State Ownership and Financial Performance of Brazilian Multinational Enterprises: An Analysis Before and After the Crisis

Hsia Hua Sheng
Professor at FGV – Fundação Getulio Vargas
São Paulo School of Business Administration (EAESP)
hsia.sheng@fgv.br
(corresponding author)

José Marcos Carrera Junios
PhD Candidate at FGV – Fundação Getulio Vargas
São Paulo School of Business Administration (EAESP)
josemarcoscj@gmail.com

Paper presented at the 6th Copenhagen Conference on: 'Emerging Multinationals': Outward Investment from Emerging Economies

Copenhagen, Denmark

11-12 October 2018

State Ownership and Financial Performance of Brazilian Multinational Enterprises: An Analysis Before and After the Crisis

ABSTRACT

We evaluate the influence of state ownership on the firm-level financial performance. SOEs may perform worse than privately controlled firms because of agency problems, while government as a minority shareholder can assist firms by providing financial and political resources. Analyzing a panel of non-financial publicly listed companies in Brazil between 2002 and 2016, we found that firms in which the government was one of the shareholders did not underperform in comparison to privately controlled firms before the Brazilian crisis of 2014-2016 crisis. However, during the crisis, when government support decreased, we verified that the relation between majority state ownership and financial performance measured by the return on assets (ROA) was negative. Although negative, there was no statistically significant effect of minority state ownership. Our study suggests the need for government-invested enterprises to develop skills to perform well when they cannot rely on government assistance. Furthermore, the degree of internationalization did not soften the effects of the crisis on the firm-level financial performance, which may indicate that the domestic institutional environment has a strong influence on the performance of Brazilian companies.

Keywords: State Ownership, Financial Performance, State Capitalism

1 INTRODUCTION

Until the late 1980s, Latin American countries adopted import-substitution industrialization policies (ISI policies). Under the ISI policy, the government would actively intervene in the economy through restrictions on the entry of foreign companies and extensive regulation (Cuervo-Cazurra, 2008), resulting in a highly protected market where domestic companies faced little competition and enjoyed great market power. These companies had few incentives to take risks or undertake large-scale investment projects. The inability or unwillingness of local entrepreneurs to take on long-term projects in an environment full of institutional voids led many Latin American governments to fill this gap with fully owned SOEs.

Throughout the years, with the lack of exposure to both domestic and international competition, Latin American companies became non-competitive (Liu, 1993). SOEs suffered from other inefficiencies such as the existence of a principal-agent problem and weak incentives (Shleifer, 1998). These issues led to losses and along with economic instability the ISI policy became unsustainable, forcing Latin American governments to undertake major reforms such as the opening of their economy and privatization programs (Musacchio & Lazzarini, 2014).

The way the Brazilian government found to safeguard national sovereignty during this process was selecting domestic companies with comparative advantages, investing in them to make them larger and more competitive and then turning these companies into great Brazilian MNEs, or national champions. To ensure that the national champions were not acquired by foreigners, and to have some degree of influence on them, the Brazilian governemnt kept a minority voting shares' stake directly and indirectly through BNDES and pension funds of SOEs and Privatised State Owned Enterprises (PSOEs). During the privatization of SOEs, the Brazilian government also decided to keep its influence in certain companies, and to avoid their acquisition by foreign investors, reduced SOEs' stakes from full to majority and minority ones (Hennart, Sheng & Carrera Jr., 2017, Musacchio & Lazzarini, 2012).

Due to agency problems and lack of strong incentives, SOEs may underperform compared to privately controlled companies, leading to the so-called "liability of stateness", a "performance gap between SOEs and private companies" (Lazzarini & Musacchio, 2015: p. 7). This potential negative effect may be softened through state minority ownership. In this case, there is a private and profit-oriented major shareholder that probably will be more inclined to design incentive contracts and to monitor the managers. In addition, minority state ownership allows financially constrained companies to undertake long-term projects and to benefit from government resources and political assistance (Brey et al., 2015; Inoue, Lazzarini & Musacchio, 2013).

Economic crises often require quick responses from firms (Lazzarini & Musacchio, 2015). In adverse conditions "SOEs' intrinsic sources of disadvantage will be especially relevant when they need to respond to negative pressures" (Lazzarini & Musacchio, 2015: p. 10). For state minority ownership we argue that the performance gap will be lower or null if the company could make good use of government assistance prior to crisis and develop skills that make the company eliminate or reduce its dependence on government support.

In this scenario, an intriguing question that may arise is: how would companies with either majority or minority state ownership perform during severe economic and political crisis, when government financial and political support sharply decreases?

Different from China, in Latin America, government intervention in domestic companies is more tenuous. Particularly in Brazil, the government can exert influence over local enterprises not only as the controlling shareholder but also as the minority one. Another peculiarity of the Brazilian scenario is that the Brazilian government indirectly holds its equity stakes through

pension funds of SOEs and PSOEs and its national development bank (BNDES). Therefore, the relationship between state ownership and financial performance is less obvious, and the means by which the Brazilian government influences domestic companies are more difficult to evaluate (Caseiro and Masiero, 2014; Hennart, Sheng & Carrera Jr., 2017).

Brazil offers the best scenario in Latin America to analyze the implications of neo-developmentalist policies. This occurs because the adoption of a "national champions" policy is easier when the country is large and has a great domestic market. Brazil also has BNDES and pension funds of SOEs and PSOEs that are an important source of long-term capital for the companies (Hennart, Sheng & Carrera Jr., 2017). Other Latin American countries do not have similar market and institutions.

Both majority and minority state ownership are common in Brazil, and during the period between 2002 and 2016 we could observe the increased use of fully and partially SOEs for political purposes. During 2014 and 2016 Brazil faced an economic and political crisis that reduced the Brazilian government's ability to support local companies. These features make Brazil also a good scenario to analyze whether state ownership influence on a company's performance is sustained during a period when the company cannot rely on government assistance.

Our study makes several contributions. First it sheds light on the importance of understanding the local institutional background to successfully operate in an emerging market. In addition, we extended the analysis by investigating the impact of majority ownership and still overlooked minority state ownership before and during a particular period when the government financial and non-financial assistance abruptly decreased, highlighting the role of BNDES and pension funds of SOEs and PSOEs.

By analyzing a panel data of non-financial publicly traded companies in the São Paulo Stock Exchange (Bovespa) between 2002 and 2016, we found that majority and minority SOEs did not underperform before the crisis. However, during the Brazilian crisis of 2014-2016, a period when the government support sharply decreased, companies in which the Brazilian government was the largest shareholder had a worse financial performance in comparison to privately controlled companies. This suggests that the agency problems, typical of SOEs, are enhanced during economic downturns. The potential benefits of minority state ownership also disappeared during a crisis, which reinforces the need for the firms to develop skills to reduce

their dependence on the government. In addition, the degree of internationalization did not relieve the negative impacts of recession, which suggests that the home country institutional environment exerts strong influence on the company's financial performance, outweighing the benefits of having operations and revenues abroad.

This paper is organized as follows: first we show the theoretical background regarding the impact of minority and majority state ownership on firm-level financial performance. In the next section we describe the data and methodology. In the following section we present the analysis and discussion of our results. And in the final section we show our concluding remarks, limitations of this research and suggestion for future studies.

2 STATE OWNERSHIP AND FINANCIAL PERFORMANCE

2.1 State Majority Ownership and Financial Performance

We found vast evidence that majority and fully-owned SOEs underperform in comparison to private companies (Megginson & Netter, 2001). The main reasons to explain this inferior performance are basically associated with agency problems (Jensen & Meckling, 1976) and incentives, creating the "liability of stateness" (Lazzarini & Musacchio, 2015: p. 7).

The agency problem (Jensen & Meckling, 1976) involving SOEs emerges from the fact that citizens (principal) delegate their role of monitoring SOE managers to politicians and other government representatives (agents). Because citizens have few incentives to get involved in the monitoring and supervision of SOEs, the managers and politicians have some freedom to pursue their own interests, which may not necessarily be to maximize performance (Cuervo-Cazurra et al., 2014; Dixit, 2002). Under these circumstances, politicians and other government authorities tend to assign SOE managers based on political connections rather than expertise and performance (Hennart, Sheng & Carrera Jr., 2017; Lazzarini & Musacchio, 2015). When the country's institutions are relatively weak, for example when the country lacks strong anti-corruption laws and independent regulatory agencies, this becomes an open door for corruption and bribes. In this scenario, politicians allied with SOE managers may divert resources from the companies in order to support their personal projects or parties (Lazzarini & Musacchio, 2015; Boycko, Shleifer, & Vishny, 1996; Shleifer & Vishny, 1998; Vickers & Yarrow, 1988).

Moreover, governments often require SOEs to follow other goals rather than maximize efficiency and profits (Shirley & Nellis, 1991). Therefore, it becomes difficult to evaluate a company's performance or design incentive contracts that motivate their management. During recession and crises. Under the MNE perspective, this problem can result in unprofitable investments in foreign markets in order to address potitical objectives (Cuervo-Cazurra et al., 2014).

The lack of strong incentives results in another major disadvantage for SOEs (Bai & Xu, 2005). Many Brazilian SOEs are monopolistic or quasi-monopolistic, and the pursue of social and political objectives rather than efficiency and profits makes comparisons with peers more difficult. Moreover, SOE managers are usually public servants with promotions and salary based on seniority and political connections rather than performance or expertise. They are also not threatened by the possibility of losing their jobs neither by bankruptcy nor by a takeover, since SOEs enjoy fewer budget constraints, having their losses covered by the state (Hennart, Sheng & Carrera Jr., 2017; Shleifer, 1998).

Aligned with this view, a number of scholars have shown a negative relation between state majority ownership and financial performance. Some of the empirical research demonstrate firm-level performance improvements after privatization of SOEs (Megginson & Netter, 2001; Megginson, 2005; Chong & Lopes-de-Silanes, 2005).

Through a cross-country analysis, Dewenter and Malatesta (2001) showed that SOEs were on average less profitable than private companies. Goldeng, Grünfeld and Benito (2008) analyzed Norwegian firms during the 1990s and concluded that private companies performed better than SOEs, using ROA as the performance variable.

