ARE STATE-OWNED FIRMS LESS PROFITABLE THAN NON-STATE-OWNED FIRMS? EUROPEAN EVIDENCE

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Abstract

Prior research suggests that state-owned enterprises (SOE) have lower performance levels than non-state-owned enterprises (NSOE). The main goal of this study is to analyse the impact of State ownership on profitability, using two major measures of performance: Return on Equity and Return on Assets, and a broader sample of about 11,000 firms, from 37 countries, between 2003 and 2011. Our main results suggest that SOE are less profitable than NSOE for both performance measures. This finding remains equal in the crisis periods and for Western and Eastern Europe countries. We also find a negative relationship between State control and SOE´s profitability levels. Additional results indicate that, in general, SOE from Western Europe are more profitable than SOE from Eastern Europe.

Key words: Profitability, State Owned Enterprises, Non-State Owned Enterprises, Crisis.

Introduction

State-owned enterprises (SOE) have contributed significantly to the gross domestic product, employment, and market capitalisation of many OECD countries, and they continue to play an important role in the economies of many countries outside the OECD (OECD, 2005). However, not many studies analyse the reality of this universe of enterprises, specifically, how efficiently they manage their resources and the performance levels that they obtain.

Although there is a general perception that non-state-owned enterprises (NSOE) have a better operational and financial performance than SOE, there is no consensus in the literature on the subject. Some authors, such as Bozec et al. (2002) and Caves & Christensen (1980), state that the performance of SOE is equal to, or slightly higher than the performance of privately-owned enterprises; while others, such as Boardman & Vinning (1989) and Picot & Kaulmann (1989), argue that NSOE have better profitability levels than those owned by the State. There is, however, a growing concern from the part of the governments to raise the level of profitability of their enterprises (Ramamurti, 1987).

The main goal of this study is to analyse and compare the profitability of European state-owned and non-state-owned enterprises. The impact of the recent international financial crisis[1] on the profitability of SOE and NSOE, as well as a comparison between the profitability levels of SOE in Western and Eastern Europe will also be discussed.

This study is motivated by several considerations. Although its subject is actual and of public interest, the majority of the studies that focus on this issue are relatively outdated and not many are centered on the European context, and particularly Western Europe. Moreover, many of the existing studies only concentrate on enterprises from a given country, and not many use an international sample. The aim is, therefore, to make a contribution to a better understanding of the existing differences between the performance levels of SOE and NSOE in Europe.

This study analyses 10,944 enterprises, of which 3,042 are state-owned, and 7,902 are non-state-owned, from 24 different industry sectors, and 37 European countries, over a 9-year period (2003-2011). The descriptive analysis of the sample reveals that, on average, SOE are larger and employ more people than their non-state-owned counterparts.

The main results of this study suggest that SOE are less profitable than NSOE, both in terms of Return on Equity (ROE) and Return on Assets (ROA). On average, the ROE of a SOE is about 3.5% lower, and the ROA is 2.7% lower than those of a NSOE.

The results also suggest that the greater the State control in SOE, the lower the profitability levels achieved.

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[1] By financial crises, we consider both the 2007-2009 global financial crisis and the European sovereign debt crisis.

The study also shows that Western European SOE are more effective in managing their assets than Eastern European SOE, despite the weight that such enterprises continue to have in the economies of Eastern Europe. Regarding NSOE, the inverse is found.

Finally, the study concludes that the profitability difference between SOE and NSOE is also a reality during the financial crisis period and that both types of enterprises lost profitability during that same period.

This paper is divided into 5 parts: Chapter 2 presents a brief literature review and formulates a research hypothesis; Chapter 3 describes the sample and the methodology used in the study; Chapter 4 presents the main results, and; finally, Chapter 5 presents the main conclusions, the main limitations, and future research ideas.

Literature Review

Profitability of SOE vs. NSOE

Studies that analyse and compare the performance of SOE and NSOE can be grouped into two larger groups: a first group, where this study belongs, which compares the performance of SOE and NSOE, namely Boardman & Vining (1989), Reeves & Ryan (1998), Dewenter & Malatesta (2001) and Bozec et al. (2002), and a second group; which compares the performance of SOE before and after privatisation, namely Ng et al. (2008) and Kang & Byung-Yeon (2012).

Although the prevailing idea in the literature is that SOE are less profitable than NSOE, some authors argue that SOE have equal or slightly higher levels of profitability than NSOE (Bozec et al., 2002; Cave & Christensen, 1980).

González-Párano & De Cos (2005) state that it is not easy to find a consensus on this issue in the literature, as there is not only a large geographical divergence in the samples, but also a wide divergence in terms of the methodologies, variables, and timeframes used in the different studies.

