

Influence of corruption on state-owned enterprise expenditures

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This study aims to analyze the effect of corruption on state-owned enterprises (SOEs) and how this practice could be harmful to the economy, despite what the *grease on the wheels* hypothesis suggests. A database built from three other databases was used. It contained only stock market listed enterprises. After the data treatment process, only 96,379 observations remained, from companies from 41 countries between 2002 and 2011. To achieve the expected results this study used the Difference-in-Differences technique in order to measure the effect of political influence on SOEs spending after the 2008 financial crisis. The results confirmed the hypothesis of the study, demonstrating that within environments with high levels of corruption, politicians use their influence for political/private gain purposes.

Keywords: political environment; corruption; state enterprises; public spending.

Influência da corrupção nos gastos das empresas estatais

O presente estudo procura analisar o efeito da corrupção sobre o nível de gastos das empresas estatais (*State-Owned Enterprises* — SOEs) e como essas práticas podem ser prejudiciais para economia, a despeito do que propõe a hipótese *grease on the wheels*. Para atender a proposta do estudo foi utilizada uma base de dados construída a partir de outras três bases que continham apenas empresas listadas no mercado de ações. Após o tratamento dos dados restaram 96.379 observações de empresas de 41 países entre 2002 e 2011. Para a consecução dos resultados a pesquisa fez uso da técnica *Difference-in-Differences* para mensurar o efeito da influência política sobre os gastos das SOEs após a crise financeira de 2008. Os resultados confirmaram a hipótese do estudo, demonstrando que em ambientes com elevada corrupção, os políticos usam a sua influência com o objetivo de obter ganhos políticos/privados.

Palavras-chave: ambiente político; corrupção; empresas estatais; gastos públicos.

Influencia de la corrupción en los gastos de las empresas estatales

Este trabajo busca analizar el efecto de la corrupción sobre el nivel de gasto de las empresas estatales (*State-Owned Enterprises* — SOEs) y como estas prácticas pueden ser perjudiciales para la economía, a pesar de lo que propone la hipótesis *grease on the wheels*. Para este propósito el estudio utiliza una base de datos construida a partir de otras tres bases conteniendo informaciones solo de empresas listadas em el mercado de acciones. Después del tratamiento de los datos, quedaron 96.379 observaciones de empresas de 41 países entre 2002 y 2011. Mediante el uso de la técnica *Difference-in-Differences*, se midió el efecto de la influencia política sobre los gasto de las SOEs, después de la crisis financiera de 2008. Los resultados confirmaron la hipótesis del estudio, demostrando que en ambientes con elevada corrupción, los políticos usan su influencia con el objetivo de obtener ganancias políticas/privadas.

Palabras clave: ambiente político; corrupción; empresas estatales; gastos públicos.

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1. INTRODUCTION

Corruption is neither a recent nor an exclusive problem of developing countries, but its characteristics and effects become more present in these nations, perhaps because of the systemic character and the social disfigurement of the problem (e.g.: Persson, Rothstein and Teorell, 2013). Indeed, Graeff and Mehlkop (2003) demonstrate empirically that there are stable patterns of corruption in free-market systems that only differ when one looks at the wealth factor, finding that poorer countries are more likely to be more corrupt. Ambraseys and Bilham (2011) also found similar results in the strong correlation between national per capita income and corruption (i.e., the poorer a country is, the more likely it is to be corrupt). This practice has serious impacts on the wellbeing of families, especially poorer families, who more actively need essential public services, as demonstrated by Justesen and Bjørnskov (2014), an implication on people's livelihood was likewise verified, by Ambraseys and Bilham (2011).

However, despite the belief that corruption may be desirable when facing aspects related to the efficiency of the systems where bureaucracy and poor governance of public institutions prevail, in order to make institutions work (the concept is known as *grease on the wheels* — e.g., Dreher and Grassebner, 2013; Kato and Sato, 2015; Melo, Sampaio and Oliveira, 2015; Goedhuys, Mohnen and Taha, 2016), the concept has not yet been consistently verified in the literature. In fact, even countries like Iceland, considered in 2005 and 2006 the least corrupt country in the world, is known to have used corruption practices that were helpful in the economic development of the country, which later showed a backlash in the financial crisis of 2008 when approximately 85% of the country's financial system collapsed (Erlingsson, Linde and Öhrvall, 2016).