Corroborating the abovementioned arguments, Borisova et al. (2012), using a sample of 373 companies from 14 European Union (EU) countries during the period 2003–2008, showed that state ownership is generally negatively associated with good corporate governance. They state that the legal system also influences the relation between state ownership and corporate governance quality. According to Borisova et al. (2012), while state ownership has an incremental negative impact on governance quality in civil law countries, it has a positive impact on governance quality in common law countries.

There are several studies assessing the financial performance of SOEs in the Chinese market. Gunasekarage, Hess and Hu (2007) investigated 1,034 companies listed in China from 2000 to

2004 and found that the firms' performance (measured by Tobin's Q and market-to-book ratio) was negatively influenced by high levels of state ownership. In another study involving Chinese newly privatized firms from 1994 to 1996, Wei and Varela (2007) similarly showed that state ownership had a negative effect on firm value (measured by Tobin's Q and monthly stock returns). Their study also showed that the relation between state equity ownership and Tobin's Q was convex, which means that for low and high levels of state ownership, firm performance was high. As a possible explanation, the authors mentioned that the state could divest of better performing firms at a slower pace in order to protect its interests. The government may also have more incentives to monitor firms when it has a large equity stake. Analyzing a panel data of non-financial Chinese listed firms during 2003 and 2010, Yu (2013) also shows that state ownership has a U-shaped relation with firm performance (measured by ROA), highlighting the benefits of government support and political connections.

Notwithstanding, some scholars indicate a positive relation between state majority ownership and a firm's financial performance. Sun, Tong and Tong (2002) analyzed all companies listed on the Shanghai Stock Exchange and on the Shenzhen Stock Exchange during 1994-1997 and examined whether state ownership affected the performance of Chinese SOEs during the privatization process. They found that state ownership and firm performance (measured by the market-to-book ratio) were positively related. However, the authors highlight that this positive relation does not necessarily imply an improvement in firm efficiency, since partially owned PSOEs in their sample kept a lot of their monopoly power, thus, might still be able to benefit from market power while retaining substantial inefficiencies.

Chen, Firth and Xu (2009) from 1999 to 2004 classified Chinese listed companies into those controlled by state asset management bureaus, SOEs affiliated to the central government, SOEs affiliated to the local government and private investors. Their empirical results show that firms affiliated to the central government had a higher operational efficiency, while companies controlled by state asset management bureaus and private investors performed worse.

Ang and Ding (2006) investigated the governance structure of government-linked companies in Singapore under the ownership structure of Temasek Holdings from 1990 to 2000. Temasek Holdings is the government holding entity that typically owns substantial cash flow rights but has disproportional control rights and exercises no operational control. They showed that Singapore's government-linked companies have higher valuations proxied by Tobin's Q and better corporate governance than firms that are not associated with the government.

2.2 State Minority Ownership and Financial Performance

Minority state ownership is a common phenomenon in emerging markets, but its firm-level implications are still not deeply explored by existing literature (Inoue, Lazzarini & Musacchio, 2013). The Brazilian government can influence domestic firm decisions not only as the majority shareholder but also as the minority one, indirectly through pension funds of SOEs and PSOEs, and BNDES (Hennart, Sheng & Carrera Jr., 2017).

Under the corporate perspective, state minority ownership provides a "patient capital" (Lazzarini & Musacchio, 2015: p. 8) that may be desirable in situations in which there is a shortage of long-term financing sources for investment projects in strategic areas (Inoue, Lazzarini & Musacchio, 2013).

The negative effects on financial performance of majority and fully owned SOEs are softened with state minority ownership. In this case, there is a private and profit-oriented major shareholder that will probably be more inclined to design incentive contracts and to monitor the company managers. If the only advantage of state minority ownership is the reduction of agency problems, then companies with state minority ownership should not exhibit a better performance and efficiency in comparison to privately controlled firms (Lazzarini & Musacchio, 2015).

However, besides mitigating the negative effects present in majority SOEs, minority state ownership also allows financially constraint firms to undertake profitable projects and to benefit from government resources and political assistance (Brey et al., 2015; Inoue, Lazzarini & Musacchio, 2013).

Wu (2011) investigated a sample of 68 Taiwanese companies with 5% to 49% state ownership during 1999–2003 and assessed the value-shaping effects of minority state ownership. The scholar suggested that internal and external contexts may moderate the influence of state ownership on firm value. The study shows that the effect of minority state ownership is not only associated in a curvilinear relationship with firm value (measured by the market-to-book ratio), but also strengthened by corporate ownership ties and market competition. According to the author, too much state ownership is indeed harmful to firm value, but too little or no government ownership may not be advantageous considering newly industrializing countries. "The benefits of investor confidence, as a result of institutional and managerial uncertainty,

prevail at lower levels of state ownership, but the risks of political interference backfire and undermine firm value at higher levels" (Wu, 2011: p. 843).

Corroborating this point of view, in Brazil, Inoe, Lazzarini and Musacchio (2013) analyzed a panel data of 367 non-financial Brazilian listed companies between 1995 and 2009. They found a positive effect of minority ownership, through BNDES, on firms' financial performance (measured by ROA – Return on Assets) and on capital expenditures of financially constrained firms with investment opportunities. This positive effect was substantially reduced when minority state ownership was allocated to business group affiliates (group of firms under the same controlling shareholder). According to the scholars, business groups can use internal resources to fill the abovementioned voids. Moreover, "in countries with weak minority owner protection, state equity may be tunneled through complex pyramids to support controlling owners' private projects or rescue struggling internal units" (Inoue, Lazzarini & Musacchio, 2013: p. 1779). Under this minority shareholder expropriation case, government equity funds would improve the wealth of the controlling shareholder but not necessarily the invested-firm's performance.

In addition, de Alcântara et al. (2017) found a positive relation between both direct and indirect state ownership and financial performance (measure by ROA – Return on Assets and ROE – Return on Equity of Brazilian) in publicly listed MNEs during 2000-2015 using investments in tax heavens as an instrumental variable.

2.3 State Ownership and Financial Performance During Crises

One question that may arise at this point is: how would companies with either majority or minority state ownership perform in a moment of crisis, when the government can no longer provide financial support? And what if this comes together with a political crisis when these companies can no longer rely on the government's financial and political support?

Economic crises and downturns often require quick tactic and strategic corporate actions, such as resource relocation, divesting, downsizing, capacity readjustments, focus on core activities (Lazzarini & Musacchio, 2015), among others. Sheng and Carrera Jr. (2017) identified that many of the top Brazilian non-financial MNEs divested under the Brazilian economic and political crisis of 2014-2016.

Under an unfavorable scenario, Lazzarini and Musacchio (2015) propose that "SOEs' intrinsic sources of disadvantage will be especially relevant when they need to respond to negative pressures from their external environment" (Lazzarini & Musacchio, 2015: p. 10). For example, the "liabilities of stateness" problem, in fully or majority state-owned enterprises, could disrupt corporate reorganization initiatives during crises and recession.

In some cases, the government may be forced to bailout SOEs and other large companies. This happened during the world financial crisis of 2008 and 2009. Therefore, regarding firm value, state ownership can be advantageous because government guarantees become more valuable when firms face a higher likelihood of bankruptcy (Beuselinck et al., 2017).

To illustrate this, Beuselinck et al. (2017) analyzed a sample of 4,737 listed firms in 28 European countries during 2005–2009 and found that firms with state ownership experienced a smaller reduction in their stock price during the financial crisis period in comparison to companies without state ownership. However, this effect was present in firms in countries with less corruption and better investor protection. The scholars argue that in countries with lower governance standards, the government is more inclined to pursue its political agenda and to expropriate other shareholders.

The state can use SOEs as a mechanism to perform politically desirable initiatives during crises, such as keep the employment rate above the efficient level and maintain prices artificially low. Another example is to require companies to undertake investments and projects in specific areas in order to benefit a specific electoral constituency (Lazzarini & Musacchio, 2015). Moreover, SOE managers have few incentives to quickly adjust their companies since they are not threatened by the possibility of losing their jobs in case of low performance and takeover (Lazzarini & Musacchio, 2015; Shirley & Nellis, 1991). Therefore, the performance gap between SOEs and private companies should increase during crises.

Corroborating this point of view, Lazzarini & Musacchio (2015) analyzed a cross-country panel data of 477 SOEs (280 of them minority owned) and 431 private firms between 1997 and 2012. Their study showed that SOEs "do not appear to systematically underperform when compared to private firms" (Lazzarini & Musacchio, 2015: p. 4), instead they found that significant performance gaps emerge when SOEs are exposed to external factors, such as economic recessions and elections. The scholars also show that this negative effect is less frequent and severe in cases of minority state ownership.

For minority state ownership we expect that the performance gap will be lower or null, if the company could make good use of government assistance prior to crisis in order to develop skills that allow the firm to "walk alone", becoming not-dependent on state support.

Brazil faced a severe economic and political crisis during 2014 and 2016 that caused deep fiscal problems. Differently from the global financial crisis of 2008/2009, the Brazilian recession was mainly domestic (Figure 1), fiscal and political. Consequently, the Brazilian government's ability to financially and politically assist national firms decreased sharply during this period.

