector outperforms the private sector, there is no clear empirical evidence to support this hypothesis. Some studies have provided evidence to support the hypothesis, while others have not.

The hypothesis involves determining whether privatization improves the financial performance of firms, where performance is measured using several indicators chosen from the literature.

2.2.1. Profitability ratios. The following ratios were used:

1. *OM* – Operating margin: Operating result/ Revenue.
2. *NOM* – Net operating margin: Net income/ Revenue.
3. *ROA* – Return on assets: Net income/Total assets.
4. *ROE* – Return on equity: Net income/Total equity.

The hypothesis is that the ratios increase after privatization, for several reasons. First, the new shareholders will seek to increase their profits and the new managers will need to meet this objective (Yarrow, 1986). Second, since privatization involves a transfer of control rights to private shareholders, the managers will need to focus on the income statement of the firm rather than seeking to comply with government guidelines aimed, among other things, at protecting jobs or (more generally) at meeting government objectives (Boyko et al., 1996), as opposed to seeking profitability.

Megginson et al. (1994), LaPorta and López-De-Silanes (1999), Boubakri and Cosset (1998), and Gupta (2005) provided evidence to suggest that privatization improves profitability (based on an analysis before and after privatization). Andrews and Dowling (1998), Makhija and Spiro (2000), Earle and Telegdy (2002), and Fong and Lam (2004) provided evidence showing that privatization improves profitability, while Frydman et al. (1999) and Gupta (2005) found that privatization stimulates labor productivity.

2.2.2. Debt ratios. The following ratios were used:

1. *ODB* – Overall debt ratio: Current and non-current liabilities/Total equity.
2. *LDB* – Long-term debt ratio: Total equity/Non-current liabilities.
3. *ICR* – Interest coverage ratio: Cost of net financial debt/Revenue.

The assumption is that privatization results in a decrease of debt since the government no longer guarantees the loans of privatized firms. The effect is that the cost of loans increases. Firms also have access to new funding sources such as shares and convertible bonds (Megginson et al., 1994).

2.2.3. Financial structure ratios. The following ratios were used:

1. *AST* – Financial assets structure: Non-current assets/ Total assets.
2. *CAC* – Current assets coverage ratio: Working capital/Current assets.
3. *RCR* – Sales and Revenues coverage ratio in days: 360 × Working capital/Revenue.
4. *TAT* – Total assets turnover: Revenue/Total assets.

Once a company has been privatized, new shareholders (i.e. shareholders other than the state) acquire a significant share of the company (over 50%). The state is no longer liable for the debts of the company and the firm is required to set up a balanced financial structure to access the financial resources required for its development.

2.2.4. Liquidity ratios. The following ratios were used:

1. *TCR* – Total current ratio: Current assets/ Current liabilities.
2. *QR* – Quick ratio: Current assets except inventories/Current liabilities.
3. *WCD* – Working capital requirements in days of sales: 360 × (Inventories on sales and revenues + receivables on sales and revenues – payables on sales and revenues)/Revenues.

Liquidity can be defined as the capacity of the company to meet its short-term financial obligations. Continued solvency is a permanent requirement for companies.

As the owner of a public firm, the state is liable for the company's debts to creditors, who therefore have an added guarantee. As such, a public firm has more current liabilities than a private firm. This key difference in the structure of the balance sheet is explained by the greater liquidity of private firms compared to public firms and by the positive effects of privatization on liquidity.

3. Results

Two methods have been used to measure changes in the financial performance of privatized public firms.

The first method involves determining whether there is a statistical difference between the ratios of privatized public firms three years before and after privatization. This approach is based on the method developed by Megginson et al. (1994), also used by Boubakri and Cosset (1998).

The second method is based on the approach developed by Albouy and Obeid (2007) to compare the performance of public and private firms three years before and after privatization. The aim of this method is to avoid the effects of environmental factors on the results.

It is important to note that the first approach uses paired or dependent samples (i.e. data relating to the same firms). There are two possible scenarios: either the data follow a normal distribution, or they do not. If they do, the test is parametric; if they do not, the test is non-parametric. Even when the conditions of application of the parametric test are met, the advantage of parametric tests over non-parametric tests remains limited. If the variable is Gaussian, the relative effectiveness of the Mann-Whitney-Wilcoxon test compared to the Student's *t*-test is $3/\pi \approx 95\%$[1], which is highly convincing.

There are two types of non-parametric tests. Both tests can be used irrespective of whether the sample is large or small: the Mann and Whitney U test and the Wilcoxon W test[2]. A recent trend involves combining them by referring to the Mann-Whitney-Wilcoxon test.

The null hypothesis H_0 is a hypothesis of no difference (i.e. no significant difference between the financial ratios of firms in the $a - 3$ and $a + 3$ samples, i.e. three years before and after privatization). The aim is to reject the null hypothesis.