Several studies reinforce the problem, such as Dutta and Sobel (2016), who verified that corruption never favors entrepreneurship, even in crisis situations (e.g.: 2008 financial crisis). According to these authors, corruption would be always an evil, just reducing its negative effect when the business climate is bad. In turn, Méon and Sekkat (2005) observed that corruption would be detrimental to growth and investment, especially in countries with weak institutional systems. This result corroborates with Mauro's (1995) findings. Mauro analyzed 58 countries and found evidence that corruption has a negative effect on the relationship between GDP and private investment. Mo (2001), studying 46 countries, has shown that the increase in corruption practices reduces economic growth, indicating political instability as the main mechanism for explaining this result.

Another problem concerning corruption is the distortion of public spending that, as Del Monte and Papagni (2001) argue, tends to reduce the inputs (e.g., investments in infrastructure and qualification of human resources) that are necessary for private enterprises to develop and stimulate economic growth. These impediments, not infrequently, tend to make public authorities justify their spending, often through public companies, in order to stimulate the economy. However, when governments incur in dubious governance practices, these practices are likely to be seen as a "green light" for corrupt acts. For that matter, this study intends to analyze the effect of corruption on the expenditures of state companies in an attempt to reveal how corrupt institutional environments can divert these organizations from their economic and social purposes for the profit of politicians and their affiliates.

In order to meet those purposes, the present study is divided into six sections, including this introduction, which sought to demonstrate the apparent divergence in the literature about the benefits and problems of corruption for the economy. Section two addresses the main issues of corruption and the efforts of nations to combat it. Section three instrumentalizes the hypotheses that will guide the research. Section four presents the methodology and lays out the design of the study and the technique used. In section five, the outputs of the proposed model are analyzed and, finally, section six presents the conclusions and limitations of the proposed study and gives suggestions for future research.

2. CORRUPTION

Corruption is a global problem that affects all of society, including governments and businesses. Public officials and entrepreneurs make the rational decision to incur in corruption when there is an incentive to practice illegal acts, namely, when the sum of the probabilities of being discovered and punished, plus the extent of the punishment, are smaller than the benefits (Rose-Ackerman, 2002:63-64; Ferreira, 2015).

Before 1990, public corruption was treated in the academic literature only by modeling-oriented economists, dedicated to studying the effect of informational imbalance in auctions, brought on by informational asymmetry. Studies of the impact of corruption on the economy were rare, and the phenomenon was considered by many researchers as a “grease” on the wheels of the bureaucracy — at first glance an unintentional and unimportant consequence, that could in fact be beneficial to the economy (Abramo, 2006; Grassebner, 2013; Melo, Sampaio and Oliveira, 2015; Kato and Sato, 2015; Goedhuys, Mohnen and Taha, 2016).

Considering the benefits from corrupt acts, corruption was deemed necessary for dealing with the public administration, considered essential to speed up certain processes. Corruption (from small bribes to major corrupt practices) in less developed countries was accepted and even encouraged by several developed countries, which made corruption in foreign countries by companies tax-deductible (Pietro, 2002; Furtado, 2006). In this regard, researchers believed that corruption could minimize uncertainties and barriers in, for example, an investment project, without seriously affecting the rate of return, and could also be a strong instrument against excessive and inappropriate regulation (Campos, 2002).

However, since the 1990s, the debate about the phenomenon has increased and grown in density, with initiatives aimed at identifying the institutional causes of corruption, alerting society to its social, economic and political costs and suggesting reforms to reduce the incidence of this complex phenomenon (Speck, 2000). That movement led to the decline of the interpretation of corruption as a beneficial “lubricant” for the economy and brought about analyses focusing on the losses that corruption brings to society (Abramo, 2006; Erlingsson, Linde and Öhrvall, 2016; Dutta and Sobel, 2016).