Boardman & Vining (1989; 1992) analyse the performance of the enterprises listed in the "International 500" of Fortune magazine, and come to the conclusion that SOE are less profitable than NSOE. The results of these studies also suggest that the profitability of SOE varies according to the industry sector, and that in sectors with limited or highly regulated competition, there is evidence of a higher efficiency in SOE.

Dewenter & Malatesta (2001), using the same methodology of Boardman & Vinning (1989), also come to the conclusion that the SOE listed in "Fortune 500" have profitability levels well below than those of NSOE. They also conclude that SOE employ more workers, have a higher volume of sales and assets, and are more leveraged (as they are financed at lower interest rates) than their non-state-owned counterparts. Picot & Kaulmann (1989) had already arrived to similar conclusions.

Reeves & Ryan (1998) conclude that Irish NSOE are more profitable than those that are state-owned, despite having similar labour productivity levels. Arens & Brouthers (2001) arrive to same conclusion with respect to Romanian SOE, arguing that SOE do not adapt as well to changes in the market, do not apply aggressive marketing strategies, and, therefore, have lower performance levels than their non-state-owned counterparts.

Bozec et al. (2002) divide Canadian SOE into those that maximize profits, and those that do not maximize profits, and conclude that SOE that maximize profits have similar results to NSOE. The result of this study emphasizes the importance of taking into account the objectives of SOE in similar studies, rather than just making a simple distinction between the kinds of enterprises, as it is the case of most studies. This idea had already been put forward by Reeves & Ryan (1998).

In summary, although there are studies that show opposite results, most studies suggest that SOE have worse performance levels and are less profitable than NSOE. However, throughout time, the gap between SOE and NSOE in terms of profitability levels (Caves & Christensen, 1980 and Davies, 1971) or productivity levels (Reeves & Ryan, 1998) has been decreasing. In particular, due to the expansion and internationalization of SOE, there has been a growing concern on the part of the State to better manage its enterprises and make them more profitable (Ramamurti, 1987), and SOE tends to have performance levels closer to those of NSOE (Bozec et al., 2002).

Explanatory Factors of Productivity Differences

In an international approach, Mascarenhas (1989) studies and characteries the SOE of 34 different countries and comes to the conclusion that SOE are more focused on their internal markets, having dominant positions in their home markets. SOE have a stable customer base, sell a small range of products, and have technology levels lower than those of NSOE.

The literature points out two main factors to explain the profitability difference between SOE and NSOE: lack of competition in SOE, and the fact that the State is the main, and sometimes the only, capital owner (ownership).

Competition

According to Borcherding et al., (1982), in a competitive environment, the difference in unit costs between State and private producers will be negligible. As many SOE are monopolistic or have dominant market positions, some authors claim that it is the lack of competition, together with the lack of motivation from the part of management and workers in the public sector that lead to a worse performance of SOE.

Doamekpor (1996) states that the inherent lack of competition of SOE means that they do not innovate and do not take risk decisions and, consequently, produce inefficiently or less efficiently than if they were operating in highly competitive environments. Shleifer (1998) also stresses the

important role of competition in business innovation, something SOE lack, as they mostly face little competition.

The lack of monitoring and performance appraisal systems of SOE managers is also referred to in the literature as being an explanatory factor for the lower level of performance. The fact that these managers do not see their good decisions rewarded may lead to a reduction in levels of managers' motivation and innovation and, consequently, adversely affect the performance of the enterprises (Barton, 1979).

Finally, in order to be efficient, businesses have to operate on the edge of their production capacities, a fact that, according to the literature, rarely happens in SOE (Leibenstein 1966; González-Párano & De Cos, 2005).

Ownership

According to Vining & Boardman (1992), ownership of capital has a very significant impact on the lives of enterprises. Many authors, including González-Párano & De Cos (2005), argue that the fact that SOE are held by, and are dependent on the State affects their performance and profitability, leading them to have lower profitability rates than their non-state-owned counterparts.

One of the main factors identified in the literature to explain the different levels of performance and profitability is the difference in the objectives of SOE and NSOE. According to Bozec et al. (2002), the difference in objectives may lead to unexpected findings. In fact, many SOE have as their sole objective the promotion and improvement of social welfare (González-Párano & De Cos, 2005), while NSOE have as their main objective the maximization of profit.

On the other hand, Shleifer and Vishny (1997) argue that state-owned enterprises are technically controlled by taxpayers and run by managements that usually have political ambitions whose objectives may not be aligned with the maximization of the enterprise's value and the contribution to social welfare.

Doamekpor (1996) e Arocena & Oliveros (2012), among others, argue that the difference in performance levels of SOE and NSOE can be explained based on three main theories: agency; ownership rights, and; public choice.

With regard to arguments supported by the agency theory, Picot & Kaulmann (1989) state that the fact that there is no real "owner" of SOE affects their performance, and means that shareholders exercise no pressure or place demand on public managers. According to these authors, the State exercises little control over SOE, and the pressure on the return on equity and on the final product is usually weak.