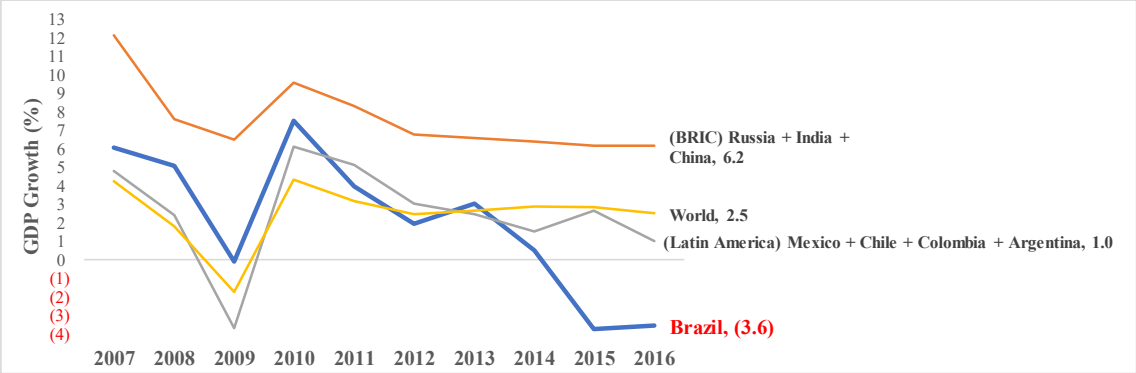

Figure 1 – Annual GDP Growth Evolution (%)
Weighted Average of Gross Domestic Product (GDP) Growth % by GDP in current USD
Source: World Bank

The Brazilian national champion policy was effective until mid-2013. After this period, these companies began suffering a reduction in their cash flow due to two factors: (1) the end of the commodity cycle in 2014 and 2015 and (2) the Brazilian crisis. Regarding the end of the commodity cycle, most national champions were from commodity industries, and were impacted by the reduction of Asian countries' demand for these products, due to their slower growth pace (mainly in China). Regarding the Brazilian crisis, when confronted with a scenario of economic and political turmoil, these companies lost a significant part of financial and non-financial government support. Without government support, they had to seek an alternative plan, and many of them decided to disinvest (Sheng & Carrera Jr., 2017).

BNDES was an important tool for financing national champions in Brazil, both through debt and through equity. The chosen companies received millionaire loans at subsidized rates. During the crisis, the bank could no longer afford this. We could witness a decrease in BNDES' investments during 2014-2016 (Figure 2).

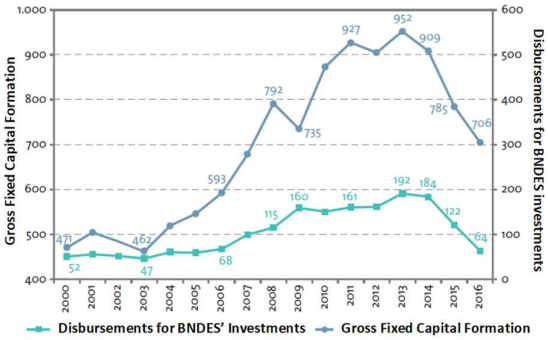

Figure 2 – Investment (excluding households) and disbursements for BNDES' Investments
(Puga & Gabrielli, 2018: p. 17)

Furthermore, agency problems are increased when government invests in companies through equity. Due to its riskier nature, equity financing only paybacks as dividends when the invested firms make profits, and during crises, profits usually fall sharply. Without strong incentives to supervise and monitor the agents, the Brazilian government ended up overinvesting in some companies that eventually became bankrupt and insolvent. In addition, overinvesting in few enterprises eroded competition in certain industries, such as in meat processing, and this could ultimately be negative for consumers, suppliers and other small players. Moreover, it is uncertain whether public resources were converted into local benefits or if it was tunneled to the controlling shareholders.

Therefore, we should analyze the impact of state ownership on financial performance of Brazilian firms under two perspectives: (1) state minority and majority ownership and (2) the period before and during the Brazilian economic and political crisis.

Then we can design the following hypothesis.

Hypothesis 1*: The impact of majority state ownership on the financial performance of Brazilian firms is negative during crises.*

Hypothesis 2*: The impact of minority state ownership on the financial performance of Brazilian firms is null during crises.*

MNEs may perform better than other domestic firms, in their home country, for several reasons. Among these reasons we can highlight the following: (1) adoption of new technologies, (2) adoption of knowhow and managerial practices, (3) diversification into new markets, (4) access

to cheaper resources and inputs, (5) access to international capital market, (6) higher scale and scope and (7) arbitrage between locations.

Moreover, MNEs are expected to be less exposed to economic downturns and recessions in their home country since part of their profits comes from sales and operations abroad. The exception would be a MNE that is very much connected with its home country government, so that, any political and economic crisis would have an impact on the company. Notwithstanding, we expect that MNEs that are connected to its home country government are less exposed to domestic shocks than domestic firms that are similarly linked with the state.

Therefore, the degree of internationalization might have a softening effect over the firm-level financial performance during crises. This means that there might be an internationalization premium that mitigates their negative effects on corporate financial performance.

Thus, we present our seventh hypothesis:

Hypothesis 3*: There is an internationalization premium during crises, which means that the higher the degree of internationalization, the higher the financial performance of Brazilian firms during crises.*

3 DATA AND METHODS

For this study, we analyzed all Brazilian publicly listed companies on the São Paulo Stock Exchange (BM&FBovespa) from 2002 to 2016. We considered only publicly listed firms, since we could collect reliable financial and ownership structure information only for this type of company.

Financial data was collected from Economatica® and Capital IQ database. Information on revenue in foreign markets was obtained from Bloomberg and Thomson One database and supplemented by information disclosed on the companies' Annual Reports (DFP – *Demonstrações Financeiras Padronizadas* and *Formulário de Referência* in Portuguese). Ownership structure information was obtained from the firms' Annual Reports (*Formulários de Referência* and IAN – *Informativos Anuais* in Portuguese) available at the Brazilian

Securities and Exchange Commission (CVM – *Comissão de Valores Mobiliários*), the Brazilian equivalent to SEC – Security Exchange Comission.

We screened the entire database in several ways. First, we excluded financial and insurance firms from the sample. These companies have very particular business characteristics. We also excluded holding corporations, keeping only their subsidiaries and affiliates. To avoid data duplication, we dropped firms controlled by other companies. In addition, we did not analyze public utilities companies (electricity and energy, water and sanitation and gas) since these companies do not have foreign sales.

We dropped companies that were in *Recuperação Judicial*, the Brazilian equivalent to Chapter 11, before crisis (before 2014). This was an attempt to mitigate distortions caused by poor performance not related to the crisis or to the ownership structure.

Lastly, as an attempt to reduce problems caused by extreme values we identified and removed outliers of key variables that vary substantially, particularly *leverage* (measured by the gross debt to the book value of total assets ratio) and *financial performance* (measured by ROA net income to book value of total assets ratio). We considered as an outlier any observation that felt more than 1.5 times in the interquartile range above the third quartile or below the first quartile.

We were able to obtain annual data on 212 Brazilian publicly listed firms. Due to missing information, especially regarding early years, mergers and acquisitions, bankruptcy, business attrition and delisting processes, we ended up with an unbalanced panel of 2,231 firm-year observations.

3.1 Dependent Variable

Our main dependent variable is the company's financial performance (measured by ROA – Return on Assets), which is the net income to average book value of total assets ratio. We chose ROA because according to DuPont Analysis it is the combination of asset turnover and net margin, which makes it a robust measure of performance.

The limitation of ROA as a measure of financial performance is associated to periods when there is a major divestment or investment program. To mitigate this distortion, we removed outliers in an annual basis, and also computed the denominator (book value of total assets) as an arithmetic average of the current period *t* with the prior period *t-1*.

Moreover, prior studies that assess the impact of state ownership on firm performance in Brazil, such as Inoue, Musacchio and Lazzarini (2013), Lazzarini and Musacchio (2015) and de Alcântara et al. (2017), also used ROA as the main measure of performance, making it possible to compare our main findings.

To ensure consistent results, as in Lazzarini and Musacchio (2015), we also considered changes in firm-level financial performance during and before the Brazilian economic and political crisis. For each firm, we estimated the financial performance during crisis as the arithmetic average of the financial performance between years 2014 and 2016 (3 years). The financial performance before crisis was measured as the arithmetic average of the financial performance between 2011 to 2013 (the 3 years before the event). Then, we took the difference between the two averages as our final indicator of financial performance change during crisis. We also included this indicator as an additional control, besides the other control variables used. With this addition, we captured the effect of fixed unobservable factors.

3.2 Explanatory Variables

Our explanatory variables are related to instances of state ownership and degree of internationalization during the Brazilian economic and political crisis.

As in Aldrighi and Neto (2007) and in Lazzarini and Musacchio (2015), whenever available and disclosed, we closely examined the pyramidal structures of companies and considered state ownership as the percentage of voting shares owned both directly and indirectly by the government.

We also created a dummy variable denominated *Crisis* that assumes the value of 1 if the year (*t*) refers to the crisis period in Brazil (2014, 2015 and 2016). Then, we joined this dummy variable together with instances of state ownership and with the degree of internationalization in order to obtain the incremental effect of state ownership and degree of internationalization over financial performance during crisis.

- Instances of state ownership:
  - *State ownership % & Crisis*: interaction of the dummy crisis indicating the crisis period, with the percentage of the total voting shares owned both directly and indirectly by the government;

- *State ownership largest shareholder & Crisis*: interaction of the dummy crisis indicating the crisis period, with a dummy variable that assumes the value of 1 if the Brazilian state is the largest shareholder;
- *State minority ownership & Crisis*: interaction of the dummy crisis indicating the crisis period, with a dummy variable that assumes the value of 1 if the Brazilian state is the minority shareholder;
- *State ownership < 10% & Crisis*: interaction of the dummy crisis indicating the crisis period, with a dummy variable that assumes the value of 1 if the percentage of the total voting shares owned both directly and indirectly by the government is less than 10% and greater than 1%.

- Degree of internationalization:
  - *FSTS % & Crisis*: interaction of the dummy crisis indicating the crisis period, with the degree of internationalization measured by the foreign sales to total sales ratio;
  - *FSTS Between 0 and 25% & Crisis*: interaction of the dummy crisis indicating the crisis period, with a dummy variable that assumes the value of 1 if FSTS is greater or equal to 1% and less or equal to 25%;
  - *FSTS Between 25 and 50% & Crisis*: interaction of the dummy crisis indicating the crisis period, with a dummy variable that assumes the value of 1 if FSTS is greater than 25% and less or equal to 50%;
  - *FSTS >= 50% & Crisis*: interaction of the dummy crisis indicating the crisis period, with a dummy variable that assumes the value of 1 if FSTS is greater than 50%;

3.3 Control Variables

We use the following control variables: *Firm size* measured as the natural logarithm of book value of total assets; *Leverage* measured as ratio of gross debt to book value of total assets; and *Liquidity* measured as the ratio of cash holdings and equivalents to book value of total assets. In Table 1 we can see a compilation of all our variables, and in Table 2 we show the descriptive statistics.