Congruently, Eigen (2002) argues that corruption, to a certain degree, poses a threat not only to the environment, to human rights, democratic institutions and fundamental freedoms but also increases poverty and hinders development. When widely disseminated, corruption reduces the

flow of investments, enables organized crime activities, and undermines political legitimacy. It might also impede the consolidation of pro-democracy reforms (Elliott, 2002; Rose-Ackerman 2002:74).

Corruption also represents an unaffordable burden on economies seeking for a competitive edge because it greatly increases the operational costs of several countries. It translates as one of the most detrimental criminal typologies, preventing the termination of poverty cycles, undermining the efforts of national states to produce economic and social development, and condemning large population groups to misery (Ribeiro, 2001). Tanzi and Davoodi (1998) support Ribeiro's (2001) arguments, having obtained empirical evidence of the negative effects of corruption on economic growth, showing that a high incidence of corruption is associated with high public spending and poor quality of public infrastructure.

Furthermore, with the globalization of the economy, there has been an increase in the circulation of illicit capital and assets, which affects not only the country of origin of the corruption but also the receiving countries, in a process named "globalized corruption" (e.g.: Ambraseys and Bilham, 2011). This process emphasizes the need for international cooperation in order to combat corruption and promote asset recovery (Olmos, 2013). When it comes to tackling globalized corruption, the American government pioneered such efforts with the Foreign Corrupt Practices Act (FCPA), adopted in 1977 and amended in 1988 and 1998 by the United States Congress (Ferreira, 2015).

The FCPA served as a model for other norms that attempt to fight corruption in several countries, as well as for the creation of international conventions. Thereby, came the International Conventions to Fight Corruption, which have the Federative Republic of Brazil as a signatory country. The main conventions are listed in box 1.

BOX 1 MAJOR INTERNATIONAL ANTI-CORRUPTION CONVENTIONS

Convention	Organization	Date of approval	Promulgation in Brazil
The Combat of Corruption by Foreign Public Officials in International Business Transactions	Organization for Economic Cooperation and Development (OECD)	December 17, 1997	Presidential Decree n. 3.678 of November 30, 2000
Inter-American Convention against Corruption	Organization of American States (OAS)	March 29, 1996	Presidential Decree n. 4.410 of October 7, 2002
UN Convention against Corruption (Merida Convention)	United Nations (UN)	December 9, 2003	Presidential Decree n. 5.687 of October January 31, 2006

Source: Elaborated by the authors from the Brazilian Comptroller General website (2014).

These Conventions are the basis for the implementation of anti-corruption measures around the world. They address issues such as national and transnational bribery, illicit enrichment, asset recovery, international legal cooperation, company accountability for acts of corruption, among others. Furthermore, according to Jones (1991), public companies should also be evaluated in order to reinforce the following of goals and objectives necessary to improve efficiency and avoid illegitimate actions.

In Brazil, in order to comply with article 173, paragraph 1 of the Federal Constitution, which stated that legislation should be drafted to institute the statute of public and mixed-capital companies, Law 13303/2016 was enacted, receiving the name of “Law of the State-Owned Companies”. This enactment brought a series of innovations seeking to modernize and adapt to present times the management of public and mixed-economy companies. These changes also attempt to change the culture in which state-owned enterprises are immersed. In Brazil, they are frequently treated as mechanisms for exchanging political favors, where ethical concepts are often ignored, and corruption is seen as normal (Gomes, 2017).

In this context of globally organized efforts against corruption, since the 1990s, concerns are strongly focused on developing countries, which deal with corruption as a persistent problem that pervades state-market relations and impacts several productive sectors, through several mechanisms, such as the deviation in behavior and administrative trajectory of the so called State-owned companies — and that is the central object of the present article.

3. FORMULATION OF THE HYPOTHESIS

Corruption can be seen as a practice that hinders the development of commerce, since it wastes resources that could be invested in a more profitable way and, moreover, as argued by Dutta and Sobel (2016), always causes damages, regardless of whether the market is up or down, only reducing its negative effects in times of crisis. Gray and Kaufmann (1998) had already highlighted this problem, arguing that corruption constitutes the greatest obstacle to the economic development and the growth of nations. Ancillary, Bai and colleagues (2013) carried out a study that verified the hypothesis that economic growth could reduce state corruption (especially bribery); resulting in the conclusion that economic growth, in fact, reduces bribery. However, this type of corruption analyzed by Bai and colleagues (2013), could be considered what the literature calls *petty bribe*, something quite different from what happens when political agents participate in the process, where values and the complexity of the relations tends to develop *grand corruption*.