In turn, González-Párano & De Cos (2005) are of the opinion that SOE meet the demand of the voters and the State, while their non-state-owned counterparts only answer to their shareholders,

who are in a closer relationship with managers and can therefore put greater pressure for better results.

In terms of ownership rights, the State intervenes to save SOE in case of financial difficulties (Picot & Kaulmann, 1989), and, therefore, these enterprises do not face the threat of being acquired by a third party, or being subject to a hostile takeover (Wintrobe, 1987). Thus, SOE do not suffer as much pressure to improve performance levels, as their survival and continuity are somewhat secured.

Finally, it may be more important to achieve personal goals for State enterprise managers and politicians, such as power and prestige, than to improve the efficiency of SOE. Political competition, caused by elections, can be positive, as it may lead to social gains, but it can also be negative if SOE are managed solely with the aim of achieving electoral results (Wintrobe, 1987), and such aim affects the performance of the enterprise (Shleifer, 1998).

In addition, in SOE there is a risk of governments appointing managers based on their political affiliation, rather than on their professional competence (Murray, 1975; Picot & Kaulmann, 1989), which can lead to the assignment of incompetent managers (Murray, 1975). In turn, in NSOE the filling of managerial positions is based on the competence, merit, and résumés of the candidates, and not on their party affiliations (Murray, 1975).

In summary, the dominant market position (in some cases a monopolistic position), the absence of monitoring by the State, the lack of incentives, the lack of competence of public administrators, the lack of pressure for results, as well as political and electoral issues, are all usually identified as being explanatory factors for the difference in the levels of performance and profitability between SOE and NSOE.

Therefore, and based on the results presented in this chapter, we formulate the following hypothesis of study:

H1: SOE are less profitable than NSOE.

Sample and Methodology

Sample

All data were collected from the *Amadeus* database, the property of *Bureau Van Dijk.* Information was accessed and consulted during June 2013.

The sample period covers nine years of observations, corresponding to the time period of 2003 to 2011. The sample consists of non-financial enterprises from all over Europe, with over 250

employees and a turnover exceeding €1 million[2] in 2012. The use of these criteria will allow greater comparability between the enterprises in the sample and avoids possible distortions in the results caused by the inclusion of small businesses.

The criterion used to define an enterprise as "state-owned" is what is termed as "*ultimate owner*" in the *Amadeus* database. This criterion takes into account "who" really has control of the enterprise, being that the *owner* needs to control at least 25.01% of the enterprise. Therefore, the sample of SOE consists of businesses whose *ultimate owner* is the State of a country, or a holding owned by a State that control other SOE (e.g. Parpública manages the holdings of the Portuguese State in other enterprises).

On the other hand, NSOE are companies whose *ultimate owner* is not an entity belonging to the State of a given country or the State itself. These enterprises might have as shareholders holding companies controlled by a State, however, these enterprises are controlled by private individuals and are, therefore, considered to be NSOE (e.g. a small part of Volkswagen is held by a Qatari sovereign wealth fund, but the enterprise is controlled by the Porsche-Peich family). It might also occur that the *ultimate owner* is a financial enterprise, but what is important is that the enterprise in the sample is not a financial business.

As there was a large difference between the number of SOE and NSOE in the initial sample, data regarding NSOE were redefined in order to minimize that difference. First, in the SOE sample, the mean and standard deviation of the values of the items Sales and Assets for each NAICS 2007 industry sector (first two digits) was calculated. Then, once these values were calculated and the *outliers*[3] removed, an interval of the mean plus (minus) the standard deviation of the value of Sales and Assets of each industry sector was created. Finally, all NSOE with values of Sales and Assets outside that interval were removed from the sample. Thus, not only the initial discrepancy between the number of SOE and NSOE was minimized, but also their comparability was increased.

Appendix 1 presents the composition of the sample by country. The final sample consists of 10,944 enterprises, 3,042 SOE (about 28% of the total), and 7,902 NSOE from 37 European countries.

The five most-represented countries in the sample, accounting for about 67% of all enterprises, are in descending order: Germany, Great Britain, Russia, Italy, and France. The countries with the highest percentage of SOE are naturally the countries of Eastern Europe, such as Russia (70.3%), Ukraine (93.3%), and Poland (85.25%).

Appendix 2 shows the composition of the sample by industry sector. The most significant sector is the Manufacturing sector, which represents about 28% of all enterprises in the sample. Regarding SOE, the most representative sectors are Waste Management and Remediation Services, Health

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[2] Based on the definition criteria of SME provided by the Commission Recommendation 96/280/CE of 3 April, 1996.

[3] Values below 1st percentile and above 99th percentile were all considered outliers.