According to Gujarati (2004), the *p*-value is the lowest significant level at which the null hypothesis can be rejected. If the *p*-value is higher than α, H_0 is not rejected. The study was based on a large sample and/or benchmark ($n > 30$). Therefore, if the Wilcoxon statistic is below 1.96 or if the *p*-value is higher than 5%, H_0 is not rejected, indicating that there is no clear evidence to suggest that H_0 is invalid. By contrast, if *W* is above 1.96 or if the p-value is below 5%, the alternative hypothesis H_1 is validated, where H_1 posits that there is a significant difference in a ratio before and after privatization.

Table 2 compares the performance ratios of privatized firms three years before and after privatization. The percentage differences of the mean and median profitability ratios increased (except for *the average ROE*). Similar results were obtained for the liquidity ratios.

The results should have been consistent with the theoretical hypothesis and with 56% of the results of empirical studies. However, the results indicate that the increase was not statistically significant in terms of the Wilcoxon W.

Table 2. Public firms three years before privatization ($a - 3$) and three years after privatization ($a + 3$)

Ratios	Average before	Average after	% change	Median before	Median after	% change	Wilcoxon test	*p*-value
A. Profitability								
OM	10.4%	13.4%	28.4%	9.0%	9.8%	7.9%	0.829	40.7%
NOM	3.3%	7.5%	127.8%	4.2%	6.4%	51.9%	1.772	7.6%
ROA	2.4%	4.4%	83.0%	2.4%	4.0%	65.2%	1.597	11.0%
ROE	85.7%	14.7%	-82.9%	10.4%	12.5%	20.2%	1.510	13.1%
B. Leverage								
ODB	101.5	5.1	-95.0%	3.1	2.9	-5.5%	0.602	54.7%
LDB	143.9%	129.6%	-9.9%	79.8%	78.8%	-1.4%	0.387	69.9%
ICR	-4.1%	-3.0%	-26.8%	-2.3%	-2.1%	-10.1%	0.562	57.4%

[1] http://www.jerrydallal.com/LHSP/npar/htm.

[2] The relationship between the two tests is given by the following relationship: $U = [n_1 \times (n_1 + 2\,n_2 + 1)/2] - W$, where n_1 is the number of individuals in the first sample and n_2 is the number of individuals in the second sample.

Table 2 (cont.). Public firms three years before privatization (a – 3) and three years after privatization (a + 3)

Ratios	Average before	Average after	% change	Median before	Median after	% change	Wilcoxon test	*p*-value
C. Capital structure								
CAC	-46.2%	162.5%	-452.0%	-0.6%	5.8%	-1020.3%	1.033	30.2%
RCR	-12.7	29.7	-333.8%	0.6	7.9	1138.1%	0.695	48.7%
AST	65.7%	64.1%	-2.4%	73.0%	69.1%	-5.3%	0.323	74.7%
TAT	0.76	0.77	1.9%	0.63	0.60	-5.4%	0.102	91.9%
D. Liquidity								
TCR	109.2%	114.6%	5.0%	99.4%	103.7%	4.3%	0.364	71.6%
QR	91.2%	93.6%	2.7%	80.9%	85.7%	6.0%	0.032	97.5%
WCD	14.3	43.4	202.7%	4.7	14.8	211.6%	0.015	98.8%

Note: The size effect or % change is given by: $(Ratio_{after} - Ratio_{before})/ Ratio_{before}$.

Consistent with 19% of the results of previous empirical studies that found no evidence of an impact of privatization on firm performance, the statistical tests showed no significant increase of the profitability and liquidity ratios of privatized firms. There was also no evidence to suggest that the median performance ratios declined after privatization.

The state guarantees the debts of public firms. Public firms are assumed to be far more heavily indebted before privatization than after privatization. The results showed a significant decrease of the average and median debt ratios. However, since the Wilcoxon statistic is below 1.96, H_0 cannot be rejected (where H_0 posits that the debt ratios remain unchanged before and after privatization).

If the study had presented the paired samples 3 years (a – 3) before and during privatization (a_0) and then during (a_0) and three years after privatization (a + 3), the results would remain unchanged. The Wilcoxon statistic is below 1.96 for most of the ratios, except for *TCR* for comparisons (a – 3, a_0) and (a_0, a + 3) and *CAC*, *RCR*, and *QR* for comparison (a – 3, a_0). Therefore, hypothesis H_1 (positing an increase of 5 median ratios out of a total of 25) is validated.

To increase the robustness of the results, the ratios of public firms were compared to the ratios of private firms based on the IFRS, while the ratios of formerly public firms were compared to the benchmark of private firms. Since the two groups of firms were observed over the same period, the impact of market conditions and the economic environment is neutralized. Therefore, privatization should be the only factor determining differences in the improvement of financial performance.