Table 1 – Variables compilation: description and formulas – performance

Type	Variables	Description	Formulas	Source
Dependent Variables	**ROA**	Financial performance measured by the Net Income in year *t* divided by the average value of book value of total assets	$\frac{Net\ Income_t}{(Total\ Assets_{t-1} + Total\ Assets_t)/2}$	Economática Capital IQ
	ROA Change	Change in financial performance during crisis measured as the difference between arithmetic average of ROA between years 2014 and 2016 and the arithmetic average of ROA between 2011 to 2013	$Average\ ROA_{2014-2016} - Average\ ROA_{2011-2013}$	Economática Capital IQ
Explanatory Variables	**Crisis**	Dummy variable that assumes the value of 1 if the year (t) refers to the crisis period in Brazil, which are 2014, 2015 and 2016	If year t = or(2014, 205, 2016) then 1 ; 0 otherwise	
	State ownership % & Crisis	Interaction of the dummy crisis indicating the crisis period, with the percentage of the total voting shares owned both directly and indirectly by means of BNDES, pension funds of SOEs and PSOEs, and other government institutions	State Ownership % * Crisis dummy	Annual Reports "Formulário de Referência" and IAN – "Informativos Anuais"
	State largest shareholder & Crisis	Interaction of the dummy crisis indicating the crisis period, with a dummy variable that assumes the value of 1 if the Brazilian state is the largest shareholder;	State the Largest Shareholder dummy * Crisis dummy	Annual Reports "Formulário de Referência" and IAN – "Informativos Anuais"
	State minority ownership & Crisis	Interaction of the dummy crisis indicating the crisis period, with a dummy variable that assumes the value of 1 if the government is the minority shareholder	State Minority Shareholder dummy * Crisis dummy	Annual Reports "Formulário de Referência" and IAN – "Informativos Anuais"
	State ownership < 10% & Crisis	Interaction of the dummy crisis indicating the crisis period, with a dummy variable that assumes the value of 1 if the percentage of the total voting shares owned both directly and indirectly by means of BNDES, pension funds of SOEs and PSOEs, and other government institutions is less than 10%.	State Ownership < 10% dummy * Crisis dummy	Annual Reports "Formulário de Referência" and IAN – "Informativos Anuais"
	BNDES & Crisis	Interaction of the dummy crisis indicating the crisis period, with a dummy variable that assumes the value of 1 if the percentage of the total voting shares owned both directly and indirectly by the BNDES is greater or equal than a threshold that can be either 1% or 10%.	BNDES >= 1 or 10% dummy * Crisis dummy	Annual Reports "Formulário de Referência" and IAN – "Informativos Anuais"
	Pension Funds & Crisis	Interaction of the dummy crisis indicating the crisis period, with a dummy variable that assumes the value of 1 if the percentage of the total voting shares owned both directly and indirectly by pension funds of SOEs and PSOEs is greater or equal than a threshold that can be either 1% or 10%.	Pension Funds >= 1 or 10% dummy * Crisis dummy	Annual Reports "Formulário de Referência" and IAN – "Informativos Anuais"
	Other Government & Crisis	Interaction of the dummy crisis indicating the crisis period, with a dummy variable that assumes the value of 1 if the percentage of the total voting shares owned both directly and indirectly by other government institutions is greater or equal than a threshold that can be either 1% or 10%.	Other Government >= 1 or 10% dummy * Crisis dummy	Annual Reports "Formulário de Referência" and IAN – "Informativos Anuais"
	FSTS % & Crisis	Interaction of the dummy crisis indicating the crisis period, with the degree of internationalization measured by the foreign sales to total sales ratio	FSTS % * Crisis dummy	Annual Reports Bloomberg Thomson One
	FSTS Between 0 and 25% & Crisis:	Interaction of the dummy crisis indicating the crisis period, with a dummy variable that assumes the value of 1 if FSTS is greater or equal to 1% and less or equal to 25%	FSTS >= 1% and <=25% Dummy * Crisis dummy	Annual Reports Bloomberg Thomson One
	FSTS Between 25 and 50% & Crisis:	Interaction of the dummy crisis indicating the crisis period, with a dummy variable that assumes the value of 1 if FSTS is greater than 25% and less or equal to 50%	FSTS > 25% and <= 50% Dummy * Crisis dummy	Annual Reports Bloomberg Thomson One
	FSTS >= 50% & Crisis	Interaction of the dummy crisis indicating the crisis period, with a dummy variable that assumes the value of 1 if FSTS is greater than 50%	FSTS >= 50% Dummy * Crisis dummy	Annual Reports Bloomberg Thomson One
Control Variables	**Size**	Firm's size measured by the natural logarithm of book value of Total Assets.	$Ln(Book\ Value\ of\ Total\ Assets_t)$	Economática Capital IQ
	Leverage	Firm's leverage measured by the ratio of Total Debt to Book Value of Total Assets.	$\frac{Book\ Value\ of\ Total\ Gross\ Debt_t}{Book\ Value\ of\ Total\ Assets_t}$	Economática Capital IQ
	Liquidity	Firm's liquidity measured by the ratio of Cash and Equivalents to Book Value of Total Assets.	$\frac{Cash\ and\ Equivalents_t}{Book\ Value\ of\ Total\ Assets_t}$	Economática Capital IQ

Table 2 – Descriptive statistics and pearson correlation matrix – performance

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	ROA (t)	1																
2	ROA Change	0.5063***	1															
3	Crisis dummy	-0.1104***	n/a	1														
4	State ownership % (t-1) & Crisis	**-0.1601*** **	**-0.0950** **	0.2824***	1													
5	State largest shareholder (t-1) & Crisis	**-0.1343*** **	**-0.1274*** **	0.2199***	0.8571***	1												
6	State minority ownership (t-1) & Crisis	**-0.0875*** **	**0.0176**	0.3337***	0.2595***	-0.0201	1											
7	State ownership < 10% (t-1) & Crisis	**-0.0440** **	**-0.0105**	0.2132***	0.0718***	-0.0129	0.6390***	1										
8	BNDES >= 1% (t-1) & Crisis	**-0.1066*** **	**-0.0358**	0.2834***	0.4101***	0.2861***	0.6461***	0.3919***	1									
9	Pension Funds >= 1% (t-1) & Crisis	**-0.1116*** **	**-0.0919** **	0.3010***	0.4973***	0.5323***	0.5331***	0.3681***	0.2178***	1								
10	Other Government >= 1% (t-1) & Crisis	**-0.0883*** **	**-0.0335**	0.1844***	0.6080***	0.5199***	0.1966***	0.0986***	0.3181***	0.1417***	1							
11	FSTS % & Crisis	**-0.1132*** **	**0.0161**	0.4721***	0.2596***	0.2345***	0.3135***	0.1798***	0.4181***	0.2720***	0.1816***	1						
12	FSTS Between 0 and 25% (t-1) & Crisis:	**-0.0705*** **	**-0.1405*** **	0.4314***	0.1526***	0.1623***	0.1869***	0.1806***	0.1575***	0.2197***	0.0981***	0.1237***	1					
13	FSTS Between 25 and 50% (t-1) & Crisis:	**-0.0390** *	**0.0751** *	0.3071***	0.1193***	0.0657***	0.2406***	0.0746***	0.1513***	0.1815***	0.1224***	0.4201***	-0.0414*	1				
14	FSTS >= 50% (t-1) & Crisis	**-0.0947*** **	**0.0200**	0.2943***	0.1936***	0.1914***	0.1965***	0.1593***	0.3382***	0.1806***	0.1032***	0.8510***	-0.0397*	-0.0283	1			
15	Size (t-1)	-0.0009	-0.0624	0.1912***	0.1193***	0.1130***	0.1502***	0.1048***	0.1740***	0.1326***	0.1035***	0.2218***	0.0794***	0.0955***	0.1786***	1		
16	Liquidity (t-1)	0.2126***	0.0245	-0.0116	-0.0179	-0.0152	0.0211	0.0267	-0.0018	0.0193	-0.0068	0.0152	-0.0098	0.0188	0.0123	0.0574***	1	
17	Leverage (t-1)	-0.2287***	0.0124	0.1003***	0.0074	-0.0073	0.1242***	0.0858***	0.0769***	0.0939***	0.0071	0.1742***	0.0388*	0.0786***	0.1479***	0.2989***	-0.1091***	1

***significant at 1%: p <= 1%; **significant at 5%: p <= 5% ; *significant at 10%: p <= 10%

3.4 Estimation Approach

In Table 2 we can see the correlation coefficients between the variables. Most are below levels for which multicollinearity would be a problem. By further analyzing Table 2 we can see a negative and statistically significant correlation between state ownership (mainly majority state ownership) and our financial performance variable.

Panel regressions allow us to control for unobservable fixed firm and year factors that may affect performance. Inoue, Lazzarini and Musacchio (2013) state that simple ordinary least squares (OLS) regressions assessing the impact of government equity investment on performance "may suffer from selection bias or endogeneity caused by unobservable factors affecting both the likelihood of state ownership and the outcome under examination" (Inoue, Lazzarini and Musacchio, 2013 p. 1786). We included time-invariant firm-specific effects and year-fixed effects. In addition, to control for heteroscedasticity, we computed the robust standard errors. Clustering standard errors at industry level allows errors to be correlated over time within industries, which is very similar to the true nature of the data structure in our sample. For example, shock to y (and error u) in industry j in year t is likely to be persistent and still partially present in year $t+1$ for most of the variables we analyzed. Clustered standard errors at industry level would account for this.

Following Oesterle, Richta, and Fish (2013), Bhaumik, Driffield and Pal (2010), Inoue, Lazzarini and Musacchio (2013) we use one-year lagged explanatory and control variables to reduce the endogeneity problems that may be caused by simultaneous association between our performance variable and all our control and explanatory covariates.