Political corruption can be defined as the misuse of power, position or resources by the governing authorities in exchange for personal gain (Svensson, 2005). In this context, the understanding is that SOEs are more conducive to the occurrence of this type of corruption — not because employees are more corrupt than private enterprise workers, but because of the number of opportunities for political corruption that they attract. Public corruption is established and developed when an employee, elected or not, uses his position in government to obtain private benefits. The existence of this type of corruption indicates a lack of respect for the rules and regulations of economic transactions in a

society, since this act shows the need to make additional and irregular payments in order to receive a public service (Kaufmann, Kraay and Mastruzzi, 2004).

Since politicians are more likely to make private gains in more corrupt environments, the government can use SOEs to gain political support. This demonstrates that corruption enables the exchange of benefits, something that would not take place in other settings (Aidt, 2009). For that matter, politicians can direct spending by state-owned companies not only to further their chances of reelection, but also to get the support they need to pass bills to promote political changes that benefit dubious motives. This type of influence is possible because, according to Shleifer and Vishny (1994), SOEs are inefficient companies because of the pressures that the politicians exert on them. These pressures may take place to reach political goals, such as the allocation of production in politically desirable regions to the detriment of economically attractive regions, which tends not to happen when the government holds a minority stake in SOEs (Inoue, Musacchio and Lazzarini, 2013)

However, it is not uncommon to see the problematic use of SOEs by politicians as means of rent seeking, especially in countries in which inequality is high (Avsar, Karayalcin and Ulubasoglu, 2013). Additionally, there also is the inefficiency of the short-term expenditures of SOEs, which are often used by politicians for personal gain (Campos and Pereira, 2016), given the state's majority control over SOEs (Musacchio and Lazzarini, 2012). It adds up to pathological corruption. The problem worsens when these SOEs deal with investors in the capital market, as chronic interferences hinder the capitalization process of these companies, especially because of the difficulty of protecting the minority shareholders.

According to La Porta and collaborators (2000), the protection rights of minority shareholders are not considered when there is little or no transparency and this becomes an “agency problem” between managers and external shareholders. Thus, in an environment with weak corporate governance, SOEs are not transparent about their actions, allowing government influences to affect the decisions about how money will be spent. Therefore, in a more corrupt environment, there is greater ease of ownership from the government, which can influence the decisions regarding the investments of the SOEs, granting the necessary support for the approval of their bills. With this in mind, we present four hypotheses:

H₁: In more corrupt environments, SOEs spend more than private companies

Four sub-hypotheses derive from this main hypothesis, associated with the types of expenses involved. They are:

H_{1.1}: In more corrupt environments, SOEs spend more on total investments than private companies;

H_{1.2}: In more corrupt environments, SOEs spend more on employee wages than private companies;

H_{1.3}: In more corrupt environments, SOEs spend more on short-term investments than private companies;

H_{1.4}: In more corrupt environments, SOEs have less efficient asset management than private companies.

For the present study, the definition of “more corrupt environments” was made based on the rating of two indicators related to corruption (*Corruption* and *Control of Corruption*), which will be detailed in the following sections.

4. METHODOLOGY

This is an exploratory-descriptive research, with a quantitative approach. It is exploratory in that it seeks a better understanding of the relationship between corruption and spending by state-owned enterprises. According to Gil (2006), exploratory research has the improvement of ideas or the discovery of intuitions as its main goals. The descriptive phase occurred with the attainment of databases and statistical analysis. The quantitative nature is justified by the methods used to achieve the results obtained.

Secondary data available from a recognized and reliable database were used for this study (box 2). 106,765 observations from companies from 41 countries were initially obtained from the *Compustat Global* database between 2002 and 2011. Secondary data from four databases were used: *Compustat Global*, *Mergers & Acquisitions (M & A)*, *Worldwide Governance Indicators* and *International Country Risk Guide*.