Care, and Urban Transportation. For NSOE, the most significant are Holdings, Consultancy Services for Enterprises and Construction (values not reported).

Empirical Models

Based on previous studies, namely those of Boardman & Vinning (1989,1992), Dewenter & Malatesta (2001), Arcas & Bachiller (2008), and Mollah *et al.* (2012), the two most commonly used measures of profitability in the literature were used: ROE and ROA[4], and the models (1) and (2) were estimated by using *pooled* OLS:

$$ROE_{it} = \beta_0 + \beta_1\ PUB + \beta_2\ Leverage_{it} + \beta_3\ Liquidity_{it} + \beta_4\ Tangibility_{it} + \beta_5\ Size_{it}$$
$$+ \beta_6\ LnBoard_{it} + \beta_7\ LnNetIncome_{it} + \sum \beta\ Country + \sum \beta\ Year + \sum \beta\ Sector_i + \varepsilon_i \qquad \textbf{(1)}$$

where ROE_i is the return on equity of enterprise i during period t; PUB is a dummy variable that has the value 1 for a SOE and 0 for a NSOE; Leverage is the level of indebtedness; Liquidity is the availability of liquid assets; Tangibility is the level at which an asset can be used as a collateral; Size is the enterprise dimension; LnBoard is the size of the Board, and; LnNetIncome is the net income.

All control variables were selected and calculated based on previous studies that identified them as being determinant of the level of return on equity and assets generated by enterprises (Arcas & Bachiller (2008) and Mollah *et al.* (2012), among others). In order to control the impact of the different characteristics of countries, sectors, and years on profitability levels, three additional dummy variables were also included: Country; Sector, and; Year. For a more detailed description and calculation of variables see Appendix 3.

If the coefficient of the PUB variable, the independent variable of interest, is negative, this means that the return on equity of SOE is lower than their non-state-owned counterparts.

$$ROA_{it} = \beta_0 + \beta_1\ PUB + \beta_2\ Leverage_{it} + \beta_3\ Liquidity_{it} + \beta_4\ Tangibility_{it} + \beta_5\ Size_{it}$$
$$+ \beta_6\ LnBoard_{it} + \sum \beta\ Cuntry + \sum \beta\ Year + \sum \beta\ Sector_i + \varepsilon_i \qquad \textbf{(2)}$$

where ROA_i is the return on assets of enterprise i during period t. Regarding model (1), the variable LnNetIncome was removed, as it is moderately correlated with the dependent variable ROA (0.45), which does not happen with ROE (0.26)[5].

Once again, a negative coefficient of the PUB variable means that the ROA of SOE is lower than that of NSOE.

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[4] *Economic Value Added* (EVA™) would probably be a more appropriate measure of performance. However, the lack of data to calculate it makes it impossible to use it as a dependent variable.

[5] According to Franzblau (1958), correlations between 0.2 and 0.4 are considered weak. Only from 0.4 are they considered moderate.

Results

Descriptive Statistics

Table 1 presents the descriptive statistics of the dependent variables, as well as of two variables that help to better characterize the companies analysed: number of employees, and total assets.

NSOE have a higher average profitability, have fewer employees, and are smaller. There is a striking difference in the profitability level, which is about 13 percentage points in ROE, and 3 percentage points in ROA. On average, SOE are larger and employ about 50% more people.

	SOE			NSOE		
	Mean	**Median**	**SDeviation**	**Mean**	**Median**	**SDeviation**
ROE	3.75	2.06	0.191	16.51	12.27	0.175
ROA	1.50	0.08	0.051	4.28	3.42	0.035
Employees	2,049	496	77.98	1 072	532	10.12
Size (€)	812,386,000	15,139,060	171,990	236,896,000	78,599,850	4,738.31

ROE: Net Income/Equity; **ROA**: Net Income/Total Assets; **Employees:** No. of Employees; **Size**: Total Assets.

Table 1 – Descriptive Statistics of Dependent Variables

Additionally, t-tests were performed to compare the means of these variables (numbers not reported), in order to assess the statistics viability of the differences found between SOE and NSOE. The results suggest that all differences are statically significant.

Table 2 shows the correlation coefficients between the variables used in the models (1) and (2). The PUB variable has a negative correlation with both profitability variables, suggesting that SOE have lower ROE and ROA levels than NSOE. With the exception of the variables Size and LnNetIncome (Panel A), all variables show relatively low correlations between each other, allowing us to believe that there were no problems of multicollinearity.