4 RESULTS & DISCUSSION

4.1 Descriptive Analysis

Analyzing the evolution of our financial performance indicator, ROA, for each instance of state ownership, as in Lazzarini and Musacchio (2015), we can see in Table 3 and in Figure 3 that companies with state ownership did not underperform before crisis. Instead they seemed to perform slightly better than firms with no state ownership.

However, companies with majority and minority state ownership start underperforming after the financial crisis from 2009 on. The performance gap was even more pronounced during the Brazilian political and economic crisis during 2014 and 2016.

Table 3 – Financial performance evolution (ROA) and state ownership

Average of ROA - Return on Assets for each group in year *t*															
Instances of State Ownership	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
State the Largest Shareholder (t-1)	4.42	5.70	8.93	6.75	5.69	6.02	5.45	3.94	2.94	(0.12)	1.46	0.56	**(4.09)**	**(2.43)**	**(5.14)**
State Minority Ownership (t-1)	(0.20)	3.82	9.38	8.58	6.33	5.64	5.09	3.72	4.47	2.04	3.91	3.71	**1.90**	**(0.42)**	**0.82**
State Ownership < 10% (t-1)	(1.50)	1.72	9.87	8.88	6.67	5.04	6.74	4.92	5.44	3.20	5.71	5.92	**2.88**	**(0.64)**	**1.96**
No State Ownership (t-1)	3.37	4.88	6.11	5.72	5.24	5.28	3.73	5.41	6.63	5.13	4.37	4.51	**4.49**	**3.58**	**3.42**

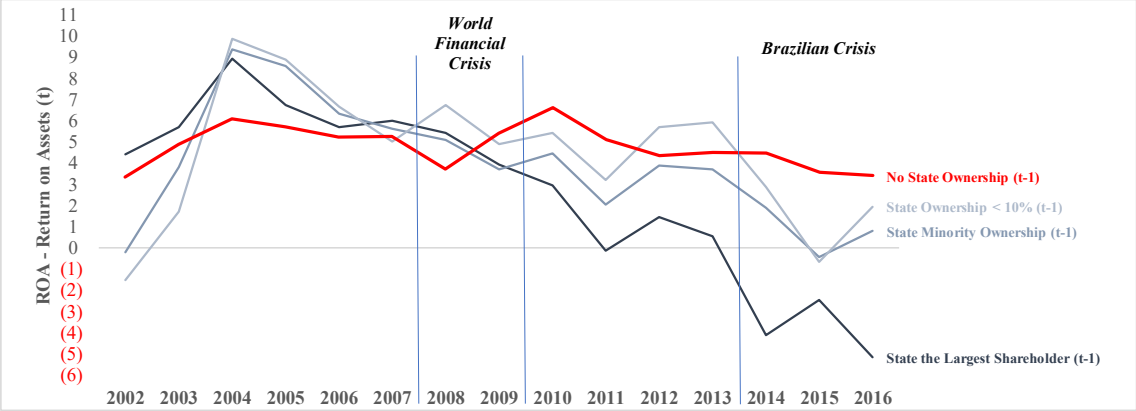

Figure 3 – Financial performance evolution (ROA) and state ownership

Corroborating the previous analysis, we also noticed in Table 4 a worse and statistically significant financial performance for all groups, on average, during the Brazilian crisis. However, the difference between financial performance before crisis and during crisis was larger for firms with some state equity stake. The performance gap was even higher for companies in which the government was the largest shareholder, suggesting that majority and fully owned SOEs are less resilient and more exposed to crisis than other companies.

Table 4 – Descriptive analysis: financial performance vs. ROA before and after crisis

ROA – Return on Assets (t)	**Before Crisis (2002-2013)**			**During Crisis (2014-2016)**			**Dif: During – Before Crisis**		
Instances of State Ownership	**Average**	**Std. Dev.**	**Obs.**	**Average**	**Std. Dev.**	**Obs.**	**Diff.**	**t Stat**	**p.value**
State the Largest Shareholder (t-1)	**4.12**	7.83	144	**-3.85**	10.39	33	**-7.98*****	-4.09	0.000
State Minority Ownership (t-1)	**4.60**	6.61	210	**0.76**	5.17	70	**-3.84*****	-4.97	0.000
State Ownership < 10% (t-1)	**5.30**	6.99	89	**1.49**	5.68	28	**-3.82*****	-2.88	0.006
No State Ownership (t-1): Baseline	**5.05**	7.56	1,398	**3.84**	6.71	376	**-1.21*****	-3.03	0.003

ROA – Return on Assets (t)	**Before Crisis (2002-2013)**			**During Crisis (2014-2016)**		
Instances of State Ownership	**vs. Baseline (no state ownership)**	**t Stat**	**p.value**	**vs. Baseline (no state ownership)**	**t Stat**	**p.value**
State the Largest Shareholder (t-1)	**-0.93**	-1.36	0.18	**-7.69*****	-4.12	0.00
State Minority Ownership (t-1)	**-0.45**	-0.91	0.36	**-3.08*****	-4.32	0.00
State Ownership < 10% (t-1)	**0.25**	0.32	0.75	**-2.36****	-2.05	0.05

***significant at 1%: p <= 1%; **significant at 5%: p <= 5% ; *significant at 10%: p <= 10%

A similar analysis was done for degree of internationalization. This analysis examined the evolution of ROA for each cluster of firms based on their FSTS. We can see in Table 5 and in Figure 4 that before crisis firms with some degree of internationalization performed better than firms with no revenues abroad. However, during crisis we note that, on average, the MNEs underperformed domestic companies. One possible explanation is that the higher the state ownership, the higher the degree of internationalization (Figure 5).

Table 5 – Financial performance evolution (ROA) and degree of internationalization

	Average of ROA - Return on Assets for each group in year *t*														
Instances of Degree of Internationalization	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
FSTS > 50% (t-1)	9.05	6.71	12.67	9.27	6.52	3.47	1.80	4.00	3.15	2.17	0.84	1.65	**0.39**	**(0.63)**	**1.67**
FSTS Between 25% and 50% (t-1)	3.59	8.64	11.01	8.44	8.79	7.02	3.33	6.25	6.41	3.37	3.70	2.67	**3.32**	**2.51**	**2.54**
FSTS Between 0% and 25% (t-1)	3.18	7.20	7.87	10.92	6.40	6.83	7.77	5.81	6.79	5.14	4.30	6.17	**3.46**	**1.75**	**1.33**
No Internationalization (t-1)	0.93	1.68	3.48	4.98	3.65	4.35	4.36	4.61	6.06	4.76	4.51	3.94	**4.30**	**3.62**	**3.24**

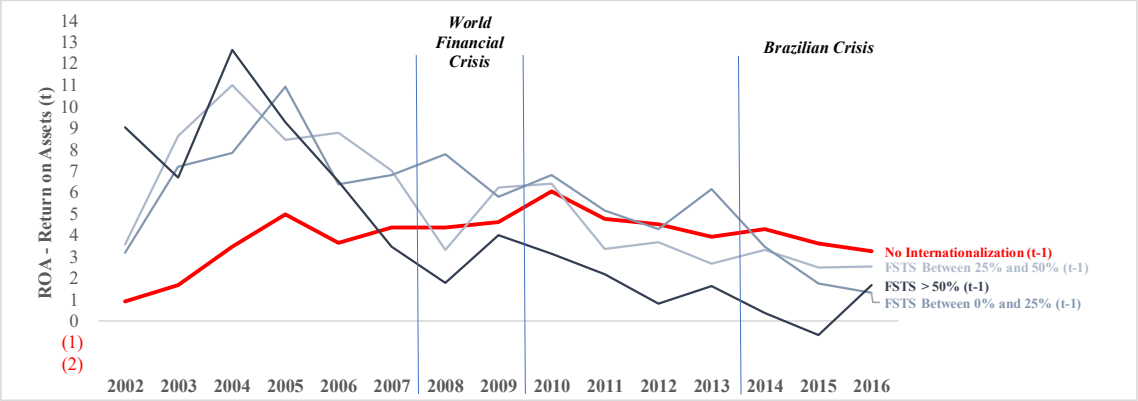

Figure 4 – Financial performance evolution (ROA) and degree of internationalization

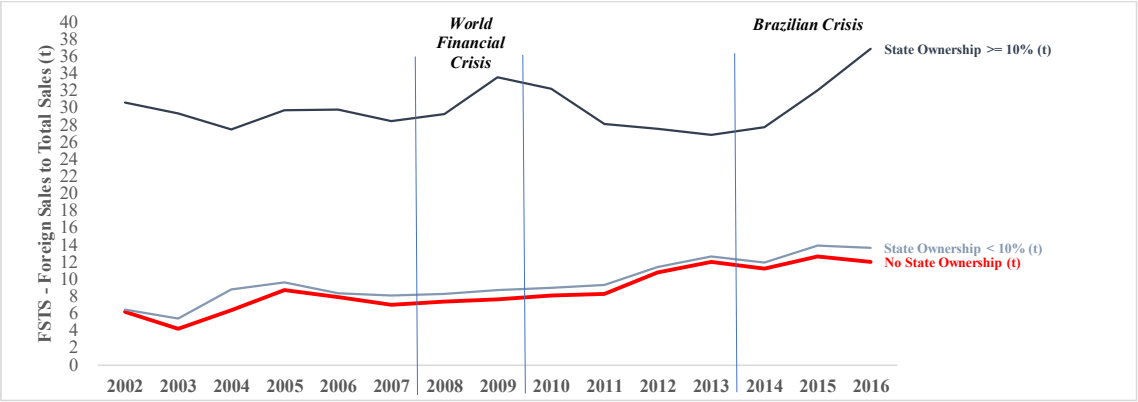

Figure 5 – Degree of internationalization evolution and state ownership

In Table 6 we see that, on average, the financial performance of enterprises with some foreign sales worsened during crisis, and this difference was statistically significant. Moreover, in comparison to firms with no sales abroad, companies with more than 50% foreign revenues presented a worse financial performance.