Compustat Global offers financial and market data from more than 13,000 companies in more than 80 countries. The data are collected by Standard & Poor's based on the companies' financial statements. Data are standardized according to local accounting principles, methods of disclosure and definitions of data items (Brito and Vasconcelos, 2005). As a measure of investments, the variables *Increase in Investments*, *Short-Term Investments*, *Employees* and *Return of Investments* were used.

For the identification of SOEs, the M & A database, developed by *Thomson Reuters*. M & A presents data about the activity of public and private companies, since the late 1970s, in all major types of businesses. The database tracks changes in economic ownership to the level of the parent company. All bids involving the purchase of at least a 5% stake (or a 3% stake for publicized promotions of at least \$ 1 million) are tracked, including transactions that started as rumors. Thus, the information covers rumor operations or official announcement until completion or cancellation. Furthermore, in order to identify state-owned enterprises, the company's official websites and their activity reports were also consulted.

The first indicator on corruption was collected from the World Bank database: *Worldwide Governance Indicators (WGI)*. WGI is composed of six large composite indicators, covering more than 200 countries since 1996: *Voice and Accountability*, *Political Stability and Absence of Violence*, *Government Effectiveness*, *Regulatory Quality*, *Rule of Law* and *Control of Corruption*. This database has aggregate and individual information on governance indicators from 213 countries from 1966 to 2012 (World Bank, 2017).

These indicators are based on hundreds of variables obtained from 31 different data sources, capturing perceptions of governance as reported by individual interviewees, nongovernmental organizations, business information providers, corporations, and public-sector organizations around the world. The values of these indicators range from -2.5 to 2.5. In the case of the *Control of Corruption* measure, for instance, a lower the value means greater the use of public power for private gain. Higher values, on the other hand, mean less corruption.

The other indicator related to corruption was obtained in the *Country Risk Guide* database, which presents twelve indicators. For this research, only the indicator *Corruption* was used. The variable *Corruption* evaluates corruption within the political system. This type of corruption distorts countries'

economic and financial circumstances and reduces government efficiency by allowing people to take positions of power through patronage rather than meritocracy. The indicator ranges from zero (most corrupt environments) to six (less corrupt environments).

The present study can be considered a non-experimental research, since there was no possibility of manipulation of the data. We used a quasi-experiment using the *Difference-in-Differences* technique. The quasi-experiment occurs when an exogenous event affects the explanatory variable.

The technique was used to analyze the relationship between corruption and expenses incurred by companies after the 2008 crisis. This crisis was chosen as a cut-off point because it was an exogenous event outside of the companies' control. For this study, control companies (private companies) and treatment companies (state-owned companies) were used.

BOX 2 **VARIABLES OF THE STUDY**

Dependent Variables	
Variable	Formula/Description
<i>Increase in Investments</i>	Represents the funds used to increase a company's long-term investments.
<i>Short-Term Investments – Total</i>	Represents the investments currently tradable, as presented in the Current Assets section of the Balance Sheet. Such assets are supposed to be converted into cash within a relatively short period of time.
<i>Employees</i>	Represents the actual number of people employed by the company and its subsidiaries.
<i>Sale of Investments</i>	This item represents the receiving of long-term investments.
Independent Variables	
Variable	Formula/Description
<i>Corruption</i>	This is an assessment of corruption within the political system. Corruption is a threat to foreign investment for several reasons: it distorts the economic and financial environment; reduces government and business efficiency by allowing people to take positions of power through other means than their capacity; and introduces an inherent instability into the political process.
<i>Control of Corruption</i>	Perceptions about the extent to which public power is exercised for private gain, including forms of corruption, as well as “capture” of the state by elites and private interests.