Panel A – Correlations between Model 1 variables

	ROE	Liquidity	Tangibility	Leverage	PUB	Size	LnBoard	LnNI
ROE	1.000							
Liquidity	-0.000	1.000						
Tangibility	-0.172***	-0.002	1.000					
Leverage	0.113***	-0.005	-0.288***	1.000				
PUB	-0.153***	-0.001	0.520***	-0.274***	1.000			
Size	0.003	0.003	-0.102***	0.105***	-0.356***	1.000		
LnBoard	0.034***	0.002	-0.235***	0.129***	-0.351***	0.423***	1.000	
LnNI	0.264***	0.002	-0.205***	0.027***	-0.432***	0.755***	0.389***	1.000

Panel B – Correlations between Model 2 variables

	ROA	Liquidity	Tangibility	Leverage	PUB	Size	LnBoard
ROA	1.000						
Liquidity	0.000	1.000					
Tangibility	-0.176***	-0.002	1.000				
Leverage	-0.213***	-0.005	-0.288***	1.000			
PUB	-0.157***	-0.001	0.520***	-0.274***	1.000		
Size	0.019***	0.003	-0.102***	0.105***	-0.356***	1.000	
LnBoard	0.079***	0.002	-0.235***	0.129***	-0.351***	0.423***	1.000

ROE: Net Income/Equity; **ROA**: Net Income/Total Assets; **Liquity**: Current Assets /Current Liabilities; **Tangibility**: Fixed Tangible Assets/Total Assets**; PUB:** dummy variable with value 1 for SOE and 0 for NSOE; **Leverage:** Total Liabilities / Total Assets; **Size**: Ln (Total Assets); **LnBoard**: Ln (No. Board Members); **LnNI:** Ln (Net Income). ***, **, *, statistical significance at 1%, 5% and 10%, respectively.

Table 2- Correlation Matrix

Profitability of SOE vs. NSOE

Table 3 shows the results of regressions (1) and (2). The results suggest that SOE are less profitable than NSOE in both performance measures, which is consistent with the results obtained in previous tests.

The ROE of SOE is on average 3.5% lower than the ROE of NSOE, and the ROA is on average 2.6% lower than the ROA of NSOE, all the rest remain the same.

These results are in line with the idea that prevails in the literature that SOE are less efficient in managing their assets and the capital invested by their owners. Stronger pressure for better results and higher returns on capital from shareholders of NSOE compared with less pressure and control from the State, which can lead to a certain degree of relaxation from the part of SOE managers for achieving better results, may partly explain such differences (Picot & Kaulmann, 1989; González-Párano & De Cos, 2005).

	Dependent Variables	
	ROE	ROA
Independent Variables		
PUB	- 0.035***	-0.026***
	(0.004)	(0.000)
Liquidity	0.000***	0.000***
	(0.000)	(0.000)
Leverage	0.246***	- 0.080***
	(0.000)	(0.000)
Tangibility	- 0.081***	- 0.051***
	(0.000)	(0.000)
Size	- 0.085***	- 0.001***
	(0.000)	(0.000)
LnBoard	- 0.014***	0.003***
	(0.000)	(0.000)
LnNetIncome	0.079***	
	(0.000)	
Dummy Country	Included	Included
Dummy Sector	Included	Included
Dummy Year	Included	Included
Observations	55,965	72,974
R²	0.2821	0.1479

PUB: dummy variable with value 1 for SOE and 0 for NSOE; **Liquity**: Current Assets /Current Liabilities; **Leverage:** Total Liabilities/Total Assets; **Tangibility**: Fixed Tangible Assets/Total Assets; **Size**: Ln (Total Assets); **LnBoard**: Ln (No. Board Members); **LnNetIncome:** Ln (Net Income). The value in brackets is the t-statistic corrected for clusters by enterprise; ***, **, *, statistical significance at 1%, 5% and 10%, respectively.

Table 3 – Profitability of SOE vs. NSOE

With regards to the control variables, the results suggest that enterprises with less liquidity, a greater proportion of fixed tangible assets, and greater size have higher levels of return on assets and equity.

Concerning the impact of leverage and the size of the Board, the results are mixed. While for ROE, the results suggest a favourable impact of leverage: if the debt ratio increases one value, ROE will on average increase 24.6%, whereas for ROA, the results suggest a negative impact: if the debt ratio increases one value, ROA will on average decline 8%. As for the size of the Board, the results suggest that the greater the number of members, the higher the ROA and the lower the ROE.

It should be noted that all coefficients are statistically significant at 1%, and that the obtained values of R^2 are consistent with previous studies. In fact, Bozec *et al.,* (2002) present R^2 values of 0.33 and 0.195 for ROE and for ROA, respectively, and Boardman & Vinning (1989) obtain 0.178 and 0.191 for ROE and ROA, respectively.

In short, the results for both performance measures confirm hypothesis H1. Therefore, there is evidence that the SOE in the sample are, on average, less profitable than NSOE; in other words, NSOE make better use of shareholders' capital and manage their assets more efficiently than SOE. However, it is important to remember that social and labour gains may be associated with the lower profitability of SOE (Reeves & Ryan, 1998).