Table 6 – Descriptive analysis: financial performance vs. FSTS before and after crisis

ROA - Return on Assets (t)	Before Crisis (2002-2013)			During Crisis (2014-2016)			Dif: During - Before Crisis		
Instances of FSTS	Average	Std. Dev.	Obs.	Average	Std. Dev.	Obs.	Diff.	t Stat	p.value
FSTS > 50% (t-1)	**3.53**	5.10	101	**0.52**	4.43	55	**-3.01*****	-3.84	0.000
FSTS Between 25% and 50% (t-1)	**5.34**	6.85	159	**2.79**	6.64	63	**-2.55****	-2.56	0.012
FSTS Between 0% and 25% (t-1)	**6.07**	8.08	310	**2.24**	8.58	112	**-3.83*****	-4.11	0.000
No Internationalization (t-1): Baseline	**4.22**	7.15	852	**3.74**	7.02	245	**-0.49**	-0.96	0.339

ROA - Return on Assets (t)	Before Crisis (2002-2013)			During Crisis (2014-2016)		
Instances of FSTS	vs. Baseline (no state ownership)	t Stat	p.value	vs. Baseline (no state ownership)	t Stat	p.value
FSTS > 50% (t-1)	**-0.70**	-1.24	0.22	**-3.22*****	-4.31	0.00
FSTS Between 25% and 50% (t-1)	**1.12***	1.88	0.06	**-0.95**	-1.00	0.32
FSTS Between 0% and 25% (t-1)	**1.84*****	3.54	0.00	**-1.49**	-1.61	0.11

***significant at 1%: p <= 1%; **significant at 5%: p <= 5% ; *significant at 10%: p <= 10%

4.2 Hypothesis Test

For our hypothesis, we split our sample in two groups: (1) before the Brazilian economic and political crisis (2002-2013) and (2) during the Brazilian crisis (2014-2016). As we can see in Table 7, before crisis (Models 1 to 4) state ownership, on average, had no influence on financial performance when the government was the largest shareholder in Model 2, and the minority shareholder in Model 3. This occurs since the coefficients of the variable *State Ownership (t - 1),* although negative, were not statistically significant. As in Lazzarini and Musacchio (2015), we also found that SOEs do not seem to underperform before crisis. In addition, in Model 4 we found a positive relation between state minority ownership and financial performance before crisis for low levels of state ownership (less than 10%).

However, corroborating our previous descriptive analysis, during the Brazilian economic and political crisis (Models 5 to 8), we can see in Table 7 a negative influence of state majority ownership on financial performance. This occurs since the coefficient of the variable *State Ownership (t - 1)* was negative and statistically significant (Model 5 and Model 6).

In Model 5 of Table 7, the coefficient of the *State Ownership (t - 1)* variable was -0.8266, which indicates that a 1 percentage point increase in state ownership during crises caused on average a 0.8266 percentage point decrease in financial performance.

For minority and low levels of state ownership, in Models 7 and 8 respectively, the state equity stake had no statistically significant impact on financial performance during crisis.

Table 7 – Financial performance vs. state ownership before and during crisis

Dependent Variable: ROA (t)	**Before Crisis (2002-2013)**				**During Crisis (2014-2016)**			
Models	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Instances of State Ownership	**%**	**The Largest**	**Minority**	**< 10%**	**%**	**The Largest**	**Minority**	**< 10%**
State Ownership (t - 1)	**-0.0227**	**-1.3363**	**-0.2947**	**0.8518***	**-0.8266*****	**-19.0158*****	**4.2848**	**0.667**
	(-0.52)	**(-0.92)**	**(-0.34)**	**(1.91)**	**(-3.15)**	**(-4.28)**	**(1.52)**	**(0.51)**
Size (t-1)	-1.0749**	-1.0673**	-1.0933**	-1.1102**	-3.1265**	-5.3071***	-3.9278**	-3.1084**
	(-2.49)	(-2.39)	(-2.14)	(-2.31)	(-2.41)	(-2.99)	(-2.66)	(-2.53)
Leverage (t-1)	-0.1017***	-0.1016***	-0.1021***	-0.103***	0.0689	0.0547	0.0237	0.0187
	(-3.68)	(-3.66)	(-3.75)	(-3.74)	(0.78)	(0.53)	(0.18)	(0.14)
Liquidity (t-1)	0.0196	0.0192	0.02	0.02	0.0414	0.0241	0.0114	0.018
	(0.89)	(0.87)	(0.89)	(0.9)	(1.2)	(0.6)	(0.27)	(0.44)
Constant	22.3837***	22.2552***	22.5681***	22.7663***	51.1147**	80.6901***	59.5919**	47.9689**
	(3.52)	(3.43)	(3.11)	(3.3)	(2.71)	(3.08)	(2.37)	(2.17)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Robust Standard Errors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,752	1,752	1,752	1,752	479	479	479	479
Firms	211	211	211	211	172	172	172	172
R-squared	0.5589	0.5591	0.5588	0.5591	0.7682	0.7675	0.7477	0.7411

***significant at 1%: p <= 1%; **significant at 5%: p <= 5% ; *significant at 10%: p <= 10%

Using our full sample, in Table 8 we also found a negative influence of state majority ownership on financial performance during the Brazilian crisis. The variable formed by the interaction of the dummy variable indicating crisis and the dummy variable indicating situations in which the Brazilian state was the largest shareholder was negative and statistically significant. This means that during the Brazilian crisis, firms that had the government as the largest shareholder presented a lower profitability. Although negative, the coefficients of the interaction of the dummy variable indicating crisis and the dummy variable indicating instances of minority ownership were not statistically significant.

Table 8 – Financial performance during crisis vs. state ownership: full sample

Dependent Variable:	**ROA - Return on Assets (t)**			
Models	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Instances of State Ownership	**%**	**The Largest**	**Minority**	**< 10%**
State Ownership & Crisis (t-1)	**-0.0721*** **	**-5.6282*** **	**-0.5243**	**-0.6538**
	(-3.76)	**(-4.36)**	**(-0.67)**	**(-0.82)**
Crisis Dummy	-1.0487**	-1.0956**	-1.3906***	-1.4357***
	(-2.87)	(-2.82)	(-3.06)	(-3.59)
Size (t-1)	-1.0169*	-1.0591*	-1.1442*	-1.1437*
	(-1.82)	(-1.83)	(-1.93)	(-1.92)
Leverage (t-1)	-0.1025***	-0.1039***	-0.0981***	-0.0981***
	(-3.89)	(-3.99)	(-3.66)	(-3.68)
Liquidity (t-1)	0.0232	0.023	0.0263	0.0262
	(0.98)	(0.98)	(1.13)	(1.12)
Constant	21.345**	22.0221**	23.0519**	23.0471**
	(2.72)	(2.69)	(2.77)	(2.74)
Year Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
Robust Standard Errors	Yes	Yes	Yes	Yes
Observations	2,231	2,231	2,231	2,231
Firms	212	212	212	212
R-squared	0.5336	0.5453	0.5297	0.5297

***significant at 1%: p <= 1%; **significant at 5%: p <= 5% ; *significant at 10%: p <= 10%

Examining the influence of state ownership on financial performance change during crisis, we can see in Table 9 that firms in which the government was the largest shareholder had, on average, a larger decrease in both profitability. This suggests that these firms are more exposed to crises. Although negative, the coefficients indicating instances of minority ownership were not statistically significant.

Table 9 – Change in financial performance and state ownership

Dependent Variable:	**Change in ROA - Return on Assets (t)**			
Models	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Instances of State Ownership	**%**	**The Largest**	**Minority**	**< 10%**
State Ownership (t - 1)	**-0.0745*** **	**-4.9145*** **	**-0.3598**	**-0.5661**
	(-5.64)	**(-4.36)**	**(-0.38)**	**(-0.69)**
Size (t-1)	-0.0197	-0.0111	-0.1838	-0.1878
	(-0.06)	(-0.04)	(-0.55)	(-0.55)
Leverage (t-1)	-0.0571**	-0.0556**	-0.0375	-0.0377
	(-2.23)	(-2.15)	(-1.47)	(-1.52)
Liquidity (t-1)	0.1016**	0.099**	0.0959**	0.096**
	(2.68)	(2.7)	(2.25)	(2.3)
Performance Before Crisis	-0.444***	-0.4227***	-0.3728***	-0.3709***
	(-13.15)	(-12.93)	(-9.75)	(-9.2)
Constant	1.414	1.0592	2.6001	2.6344
	(0.32)	(0.27)	(0.62)	(0.61)
Robust Standard Errors	Yes	Yes	Yes	Yes
Observations	479	479	479	479
Firms	172	172	172	172
R-squared	0.1843	0.1824	0.1418	0.1418

***significant at 1%: p <= 1%; **significant at 5%: p <= 5% ; *significant at 10%: p <= 10%

Our results suggest that before crisis, firms can use government economic and political assistance to grow and increase their marker power. This can be especially advantageous in a country with institutional voids, such as Brazil. These companies, in general, did not underperform in comparison to privately controlled enterprises. However, during crises, or periods when the companies can no longer rely on state assistance, the agency and incentives problems may escalate. In this scenario, firms with the government as the largest shareholder showed a consistently worse performance. Our results are consistent with the view that majority and fully owned SOEs underperform when they need to respond quickly to negative pressures.

Regarding minority state ownership, our results are consistent with existing literature by showing that the performance gap is lower or null due to the existence of a profit-oriented shareholder. Our findings showed that the potential advantages of minority state ownership in countries with institutional voids may disappear during economic and political downturns. This highlights the need for companies to develop and absorb skills in order to reduce their dependence from state support.

Knowing that the Brazilian government can hold voting shares directly and indirectly through BNDES, pension funds of SOEs and PSOEs and other government institutions, the next step was to analyze what kind of state ownership is negatively influencing financial performance during the Brazilian crisis.