The two samples were independent (not paired) since they were based on data from different companies. Tables 3 and 4 compare the two categories of firms three years before and after privatization.

Overall, the ratios of public firms three years before privatization were lower than the ratios of private firms, except for *QR* and operating profitability. However, for the second time, since the Wilcoxon statistic was below 1.96 or the *p*-value was higher than 5%, hypothesis H_0 cannot be rejected for all the ratios (H_0 posits that the difference between the financial performance of the two groups is not significant).

The median values shown in Table 3 indicate that public firms three years before privatization were less efficient than private firms in the majority of cases. However, this difference is only statistically significant for 4 ratios. One of these ratios (*LDB*) is not consistent with the theoretical hypothesis. A significant statistic for a profitability ratio (*ROA*) was also found.

Table 3. Public firms three years before privatization (a – 3) and private firms three years before privatization (b – 3)

Ratios	Average public	Average private	% change average	Median public	Median private	% change median	Wilcoxon test	*p*-value
A. Profitability								
OM	10.4%	9.2%	-11.8%	9.0%	8.0%	-11.3%	0.166	86.8%
NOM	3.3%	2.0%	-39.7%	4.2%	4.7%	12.1%	0.858	39.1%
ROA	2.4%	2.9%	21.3%	2.4%	4.0%	65.2%	1.987	4.7%
ROE	85.7%	15.3%	-82.1%	10.4%	12.2%	17.1%	1.557	12.0%
B. Leverage								
ODB	101.5	2.8	-97.2%	3.1	2.4	-21.8%	2.703	0.7%
LDB	143.9%	306.9%	113.3%	79.8%	127.9%	60.2%	2.720	0.7%
ICR	-4.1%	-2.5%	-39.5%	-2.3%	-1.5%	-35.1%	1.318	18.8%

Table 3 (cont.). Public firms three years before privatization (a – 3) and private firms three years before privatization (b – 3)

Ratios	Average public	Average private	% change average	Median public	Median private	% change median	Wilcoxon test	*p*-value
C. Capital structure								
AST	-46.2%	31.7%	-168.7%	-0.6%	18.6%	-3035.6%	2.319	2.0%
CAC	-12.7	26.2	-306.4%	0.6	25.5	3900.4%	1.720	8.6%
RCR	65.7%	93.1%	41.8%	73.0%	71.0%	-2.7%	0.189	85.0%
TAT	0.76	1.00	32.1%	0.63	0.70	11.3%	1.074	28.3%
D. Liquidity								
TCR	109.2%	140.3%	28.5%	99.4%	117.4%	18.2%	1.225	22.1%
QR	91.2%	115.5%	26.7%	80.9%	92.0%	13.7%	1.155	24.8%
WCD	14.3	27.4	91.3%	4.7	25.2	432.8%	0.922	35.6%

A more detailed examination of the statistical tests yields different results. Barnett and Lewis (1978) defined discordant observations or outliers as 'statistically unreasonable on the basis of some prescribed probability model'. The idea is to discard cases with extreme values: although trimming the data reduces data asymmetry and results in an improvement of normality (Cochran, 1963), there may be a significant loss of information. Based on the Tukey box plot (see Tukey, 1977), mild outliers are defined as those above $Q_3 + [1.5 \times (Q_3 - Q_1)]$ (upper inner fence) and below $Q_1 - [1.5 \times (Q_3 - Q_1)]$ (lower inner fence), where $(Q_3 - Q_1)$ is the interquartile range and the second quartile (Q_2) is the median. The more extreme outliers are those above $Q_3 + [3 \times (Q_3 - Q_1)]$ and below $Q_1 - [3 \times (Q_3 - Q_1)]$.

In the case of the financial autonomy ratio *ODB*, and after eliminating the outliers, hypothesis H_0 is not rejected (where H_0 posits that there is no significant difference between the median ratios; $n > 30$; $W = 0.431$; p-value = 67%). However, for (b – 3), the normality hypothesis (p-value < 1%) must be rejected. Likewise, for ratio *CAC*, and after eliminating the outliers through the box plot, hypothesis H_0 is not rejected (where H_0 posits that there is no significant difference between the median ratios; $n > 30$; $W = 0.513$; p-value = 61%).

For ratio ROA, even after eliminating the outliers, the alternative hypothesis H_1 is validated (where H_1 posits that the asset profitability (or return on assets) ratio of private firms will be higher than the asset profitability (or return on assets) ratio of public firms. However, if threshold α is fixed at 1%, hypothesis H_0 is not rejected (where H_0 posits that there is no significant difference between the median ratios; $n > 30$; $W = 2.44$; p-value > 1%).