Profitability of SOE vs. NSOE: The Impact of the Financial Crisis

As the sample period includes years of financial crisis, two additional analyses were carried out in order to assess the impact of the crisis on the profitability of SOE and NSOE.

Thus, different dummy variables were included in Models (1) and (2), resulting from the interaction between the CRISIS variable and PUB variable: DPC - NSOE in the period of crisis; DPNC - NSOE not in the period of crisis; DPUBC - SOE in the period of crisis and DPUBNC - SOE not in the period of crisis. The variable CRISIS takes the value 1 for years considered of crisis (2007 to 2011), and 0 if otherwise.

Table 4 presents the main results of the regressions. Panel A shows the results of the comparative analysis of profitability between SOE and NSOE during the financial crisis period, and Panel B shows results that allow the assessment of the impact of the financial crisis on profitability.

The table shows that, during the financial crisis, SOE continue to show profitability levels lower than NSOE, and that the coefficients of the DPUBC variable (Panel A) are negative and statistically significant for both performance variables: ROE and ROA (-0.032 and -0.025, respectively).

Panel A: SOE vs. NSOE in the period of crisis

	Dependent Variables	
Independent Variables	ROE	ROA
DPUBC	- 0.032*** (0.000)	- 0.025*** (0.000)
DPUBNC	- 0.027*** (0.000)	- 0.027*** (0.000)
DPNC	0.007*** (0.007)	0.001** (0.023)
Remaining variables (except PUB)	Included	Included
Observations **R²**	55,965 0.2354	72,974 0.1479

Panel B: SOE in the period of crisis and non-crisis

	Dependent Variables	
Independent Variables	ROE	ROA
DPC	0.021*** (0.000)	0.027*** (0.000)
DPNC	0.035*** (0.000)	0.028*** (0.000)
DPUBC	- 0.012** (0.011)	0.001 (0.183)
Remaining variables (except PUB)	Included	Included
Observations **R²**	55,965 0.2352	72,974 0.1434

DPC: dummy variable with value 1 for a NSOE in the period of crisis and 0 if otherwise; **DPNC:** dummy variable with value 1 for a NSOE not in the period of crisis and 0 if otherwise; **DPUBC:** dummy variable with value 1 for a SOE in the period of crisis and 0 if otherwise; **DPUBNC**: dummy variable with value 1 for a SOE not in the period of crisis and 0 if otherwise. The value in brackets is the t-statistic corrected for clusters by enterprise; ***, **, *, statistical significance at 1%, 5% and 10%, respectively.

Table 4 – Profitability of SOE vs. NSOE: Financial Crisis

The results shown in Panel B suggest that the crisis negatively affected the return on equity of SOE, as the ROE is on average lower by 1.2% during the period of crisis, and it had no impact on the return on assets, as the ROA coefficient is not statistically significant. The same is observed for NSOE, as there was a decrease in profitability during the period of crisis. NSOE, during the period of crisis, had a ROE lower by 0.7% when compared to the period of no financial crisis.

In short, the results of analyses carried out on the possible impact of the crisis on corporate profitability confirm the results of the main analysis - SOE are less profitable than NSOE, and suggest that the financial crisis had a negative impact on the return on equity of both SOE and NSOE.

Profitability of SOE vs. NSOE: Western Europe vs. Eastern Europe

Given the significant role that SOE played and continues to play in the economy of Eastern European countries, it will be interesting to observe whether these enterprises are more, or less profitable than their non-state-owned counterparts, as well as to compare their performance levels with those of SOE in Western European countries.

In order to carry out these additional analyses, countries were classified as Western or Eastern European, according to the criterion of UNESCO (see Appendix 4). Then, different dummy variables were created and included in the regressions (1) and (2) resulting from the interaction between the Western European variable and the PUB variable: DPWE - Western European NSOE; DPEE - Eastern European NSOE; DPUBWE - Western European SOE and DPUBEE - Eastern European SOE.

Table 5 presents the main results. Panel A shows the results of the comparative analysis of profitability between SOE and NSOE in countries of Western and Eastern Europe, and Panel B shows the results of the comparative analysis of profitability of SOE in Western Europe vs. Eastern Europe.

Regarding SOE vs. NSOE, it can be concluded that, both in Western and Eastern Europe, SOE are always less profitable than NSOE, which once again confirms the previous conclusion that SOE are less profitable than NSOE.

With respect to SOE only, in terms of ROA, Western European SOE are more profitable than their Eastern European counterparts. On average, Western European SOE have a ROA that is 1.1% higher than Eastern European SOE.