Continue

Control Variables	
Variable	Formula/Description
Country	Series of <i>dummy</i> variables, each one related to a country, in which 1 indicates that the company operates in the country and zero if not.
Year	Series of <i>dummy</i> variables, each related to one year.
Company	Series of <i>dummy</i> variables, each related to a company
Type	<i>Dummy</i> variable related to a type of company, in which 1 indicates that the company is a state company and zero in case it is a private company.
Crisis	<i>Dummy</i> variable related to the 2008 international crisis, in which it was assigned the value 1 for the years 2008 onwards and zero for the years prior to 2008.
Type x Crisis	<i>Dummy</i> variable in which the interaction between the two previous dummies captures the companies (i) in the year (t) that are SOEs and go through the crisis receiving the value 1 and the other companies are assigned the value 0
Crisis (2006)	<i>Dummy</i> variable related to the placebo effect for the crisis, in which the value 1 was assigned for the years 2006 onwards and zero for the years prior to that.
Type x Crisis (2006)	<i>Dummy</i> variable in which the interaction between the dummies Type and Crisis (2006) will capture the companies (i) in year (t) that are SOEs that from the period of 2006 onwards receiving the value 1 and other companies receive 0

Source: Research data.

Meyer (1995), in his seminal work, describes the *Diff-in-Diff* method as suitable to conduct experiments, in which it is possible to identify the influence of an exogenous source on the explanatory variables, induced by a change in the policy or similar event. In order to implement the *Diff-in-Diff* model, a double-effect double-regression panel regression was used, since it is the one that best adapts to longitudinal studies with multiple variables whose units repeat across the various cross-sections.

The model for hypothesis 1 can be written as follows:

$$Y_{it} = \alpha_i + \Psi_t + \beta_1 \text{Tipo} + \beta_2 \text{Crisis} + \beta_3 \text{Tipo} \times \text{Crisis} + \beta_4 \text{Ano} + \beta_5 \text{País} + \epsilon_{it} \quad (\text{Equation 1})$$

In which:

Y_{it} = dependent variables: Increase in Investments, Short-Term Investments, Employees and Sale of Investments.

α_i = Fixed effect of firms.

Ψ_t = Fixed effect of time.

Type = *dummy* variable which receives the value 1 if the company is an SOE and 0 if it is a private company.

Crisis = *dummy* variable which receives the value 1 if the company (i) in the quarter (t) is present in the period of the crisis (from 2008 to 2011) and 0 during the other time analyzed in the sample.

Type X Crisis = *dummy* variable that captures the effect of *Diff-in-Diff*, that is, the difference of the groups in periods of crisis. It is represented by the interaction between the two previous dummies.

Year = *dummy* variable for year.

Country = *dummy* variable for country.

ϵ_{it} = stochastic error term of the regression.

For the technical application of *Diff-in-Diff*, the general sample was subdivided. The median was used to characterize the environment with high corruption. For the *Control of Corruption* variable, for example, the first database contained all companies that were in countries where the corruption indicator was greater than or equal to 0.58.

The second database was composed of all companies that were in countries where the indicator was below 0.58. The same procedure was done for the variable *Corruption*. Therefore, two databases were generated: one with companies in environments with low corruption (less corrupt environments) and another with companies in environments with high corruption (more corrupt environments).

For data treatment and adequacy of the sample verification, regarding the normality of the data, the sample was winsorized, as prescribed by Kállás (2014). Tests of multivariate normality, with the parameters of asymmetry and kurtosis, as well as the tests of normality Doornik-Hansen and Henze-Zikler, as proposed by Xavier (2011), were carried out.

5. RESULTS

The original database came from *Compustat Global* and contained 106,765 observations between 2002 and 2011. Corporate governance-related issues, gathered at the national level, also come from 2002 to 2011. Following the treatment of the duplicate observations, the final sample resulted in 96,379 company observations from 41 countries. In addition, the variable *Increase in Investments* was treated in relation to the missing values, since it was greater than 10%, filling the values with the average of that variable.

Next, we analyzed the occurrence of atypical observations (*outliers*), which are observations that present different characteristics from the others. Traditionally, observations are considered to have very high or very low values. Atypical observations deviate so much from the others to the point of generating suspicions that they were generated by different mechanisms. Because of this, they can influence the results of statistical analyzes and eventually lead researchers to wrong conclusions (Kállás, 2014).

For this study, the model followed by Kállás (2014) was adopted, using the Winsorization technique. This is a technique developed by Charles P. Winsor in 1941 which suggests that when encountering an atypical observation, one should not simply reject it. Instead, you must replace its value by the nearest value of an unsuspected observation. For normal distributions, the means of the winsorized samples are more stable than the means of the samples where the atypical observations are eliminated. The winsorized samples are, therefore, inevitably the same size as the original samples collected (Kállás, 2014:93). Through the analysis and judgment of the researcher, we chose to use the winsorized variables at 1%.