The long-term debt ratio (*LDB*) yields similar results. Even after eliminating the outliers, hypothesis H_1 was validated (where H_1 posits that the ratio of the structure of permanent resources was more favorable to private firms than to public firms). However, if threshold α is fixed at 1%, hypothesis H_0 is not rejected (where H_0 posits that there is no significant difference between the median ratios; $n > 30$; $W = 2.11$, p-value = 3%).

The study compared the performance of public and private firms to avoid the impact of environmental factors on performance. Having presented the results of the comparisons three years before privatization in Table 3, the differences between the ratios three years after privatization also need to be examined. The results are shown in Table 4. Overall, the ratios of public firms three years after privatization were lower than the ratios of private firms, except for quick ratio and operating margin. However, since the Wilcoxon statistic was still below 1.96 or the p-value was higher than 5%, hypothesis H_0 (positing that the difference between the financial performance of the two groups of firms is not significant) could not be rejected for all the ratios.

Table 4. Public firms three years after privatization (a + 3) and private firms three years after privatization (b + 3)

Ratios	Average ex-public	Average private	% change	Median ex-public	Median private	% change	Wilcoxon test	*p*-value
A. Profitability								
OM	13.4%	12.7%	-4.9%	9.8%	10.2%	4.2%	0.026	97.9%
NOM	7.5%	7.6%	2.0%	6.4%	5.7%	-10.8%	0.253	80.0%
ROA	4.4%	4.8%	9.7%	4.0%	5.1%	25.4%	1.085	27.8%
ROE	14.7%	17.8%	21.3%	12.5%	14.4%	14.6%	0.789	43.0%
B. Leverage								
ODB	5.1	4.5	-11.9%	2.9	2.9	-2.0%	0.503	61.5%
LDB	129.6%	277.9%	114.5%	78.8%	100.1%	27.0%	1.539	12.4%
ICR	-3.0%	-2.4%	-18.9%	-2.1%	-1.2%	-40.4%	1.039	29.9%

Table 4 (cont.). Public firms three years after privatization (a + 3) and private firms three years after privatization (b + 3)

Ratios	Average ex-public	Average private	% change	Median ex-public	Median private	% change	Wilcoxon test	*p*-value
C. Capital structure								
AST	162.5%	0.1%	-99.9%	5.8%	11.3%	94.6%	0.061	95.1%
CAC	29.7	3.1	-89.6%	7.9	9.0	14.5%	0.119	90.5%
RCR	64.1%	75.6%	18.0%	69.1%	67.6%	-2.3%	0.038	97.0%
TAT	0.77	1.06	37.1%	0.60	0.79	32.8%	1.656	9.8%
D. Liquidity								
TCR	114.6%	114.4%	-0.1%	103.7%	108.4%	4.6%	0.143	88.7%
QR	93.6%	93.5%	-0.2%	85.7%	83.5%	-2.5%	0.108	91.4%
WCD	43.4	14.6	-66.3%	14.8	12.5	-15.1%	0.201	84.1%

Conclusion

The analysis of the economic and financial performance of firms following privatization is a rich and controversial area of research. The value of research in this area is not only theoretical but also empirical, since it involves using econometric techniques and collecting a significant amount of data on firms before and after privatization.

The results of the tests were not consistent with the hypothesis that private ownership is more efficient than public ownership. The findings also differ from the results of previous studies by Megginson, Netter and Chahyadi (1994), Boubakri and Cosset (1998) and Dewenter and Malatesta (2001), who found significant improvements in the ratios, particularly in terms of profitability. In almost all cases, the results showed an improvement of financial performance after privatization. The IFRS financial ratios highlighted the superiority of private ownership over public ownership. However, the Mann-Whitney-Wilcoxon tests provided evidence in support of hypothesis H_0, showing that these results were not significant. Based on the results of this study, there is no evidence to suggest that privatization had a positive impact on the economic and financial performance of the European firms included in the sample. However, the hypothesis that privatization has no impact on the improvement of IFRS financial ratios cannot be rejected.

These results are consistent with the findings of Alexandre and Charreaux (2004), who assessed whether privatization resulted in an improvement of the performance of French firms. The authors concluded that 'privatization only had a positive impact on performance in a very small minority of privatized firms'.

The results are also consistent with the findings of Shirley and Walsh (2001). Their results indicated that there was no definitive evidence to suggest that private ownership is more efficient than public ownership. Therefore, this empirical study confirms the results of previous studies that found no statistically significant results for the privatization of public firms.

The interest of this study is that it is based on a sample of European firms. Although they are subject to different economic and political constraints, European firms operate mainly within the EU single market and are faced with the globalization of trade. The profound and rapid economic changes that have occurred in recent years as a result of globalization limit the possibility of comparative studies. It is impossible to say what might have happened to these firms if they had remained public. Would they have been able to adapt to the new order in quite the same way? Would they have achieved the same performances? These questions remain unanswered.

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