Panel A: SOE vs. NSOE in Western Europe

	Dependent Variables	
	ROE	**ROA**
Independent Variables		
DPUBEE	-0.022*** (0.001)	-0.029*** (0.000)
DPUBWE	-0.028*** (0.000)	-0.017*** (0.000)
DPEE	0.043*** (0.000)	0.013*** (0.000)
Remaining variables (except PUB)	Included	Included
Observations **R²**	55965 0.2832	72794 0.1480

Panel B: SOE in Western Europe and Eastern Europe

	Dependent Variables	
	ROE	**ROA**
Independent Variables		
DPWE	0.022*** (0.001)	0.029*** (0.000)
DPEE	0.066*** (0.000)	0.042*** (0.000)
DPUBWE	- 0,005 (0.419)	0,011*** (0,000)
Remaining variables (except PUB)	Included	Included
Observations **R²**	55,965 0.2832	72,794 0.1480

DPWE: dummy variable with value 1 if it is a NSOE of a country in Western Europe and 0 if otherwise; **DPEE:** dummy variable with value 1 if it is a NSOE of a country in Eastern Europe and 0 if otherwise; **DPUBWE:** dummy variable with value 1 if it is a SOE of a country in Western Europe and 0 if otherwise and; **DPUBEE:** dummy variable with value 1 if it is a SOE of a country in Eastern Europe and 0 if otherwise. The value in brackets is the t-statistic corrected for clusters by enterprise; ***, **, *, statistical significance at 1%, 5% and 10%, respectively.

Table 5 – Profitability of SOE Western Europe vs. Eastern Europe

Regarding ROE, there is no statistical evidence that Western European SOE are more profitable. However, taking only into account NSOE, the inverse relationship is observed. Panel A shows that Eastern Europe NSOE have higher levels of profitability (ROE and ROA) than Western European NSOE (0.043 and 0.013 respectively).

These results can be partly explained by the fact that Eastern European countries have been experiencing higher growth rates in GDP, despite the fact that, as a rule, Western European countries are richer. On the other hand, it must be highlighted that the countries of Eastern Europe still have, in relative terms, a very high number of SOE, as can be seen in Appendix 1, which increases the probability of the existence of less-profitable enterprises in the public sector.

Impact of the Percentage of State Control on the Profitability of SOE

Only a few studies analyse the profitability of SOE based on the percentage of State control. Therefore, it would be interesting to analyse the impact that a higher or lower participation of the State in the capital of enterprises has on the profitability of SOE. Thus, the PUB dummy variable was replaced by the CONTROL continuous variable, which represents the percentage of capital held by the State, in both (1) and (2) regressions. Table 6 shows the main results.

Independent Variables	Dependent Variables	
	ROE	**ROA**
CONTROL	- 0.00026*** (0.000)	- 0.000301*** (0.000)
Remaining variables (except PUB)	Included	Included
Observations **R²**	54,935 0.2815	71,717 0.1488

CONTROL: percentage of capital held by the Sate in each SOE; The value in brackets is the t-statistic corrected for clusters by enterprise; ***, **, *, statistical significance at 1%, 5% and 10%, respectively.

Table 6 – Impact of the Percentage of State Control

The coefficients of the CONTROL variable are both negative and statistically significant, suggesting that the greater the State control, the lower the levels of returns on equity and assets.

These results reinforce the previous findings. It can be concluded that SOE are less profitable than NSOE, and that the higher the percentage of capital held by the State, the lower the level of profitability of SOE.

Conclusion

A comparative analyses of the profitability of SOE and NSOE for a period of nine years (2003-2011) was carried out, based on a sample of 10,994 enterprises from 37 European countries. On average, SOE in the sample are larger, and employ more people than NSOE.

The main results suggest that European SOE are less profitable than NSOE, both at the level of return on equity and return on assets. On average, the ROE of a SOE is lower by 3.5%, and the ROA is lower by 2.6% when compared to those of a NSOE.

The lack of competition, the lack of objectives for maximization of profit, the lack of pressure and incentives of SOE managers to improve corporate performance may all contribute to a less-efficient management of assets and to a lower performance of SOE when compared with their non-state-owned counterparts. However, it is important to remember that the lower profitability of SOE may be associated with social gains (Reeves & Ryan, 1998).

The results also suggest that enterprises with less liquidity, greater proportion of fixed tangible assets, and larger size have higher levels of ROE and ROA, and that leverage has a strong impact on ROE. In fact, an increase of one unit in the debt ratio increases the ROE by around 25%.

The results from the additional analyses carried out confirm our main conclusion - SOE are less profitable than NSOE, which have higher performance levels in Western and Eastern European countries during periods of financial crisis (2007-2011) and also periods of non-crisis (2003-2006).

The results also suggest that Western European SOE manage their assets more efficiently than their counterparts in Eastern Europe, with higher levels of ROA. The same is not observed in NSOE.

It was also observed that during the period of financial crisis, enterprises had lower levels of ROE, which shows a negative effect of the financial crisis on the profitability of SOE and NSOE.