Table 1 shows the descriptive statistics of the independent variables. The possible values for the *Corruption* variable from the *International Country Risk Guide* database range from 0 to 4, and for this

sample the average was 3.10. The values for the Control of Corruption variable, captured from the Worldwide Governance Indicators database, could range from -2.5 to 2.5 and its mean for this sample was 0.58.

TABLE 1 DESCRIPTIVE STATISTICS OF INDEPENDENT VARIABLES

Variable	Obs	Average	SD	Minimum	Maximum
Corruption	96,379	3.10	1,18	1,00	5,50
Control of Corruption	96,379	0.58	1,10	-1,83	2,46

Source: Research data.

Table 2 presents the results of the tests referring to multivariate normality. According to Xavier (2011), these tests are crucial to verify if the assumptions of statistical tests are partially met. All four tests performed refuted the null hypothesis of multivariate normality. The univariate normality test also refuted the assumptions of lack of asymmetry, kurtosis, and normal distribution. The tests were done from the command *mvtest normality* of the Stata program, with the option *all*.

TABLE 2 MULTIVARIATE TESTS OF NORMALITY

Asymmetry	=	9.303.455	chi2(816)	=	1.45e+08	Prob>chi2	=	0.0000
Curtose	=	11692.07	chi2(1)	=	5.26e+09	Prob>chi2	=	0.0000
Henze-Zirkler	=	1.325.681	chi2(1)	=	9.15e+08	Prob>chi2	=	0.0000
Doornik-Hansen			chi2(32)	=	3.84e+08	Prob>chi2	=	0.0000

Source: Research data.

5.1 COMPANIES IN ENVIRONMENTS WITH HIGH CORRUPTION

In the analysis, the Diff-in-Diff technique was applied for each dependent variable. Table 3 contains only companies that are located in environments (countries) with high corruption. With the variable “type x crisis”, it was first analyzed if there are differences regarding the behavior of the public and private companies’ expenses in the period from 2008 to 2011. As a comparison, the same procedure was performed using the 2006 to 2011 (variable “type x crisis (2006)”). This measure was taken to verify if the *Diff-in-Diff* results are specific to the 2008 crisis period, so the period from 2006 to 2011 was used as a placebo.

TABLE 3 DIFF-IN-DIFF RESULTS FOR HIGH CORRUPTION

Variables	Corruption				Control of Corruption			
	Type × crisis	P> z	Type × crisis (2006)	P> z	Type × crisis	P> z	Type × crisis (2006)	P> z
Increase in Investments	-12609.42	0.851	272299.6	0.546	-20098.64	0.767	191107.3	0.659
Employees	7020622	0.029	4.383.762	0.126	6.323.302	0.034	4.011.614	0.153
Short-Term Investments	6.84e+08	0.048	-482875.9	0.298	8.84e+08	0.058	-595513.2	0.236
Sale of Investments	-295168.7	0.057	258443.6	0.164	-546951.3	0.000	41651.06	0.751

Source: Research data.

With the exception of the *Increase in Investments* variable (P value above 10%), hypothesis $H_{1,1}$, for all other variables, state-owned companies invested more than private companies in highly corrupt environments after the 2008 crisis (the value of the variable “type x crisis” was positive). As the significance of the variables in the placebo period was above 10%, that is, there were no differences, then it can be stated that there was an increase in the expenses of state-owned companies after the 2008 crisis. Additionally, according to table 3, SOEs invested more in employees after the 2008 crisis ($H_{1,2}$). This result may be an indication that politicians, in fact, use their influence over state-owned companies to signal the hiring of employees in return for political favors. This idea has already been debated in other studies, such as Gomes (2017), who verified that state-owned companies can be recognized as excellent mechanisms for bargaining and exchange of favors.