The results presented in Table 10 indicate that although the coefficients associated with all state ownership classifications were negative, the adverse influence on financial performance measured primally comes from pension funds of SOEs and PSOEs. The coefficients of the variable *Pension Funds (t-1) & Crisis* were all negative and statistically significant. The coefficient associated to BNDES ownership, *BNDES (t-1) & Crisis,* was negative and statistically significant only in cases when BNDES owned more than 10% of the voting shares, directly or indirectly. This finding may suggest that the negative effects of state ownership during crisis are more pronounced when the government uses pension funds of SOEs and PSOEs as a way to equity invest, and also emerge from high level of BNDES equity stake.

Table 10 – Financial performance and type of state ownership

Dependent Variable:	**ROA - Return on Assets (t)**					
Models	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Instances of State Ownership	**>= 1%**	**>= 1%**	**>= 1%**	**>= 10%**	**>= 10%**	**>= 10%**
BNDES (t-1) & Crisis	**-2.6838**	-	-	**-3.8511***	-	-
	(-1.46)			**(-1.79)**		
Pension Funds (t-1) & Crisis	-	**-3.3529*****	-	-	**-4.3947*****	-
		(-5.57)			**(-5.48)**	
Other Gov. (t-1) & Crisis	-	-	**-1.6262**	-	-	**-1.6262**
			(-0.76)			**(-0.76)**
Crisis Dummy	-1.201**	-1.0105**	-1.3966***	-1.2338***	-1.1019***	-1.3966***
	(-2.78)	(-2.81)	(-3.42)	(-3.11)	(-3.38)	(-3.42)
Size (t-1)	-1.152*	-1.0676*	-1.1539*	-1.1534*	-1.0502*	-1.1539*
	(-1.87)	(-1.83)	(-1.92)	(-1.9)	(-1.83)	(-1.92)
Leverage (t-1)	-0.0997***	-0.0986***	-0.0991***	-0.0999***	-0.0999***	-0.0991***
	(-3.85)	(-3.68)	(-3.83)	(-3.8)	(-3.67)	(-3.83)
Liquidity (t-1)	0.0259	0.0265	0.0257	0.0266	0.0262	0.0257
	(1.12)	(1.12)	(1.1)	(1.15)	(1.1)	(1.1)
Constant	23.221**	21.9599**	23.2313**	23.2322**	21.7394**	23.2313**
	(2.66)	(2.67)	(2.73)	(2.72)	(2.7)	(2.73)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Robust Standard Errors	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,231	2,231	2,231	2,231	2,231	2,231
Firms	212	212	212	212	212	212
R-squared	0.5315	0.5333	0.5299	0.5320	0.5341	0.5299

***significant at 1%: p <= 1%; **significant at 5%: p <= 5% ; *significant at 10%: p <= 10%

Complementing our results, we can see in Table 11 that both BNDES and pension funds of SOEs and PSOEs had a negative and statistically significance influence on financial

performance change during the Brazilian crisis, and the performance gap was higher for larger equity stake (Model 4 and Model 5).

Table 11 – Financial performance change and type of state ownership

Dependent Variable:	**Change in ROA - Return on Assets**				
Models	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Instances of State Ownership	**>= 1%**	**>= 1%**	**>= 1%**	**>= 10%**	**>= 10%**
BNDES (t-1)	**-1.5778** **	-	-	**-2.2418** **	-
	(-2.5)			**(-2.82)**	
Pension Funds (t-1)	-	**-2.3056** ***	-	-	**-2.8139** ***
		(-3.63)			**(-3.78)**
Other Gov. (t - 1)	-	-	**-2.7832**	-	-
			(-1.3)		
Size (t-1)	-0.1021	-0.1252	-0.1194	-0.1172	-0.1317
	(-0.31)	(-0.35)	(-0.38)	(-0.35)	(-0.38)
Leverage (t-1)	-0.0399	-0.0369	-0.0442*	-0.0404	-0.0378
	(-1.64)	(-1.54)	(-1.85)	(-1.66)	(-1.56)
Liquidity (t-1)	0.0967**	0.0999**	0.0978**	0.0963**	0.0949**
	(2.42)	(2.71)	(2.3)	(2.41)	(2.53)
Performance Before Crisis	-0.3851***	-0.3854***	-0.3903***	-0.3861***	-0.3838***
	(-9.23)	(-8.71)	(-12.21)	(-8.74)	(-9.24)
Constant	1.6185	1.9558	1.9643	1.8424	2.0884
	(0.39)	(0.44)	(0.49)	(0.45)	(0.48)
Robust Standard Errors	Yes	Yes	Yes	Yes	Yes
Observations	479	479	479	479	479
Firms	172	172	172	172	172
R-squared	0.1473	0.1577	0.1497	0.1493	0.1591

***significant at 1%: p <= 1%; **significant at 5%: p <= 5% ; *significant at 10%: p <= 10%

Therefore, we found strong support for our Hypothesis 1 and Hypothesis 2.

Analyzing the influence of different levels of internationalization in the firm-level financial performance during the Brazilian crisis in Table 12 and in Table 13, we did not find a positive influence that could mitigate the negative effects of the domestic recession.

This result may suggest that the negative effects of a crisis in the home country may overcome the benefits of operating and selling in other markets. Consequently, as stated by Hennart, Sheng and Carrera Jr. (2017), it is vital to understand the internal institutions if one wants to operate in emerging markets since they have strong effects on performance.

Therefore, we did not find support for our Hypothesis 3. One possible explanation for this result is that, on average, Brazilian MNEs present high degrees of state ownership, and majority and fully owned SOEs underperformed during the Brazilian crisis.

Table 12 – Financial performance and degree of internationalization

Dependent Variable:	**ROA - Return on Assets (t)**			
Models	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Instances of Internationalization	**%**	**0-25%**	**25-50%**	**> 50%**
Internationalization (t-1) & Crisis	**-0.0279**	**-2.669*** **	**-0.049**	**-0.9609**
	(-1.5)	**(-3.51)**	**(-0.07)**	**(-0.81)**
Crisis Dummy	-1.3662***	-1.1092**	-1.7795***	-1.679***
	(-3.02)	(-2.49)	(-3.79)	(-3.92)
Size (t-1)	-0.9213	-0.9575*	-0.9017	-0.8954
	(-1.68)	(-1.91)	(-1.63)	(-1.64)
Leverage (t-1)	-0.0634***	-0.0626***	-0.0639***	-0.0637***
	(-3.44)	(-3.27)	(-3.48)	(-3.47)
Liquidity (t-1)	0.0167	0.0158	0.0151	0.0156
	(0.75)	(0.72)	(0.67)	(0.69)
Constant	19.0533**	19.5637**	18.8018**	18.6949**
	(2.41)	(2.72)	(2.35)	(2.38)
Year Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
Robust Standard Errors	Yes	Yes	Yes	Yes
Observations	2,231	2,231	2,231	2,231
Firms	212	212	212	212
R-squared	0.5628	0.5654	0.5614	0.5617

***significant at 1%: p <= 1%; **significant at 5%: p <= 5% ; *significant at 10%: p <= 10%

Table 13 – Change in financial performance and degree of internationalization

Dependent Variable:	**Change in ROA - Return on Assets (t)**			
Models	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Instances of State Ownership	**%**	**0-25%**	**25-50%**	**> 50%**
Internationalization (t-1)	**-0.0035**	**-1.6302*** **	**0.8558**	**-0.1855**
	(-0.37)	**(-4.9)**	**(1.25)**	**(-0.35)**
Size (t-1)	-0.2005	-0.2258	-0.2201	-0.2052
	(-0.65)	(-0.79)	(-0.7)	(-0.64)
Leverage (t-1)	-0.0346	-0.0343	-0.0361	-0.0349
	(-1.46)	(-1.47)	(-1.54)	(-1.49)
Liquidity (t-1)	0.0925**	0.0892**	0.0902*	0.0923**
	(2.23)	(2.2)	(2.12)	(2.25)
Performance Before Crisis	-0.3636***	-0.3524***	-0.3588***	-0.3631***
	(-10)	(-9.41)	(-9.79)	(-9.93)
Constant	2.7503	3.4261	2.9288	2.798
	(0.71)	(1)	(0.73)	(0.7)
Robust Standard Errors	Yes	Yes	Yes	Yes
Observations	479	479	479	479
Firms	172	172	172	172
R-squared	0.1424	0.1560	0.1446	0.1423

***significant at 1%: p <= 1%; **significant at 5%: p <= 5% ; *significant at 10%: p <= 10%

4.3 Implications

Our study has several practical implications. For the management field, it highlights the importance of developing skills to reduce the companies' reliance on the state. This will be particularly useful during crisis. Moreover, to operate and succeed in emerging markets, it is vital to understand the home country institutions and their business implications, since they exert influence on a firms' strategic decisions and its financial performance.

For public policy makers, it shows the need to convert state equity investment into benefits for the economy and the society as a whole. In some occasions, public resources were tunneled to the majority shareholder at the expense of the minorities and the citizens. During crisis, this problem is potentialized.

Good governance practices and strong home country institutions can reduce the potential negative effects of majority state ownership on performance. Beuselinck et al. (2017) show that in countries with lower governance standards, the government is more inclined to pursue its political agenda and to expropriate other shareholders. Therefore, our study also sheds light on the importance of the adoption of good governance in majority and minority SOEs, pension funds of SOEs and on other public institutions such as BNDES. As Lazzarini and Musacchio (2015: p. 28-29) stated, our study does not suggest that SOEs should be generally avoided. In Brazil they control important and strategic resources. However, "particular caution is needed when exogenous changes increase the temptation of the government to intervene".

5 CONCLUSION

Given the importance of MNEs and SOEs for the global economy, particularly in emerging markets, our study aimed to analyze the impact of state majority and minority ownership on firm-level financial performance before and during the Brazilian economic crisis, a period when the state financial and political support sharply decreased.

We hypothesized that on account of agency problems and lack of strong incentives, majority and fully owned SOEs would underperform private companies during crises. We found that these firms did not underperform before the Brazilian crisis of 2014-2016. However, corroborating our hypothesis, during the crisis they had a worse financial performance in

comparison to private firms. These companies could not react quick enough and adopt measures to mitigate the impact of the crisis.