Finally, the findings show that the difference in the profitability levels of SOE and NSOE is even more noticeable when there is a higher percentage of capital owned by the State, supporting the idea that an increase of Sate control over the enterprises does not generate greater efficiency in the management of resources, neither a greater return for equity investors.

With regards to the main limitation of this study, we highlight the lack of information that made it impossible to deepen the analyses carried out. Specifically, it was not possible to classify SOE according to those that maximize profit, and those that do not maximize profit, as suggested by Bozec *et al.* (2002); nor to include in the study other explanatory factors for the profitability differences between SOE and NSOE identified in the literature, such as level of competition.

In the future, it would be interesting to extend the study to other countries outside Europe, namely China. It would also be interesting to compare the profitability levels of listed and unlisted SOE, in order to analyse the impact of the capital market on the profitability of SOE.

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Appendixes

Country	No. SOE	No. NSOE	Total	% SOE
Germany	335	1,773	2,108	15.9%
Austria	25	130	155	16.1%
Bosnia Herzegovina	12	6	18	66.7%
Belgium	11	87	98	11.2%
Bulgaria	106	7	113	93.8%
Belarus	278	1	279	99.6%
Croatia	27	16	43	62.8%
Cyprus	1	3	4	25%
Denmark	3	185	188	1.6%
Slovenia	1	1	2	50%
Slovakia	10	8	18	55.6%
Estonia	2	5	7	28.7%
Spain	73	516	589	12.4%
Finland	25	67	92	27.2
France	39	1,012	1,051	3.7%
Great-Britain	14	1,794	1,808	0.8%
Greece	3	63	66	4.5%
Hungary	0	9	9	0%
Ireland	2	35	37	5.4%
Italy	122	988	1,110	11%
Latvia	2	3	5	40%
Lithuania	7	12	19	36.8%
Luxembourg	1	9	10	10%
Moldavia	6	0	6	100%
Montenegro	6	1	7	85.7%
Holland	8	128	136	5.9%
Norway	4	92	96	4.1%
Poland	248	43	291	85.2%
Portugal	17	94	111	14.3%
Czech Republic	7	42	49	14.3%
Romania	27	36	63	42.9%
Russia	891	376	1,267	70.3%
Serbia	1	22	23	4.4%
Sweden	30	233	263	11.4%
Switzerland	38	42	80	47.5%
Turkey	2	16	18	11.1%
Ukraine	658	47	705	93.3%
Total	**3,042**	**7,902**	**10,944**	**27.8%**

Appendix 1 – Structure of the sample by country

Sector	No. of Enterprises
Sector **11** (Agriculture, Forestry, Fishing and Hunting)	201
Sector **21** (Mining, Quarrying, and Oil and Gas Extraction)	151
Sector **22** (Utilities)	570
Sector **23** (Construction)	636
Sector **31** to **33** (Manufacturing)	3,024
Sector **42** (Wholesale Trade)	466
Sector **44 & 45** (Retail Trade)	507
Sector **48 & 49** (Transportation and Warehousing)	853
Sector **51** (Information)	284
Sector **52** (Finance and Insurance)	192
Sector **53** (Real Estate and Rental and Leasing)	340
Sector **54** (Professional, Scientific and Technical Services)	833
Sector **55** (Management of Companies and Enterprises)	1,494
Sector **56** (Administrative and Support and Waste Management and Remediation Services)	589
Sector **61** (Educational Services)	45
Sector **62** (Health Care and Social Assistance)	424
Sector **71** (Arts, Entertainment and Recreation)	95
Sector **72** (Accommodation and Food Services)	63
Sector **81** (Other Services)	130
Sector **92** (Public Administration)	47
Total	**10,944**

Appendix 2 – Structure of the sample by sector NAICS 2007 (*core code*)

Variable	Description	Formula
ROE	Return on Equity	Net Income / Total Equity
ROA	Return on Assets	Net Income / Total Assets
PUB	SOE	Dummy variable, value 1 if the *"ultimate owner"* is the State of a country in Europe or value 0 if otherwise
Leverage	Level of Indebtedness	Total Liabilities / Total Assets
Liquidity	Level of Liquidity	Total Current Assets / Total Current Liabilities
Tangibility	Level of Tangibility	Total Fixed Tangible Assets / Total Assets
Size	Dimension	Logarithm of Total Assets
LnBoard	Dimension of the Board	Logarithm of number of Board Members in 2011
LnNetIncome	Net Income	Logarithm of net income
Sector	Industry Sector	Dummy variable, starting on the agriculture sector
Country	Country	Value of annual GDP growth of each country rather than the value 1 characteristic of dummy variables (Dewenter & Malatesta, 2001)
Year	Year	Dummy variable, starting on the oldest year (2003)

Appendix 3 – Description of variables