It is also possible to say that, in more corrupt environments, SOEs that have the government as majority shareholder spend more on short-term investments in relation to private companies ($H_{1,3}$). In this case, corruption can facilitate the exchange of political favors, and short-term investment can be helpful by having a faster return. According to Campos and Pereira (2016), the short-term investments of state-owned companies are generally higher than necessary due to inefficiencies. Therefore, politicians take advantage of this inefficiency to steal and obtain personal gains.

Another important result is that in more corrupt environments, SOEs that have the government as a majority shareholder invest less than private firms ($H_{1,4}$). Therefore, the lower revenue obtained by state-owned enterprises may be due to their own inefficiency. For Shleifer and Vishny (1994), the inefficiencies of state-owned enterprises can be very damaging to the company and to society.

In this case, Jones (1991) showed in his study that a 5% increase in the efficiency of state-owned enterprises, without any change in prices or investments, would mean a 5% increase in Egypt’s GDP, or a 50% tax reduction in Pakistan, or a 150% increase in China’s spending on education, health, culture and science.

5.2 COMPANIES IN ENVIRONMENTS WITH LOW CORRUPTION

The results for the database for companies that were in low corruption environments, shown in table 4, showed no differences either before or after the placebo (2006) and neither before nor after the crisis (2008). The analysis was based on the P value (all above 10%). Thus, it becomes clear that the influence of politics on SOEs is most evident in more corrupt environments.

TABLE 4 DIFF-IN-DIFF RESULTS FOR LOW CORRUPTION

Variables	Corruption				Control of Corruption			
	tipo × crise	P> z	tipo × crise (2006)	P> z	tipo × crise	P> z	tipo × crise (2006)	P> z
Increase in Investments	-134186.9	0.153	-146897.9	0.131	-1390994	0.962	14624.55	0.502
Employees	5596125	0.870	5.812.953	0.983	7.436.006	0.878	-7.924.969	0.871
Short-Term Investments	85128.46	0.303	34080.46	0.611	39201.53	0.217	3687693	0.905
Sale of Investments	-1841925	0.291	-359584.2	0.121	-1841925	0.291	-359584.2	0.121

Source: Research data.

6. CONCLUSIONS

Overall, corruption indicators may be related to the expenditures made by state-owned enterprises. With regard to corruption (*Corruption*), governments use SOEs to try to reduce inequality in their country by paying higher wages or hiring more employees than necessary (Avsar, Karayalcin and Ulubasoglu, 2013). Therefore, in more corrupt environments, politicians use their influence on SOEs to increase spending and raise private gains, since corruption is one of the ways to circumvent institutions and engage in opportunistic acts. Once there is the feeling that it is controlled, opportunism falls.

Regarding the Control of Corruption variable, in environments with greater use of public power for private gain, SOEs that have the government as a majority shareholder can invest more than private companies. Following Svensson’s (2005) argument, which states that political corruption can be considered an abuse of power, position or resources by politicians, for personal gain, this fact is justified by the use of the influence of politicians on state-owned enterprises to achieve political and private advantages.

According to Inoue, Musacchio and Lazzarini (2013), the benefits of state-owned enterprises compared to private enterprises have not been examined in the literature. According to these authors, the risk of an agency problem is lower in state-owned enterprises in which the state is a minority shareholder because of low government intervention and high monitoring. This research brings important contributions to management theory, especially regarding strategic management. First, it improves our understanding of how SOEs decide to invest, including a new perspective that may

also explain SOEs' decision to spend. Another important contribution is the attempt to elucidate the efficiency of investments made by state-owned companies.

The study has some limitations. The indicators of corporate governance used are measures of perception and, although widely used in academic research, are subject to distortions. As a suggestion for future research, there is a classification proposed by Musacchio and Lazzarini (2012) for minority SOEs, in which the authors proposed the following possibilities: partially privatized companies, participation in state holdings, loans by state-owned companies and or development banks, pension funds controlled by the government etc. In this case, it would be necessary to search for other databases, since we have attempted to develop a ranking, but only two types of state-owned enterprises were present, both having the government as the minority shareholder: partially privatized companies and state holdings. Another suggestion would be to use other investment measures, as well as other measures of corruption. Regarding corruption, in particular, an alternative indicator would be the *Corruption Perception Index*, developed by the nongovernmental organization Transparency International.

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