The effects of agency problems, in turn, should be alleviated in firms with state minority ownership. In these cases, there is a profit-oriented major shareholder that seeks to maximize returns and will have strong incentives to monitor the management team. Still relying on government financial and political support, it is expected that these firms present a better performance under normal circumstances. However, if they cannot develop and incorporate managerial skills to either reduce or eliminate their dependence from the state, during periods in which the government support is reduced, they may show a worse performance in comparison to privately controlled firms. In fact, we found that companies in which the state owned directly and indirectly less than 10% of the voting share had, on average, a better performance before crisis. However, this positive effect was eliminated during the crisis. Our result reinforces the need for the firms to develop skills to reduce their reliance from the state. The degree of internationalization did not alleviate the negative impacts of crisis, which suggests that the home country institutional environment exert strong influence on a firms' financial performance even when the companies have a relevant portion of their revenues in foreign countries.

As any other study, our study also has limitations. First of all, our analysis is restricted only to the Brazilian market, and consequently some of our results may be specific to Brazil. Moreover, due to data availability we only considered publicly listed firms. Regarding the firm-level performance measure, we focused our empirical analysis on ROA – Return on Assets. SOEs and minority SOEs may pursue social and political objectives, such as the development of specific regions where capital and infrastructure are scarce and the promotion of R&D activities. Notably, these goals that might create positive spillovers for the economy and society in the long-term (Lazzarini & Musacchio, 2015) are not captured, at least in the short-term, by the indicators used in our study.

Our results may suffer from the impact of "survival bias" since we are analyzing only firms that are publicly listed, and "survived" a series of events. We are not capturing the effects of state majority and minority ownership in companies under Chapter 11, and that were delisted for some reason.

Another limitation is that there may be tacit voting agreements between shareholders that are not disclosed in the available reports, and hence, they were not considered in our database. We are also not capturing the effects of government investment in the companies' non-voting shares, another modality of equity financing. Still concerning ownership structure, we considered that pension funds of SOEs and PSOEs had

As suggestion for future studies, we recommend the analysis of the influence of corporate governance over the performance of majority and minority SOEs, since good governance practices, such as a board of directors composed by independent directors, may limit government intervention, consequently reducing the "liability of stateness". Regarding this topic, a deeper analysis of governance practices in pension funds of SOEs and PSOEs can be rewarding given their influence on strategic decisions and firm-level financial performance. Lastly, by the analysis of other social and economic indicators, one can evaluate whether the state investment and ownership are being converted into higher development and benefits for the society.

REFERENCES

de Alcântara, J. N., Calegario, C.L.L., de Andrade, L.P., & de Alcântara, J.N. (2017). A propriedade estatal. a condição dos paraísos fiscais e o desempenho finaneiro: uma análise dasmultinacionais brasileiras no período de 2000 a 2015. In: Encontro Nacional de Programas de Pós-graduação em Administração. Anais. São Paulo: Anpad. October/2017. Estratégia em Organizações.

Aldrighi, D. M., & Neto, R. M. (2007). Evidências sobre as estruturas de propriedade de capital e de voto das empresas de capital aberto no Brasil. *Revista Brasileira de Economia.* 61(2): 129-152.

Bai, C-E., & Xu, L.C. (2005). Incentives for CEOs with multitasks: evidence from Chinese state-owned enterprises. *Journal of Comparative Economics*. 33(3): 517-539.

Beuselinck, C., Cao, L., Deloof, M., & Xia, X. (2017). The value of government ownership during the global financial crisis. *Journal of corporate Finance.* 42: 481-493.

Bhaumik, S. K., Driffield, N., & Pal. S. (2010). Does ownership structure of emerging market firms affect their outward FDI? The case of the Indian automotive and pharmaceutical sectors. *Journal of International Business Studies.* 41(3): 437-450.

Borisova, G., Brockman, P., Salas, J. M., & Zagorchev, A. (2012). Government ownership and corporate governance: Evidence from the EU. *Journal of Banking & Finance*. 36(11): 2917-2934.

Boycko, M., Shleifer A., & Vishny, R. (1996). A Theory of Privatization. *Economic Journal*. 106(435): 309-319.

Brey, N. K., Camilo, S. P. O., Marcon, R., & de Mello, R. B. (2015). Conexões políticas das empresas por estruturas de propriedade: uma abordagem do governo como acionista. *RACE-Revista de Administração, Contabilidade e Economia.* 11(2): 319-350.

Caseiro, L., & Masiero, G. (2014). OFDI promotion policies in emerging economies: The Brazilian and Chinese strategies. *Critical Perspectives in International Business.* 10(4): 237–255.

Chen, G., Firth, M., & Xu, L. (2009). Does the type of ownership control matter? Evidence from China's listed companies. *Journal of Banking & Finance.* 33(1): 171-181.

Chong, A., & Lopes-de-Silanes, F. (2005). *Privatization in Latin America: myths and reality*. World Bank Publications and Stanford University Press. Washington DC.

Cuervo-Cazurra, A. (2008). The multinationalization of developing countries MNEs: The case of multilatinas. *Journal of International Management*, 14 (2): 138-154.

Cuervo-Cazurra, A., Inkpen, A., Musacchio, A., & Ramaswamy, K. (2014). Governments as owners: State-owned multinational companies. *Journal of International Business Studies*. 45(8): 919-942.

Dewenter, K. L., & Malatesta, P. H. (2001). State-owned and privately owned firms: An empirical analysis of profitability, leverage, and labor intensity. *American Economic Review*. 91(1): 320-334.

Dixit, A. (2002). Incentives and organizations in the public sector: an interpretative review. *The Journal of Human Resources*. 37(4): 696-727.

Economist (2012. January 21st). Special report: state capitalim. *Economist*, January 21st. 2012.

Goldeng, E., Grünfeld, L. A., & Benito, G. R. (2008). The performance differential between private and state owned enterprises: The roles of ownership, management and market structure. *Journal of Management Studies.* 45(7), 1244-1273.

Gunasekarage, A., Hess, K., & Hu, A. J. (2007). The influence of the degree of state ownership and the ownership concentration on the performance of listed Chinese companies. *Research in International Business and Finance.* 21(3): 379-395.

Hennart, J-F., Sheng, H. H., & Carrera Jr., J. M. (2017). Openness, international champions, and the internationalization of Multilatinas. Journal of World Business. 52(4): 518-532.

Inoue, C., Lazzarini, S., & Musacchio, A. (2013). Leviathan as a minority shareholder: firm-level implications of equity purchases by the state. *Academy of Management Journal*. 56(6): 1775-1801.

Jensen, M. C. (1986). Agency costs of free cash flow. corporate finance. and takeovers. *American Economic Review.* 76(2): 323-329.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics.* 3(4): 305-360.

Lazzarini, S. G., & Musacchio, A. (2011). Leviathan as a minority shareholder: a study of equity purchases by the brazilian national development bank (BNDES). *Harvard Business School Working Paper*. 1995-2003. Available at http://www.hbs.edu/research/pdf/11-073.pdf.

Lazzarini, S. G., & Musacchio, A. (2015). *State Ownership and Firm-Level Performance*. In Academy of Management Proceedings (Vol. 2015, No. 1, p. 14457). Briarcliff Manor, NY: Academy of Management.

Liu, L. (1993). Entry-exit, learning and productivity change: evidence from Chile. *Journal of Development Economics*. 42(2): 217–242

Megginson, W. L. (2005). *The financial economics of privatization*. Oxford University Press. New York.

Megginson, W., & Netter, J. (2001). From state to market: A study of empirical studies of privatization. *Journal of Economic Literature.* 39(2): 321–389.

Musacchio, A., & Lazzarini, S. G. (2012). Leviathan in business: varieties of state capitalism and their implications for economic performance. *Harvard Business School Working Paper*. No. 12-108. Available at SSRN 2070942.

Musacchio, A., & Lazzarini, G. (2014). *State-owned enterprises in Brazil: History and lessons, paper prepared for the workshop on state-owned enterprises in the development process*. Paris, 4 April. Paris: Organization for Economic Cooperation and Development.

Oesterle, M-J., Richta, H. N., & Fish, J. H. (2013). The influence of ownership structure on internacionalization. *International Business Review.* 22(1): 187-201.

Puga, F. P., & Gabrielli, H. (2018, March). O BNDES e o investimento: 2000 a 2016. Available at: https://web.bndes.gov.br/bib/jspui/handle/1408/14580

Sheng, H., & Carrera Jr., J.M. (2017). *The Top 20 Brazilian Multinationals: Divestment under Crises*. Emerging Markets Global Players (EMGP) Report – Report of the Fundacao Getulio Vargas and the CCSI – Columbia Center on Sustainable Development. Available at: http://ccsi.columbia.edu/files/2013/10/EMGP-Brazil-Report-March-21-2017-FINAL.pdf

Shirley M., & Nellis J. (1991). *Public enterprise reform: the lessons of experience*. Economic Development Institute of the World Bank: Washington, DC.

Shleifer, A. (1998). State versus private ownership. *Journal of Economic Perspectives*, 12(4): 133–150.

Shleifer A., & Vishny, R.W. (1998). *The grabbing hand: government pathologies and their cures*. Harvard University Press: Cambridge.

Sun, Q., Tong, W. H., & Tong, J. (2002). How does government ownership affect firm performance? Evidence from China's privatization experience. *Journal of Business Finance & Accounting*. 29(1-2:, 1-27.

Vickers, J., & Yarrow, G. (1988). *Privatization: an economic analysis*. MIT Press: Cambridge

Wei, Z., & Varela, O. (2003). State equity ownership and firm market performance: evidence from China's newly privatized firms. *Global Finance Journal.* 14(1): 65-82.

Wu, H. L. (2011). Can minority state ownership influence firm value? Universal and contingency views of its governance effects. *Journal of Business Research.* 64(8). 839-845.

Yu, M. (2013). State ownership and firm performance: Empirical evidence from Chinese listed companies. *China Journal of Accounting Research.* 6(2): 75-87.