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## Accounting and financial irregularities in companies with government

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### Resumo/Abstract

The research aims to verify whether the listed companies with government participation are more likely to present accounting and financial irregularities than other publicly traded firms. The results pointed out that companies with government participation, when analyzed in isolation, did not show significant discrepancies that would suggest a propensity to commit irregularities. However, the interactions between government shareholding and governance levels reveal that companies with government participation and different governance levels are more likely to be involved in SAP than those that do not count on government participation and with the same levels of governance.

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### Abstract

The research aims to verify whether the listed companies with government participation are more likely to present accounting and financial irregularities than other publicly traded firms. The results pointed out that companies with government participation, when analyzed in isolation, did not show significant discrepancies that would suggest a propensity to commit irregularities. However, the interactions between government shareholding and governance levels reveal that companies with government participation and different governance levels are more likely to be involved in SAP than those that do not count on government participation and with the same levels of governance.

**Keywords:** accounting irregularities; financial irregularities; CVM's sanctioning administrative proceedings; companies with government participation.

### 1. Introduction

The recent fraud and corruption cases involving privately held and state-owned companies revealed by the Brazilian Federal Police, particularly *Operation Car Wash* (lavajato) started in March 2014, stress the relevance of this study. According to the Federal Prosecutor's Office, this operation is the largest corruption and money laundering investigation in the country's history.

As a result of Operation Car Wash, in 2018, Brazil obtained its worst score in the Transparency International corruption perception index. Since 2014, the country has been falling in the ranking, having lost 17 positions in relation to 2016 and 9 compared to 2017. In 2018, Brazil was in the 105<sup>th</sup> position out of 180 countries assessed.

An important aspect to consider is the intensification of government participation in companies due to the financial crisis triggered by the subprime housing crisis in the United States in 2007. The policies bailing out the companies most affected by the crisis, the increase in public spending, and the government intervention measures in developed countries (Boubakri, Cosset, & Walid, 2011) made the US government one of the controlling shareholders in several large American corporations, such as AIG, Citigroup, GM, GMAC, Fannie Mae, and Freddie Mac (Kahan & Rock 2010). Likewise, in Brazil, the government increased its participation and control over economic activity through the National Development Bank, pension funds, and strengthening state-owned companies (Lazzarini 2011; Novaes & Almeida, 2020).

Issues such as fraud, corruption, and other irregularities in companies have led to studies on determinants for accounting and financial irregularities. Some of these determinants are the weaknesses of the firms' corporate governance structure (Yang, Jiao, & Buckland, 2017), weaknesses in their processes and internal controls (Donelson, Ege, & Mcinnis, 2016; Wuerges 2010), accounting manipulation involving components of Cressey's fraud triangle theory (Loebbecke, Eining, & Willingham, 1989; Wuerges, 2010; Song et al. 2014), statistical models to predict bankruptcy (Beaver, 1966; Altman, 1968) and to predict earnings manipulation (Beneish, 1999; Song et al. 2014).

The studies on listed companies' accounting and financial irregularities have used as variables instruments such as the Accounting and Auditing Enforcement Releases (AAERs), published by the US Securities and Exchange Commission (SEC) (Beneish, 1999; Wuerges, 2010; Dechow, Larson, & Sloan, 2011; Nicholls, 2016), and the Brazilian Sanctioning Administrative Proceedings (SAP) judged by CVM- Brazil's Securities and Exchange Commission (Fusiger, Silva, & Carraro, 2014; Smetana, 2015; Borges & Andrade, 2017;

Mello, Alvarenga, Marques, & Sauerbronn, 2018).

Part of the literature that analyzes irregularities assesses the effects of government shareholding on fraud, corruption, and earnings management (Laffont & Tirolle, 1991; Weng, 2008; Boubakri, Cosset, & Walid, 2011; Arvate et al. 2010; Lazzarini, 2011; Ben-Nasr & Cosset, 2014; Yang, Jiao, & Buckland, 2017). For Laffont and Tirolle (1991), for example, when the government has shares in a company, the organization becomes subject to pressure from interest groups in order to behave according to their convenience. Likewise, the study by Ben Nars and Cosset (2014) states that the government as a shareholder has more incentives to expropriate resources from the organization and other shareholders to meet public policies or obtain political gains.

In China, the study by Yang, Jiao, and Buckland (2017) examined companies' ownership structure and corporate governance as possible determinants of irregularities judged by the China Securities Regulatory Commission (CSRC). The research found that companies with less concentrated ownership tend to be involved in financial fraud, whereas companies with high share concentration are less likely to commit fraud. The specific analysis on Chinese state-owned companies did not show evidence that these firms influence the likelihood of financial fraud.

In Brazil, Siqueira (2018) analyzed the effects of government shareholding on the quality and earning quality and earning persistent. For the author, government shareholding leads to lower levels of earnings management, a better quality of earnings, and, at the same time, persistence and sustainability of results.

The results of the studies above are relevant to understand the determinants of irregularities, even though they did not associate the irregularities of SAP judged by CVM with companies with government participation. This research fills this gap, seeking to verify whether companies with government participation are more likely to commit irregularities.

This research consists of an empirical study of accounting and financial irregularities involving Brazilian companies with or without government participation, listed on B3 from 2001 to 2018. The tests were carried out considering as determinant of irregularities, the SAP judged by CVM, and as the model's explanatory variable the level of government shareholding in listed companies.

The results suggest that firms with government participation, when analyzed in isolation, do not present significant differences that would confirm a propensity to be involved in irregularities, corroborating the findings by Yang, Jiao, and Buckland (2017) in China. However, when observing the connection between government shareholding and the different corporate governance levels, companies with government participation – especially those with differentiated corporate governance levels – are more likely to commit irregularities than companies in the same segments but without government participation. The analysis showed that companies made decisions that satisfied the government's interests (as a controller) or of specific groups, to the detriment of minority shareholders, in line with the international literature (Laffont & Tirolle 1991; Ben Nars & Cosset 2014).

## **2. Theoretical Foundations**

### ***2.1 Determinants of Irregularities***

Studies analyzing accounting and financial irregularities in listed companies adopt as determinants of such irregularities instruments such as the Accounting and Auditing Enforcement Releases (AAERs), published by the US Securities and Exchange Commission (SEC) (Beneish, 1999; Wuerges, 2010; Dechow, Larson, & Sloan, 2011); the financial fraud reports released and judged by the China Securities Regulatory Commission (CSRC) (Yang, Jiao, & Buckland, 2017); and, in Brazil, the Sanctioning Administrative Proceedings (SAP) judged by the Brazilian Securities and Exchange Commission (CVM) (Fusiger, Silva, &

Carraro, 2014; Smetana, 2015).

According to Dechow, Larson, and Sloan (2011), the use of AAERs issued by the SEC as a variable to investigate fraud and irregularities offers a high level of confidence that the commission has identified manipulation in the company's accounting. In their research, the authors examined 2,190 AAERs issued between 1982 and 2005, seeking to find common characteristics of listed companies that engaged in manipulation or issued misstatements. As a result, Dechow, Larson, and Sloan (2011) developed the F-Score model to measure discretionary accruals and identify the companies' quality of earnings. Wuerges (2010), supported by Cressey's fraud triangle theory (1953) and using AAERs, found that only 1.43% of financial fraud cases in American companies are discovered and disclosed by the SEC. In addition, a company that received a qualified opinion in the audit report is 5.12 times more likely to be involved in fraud.

Regarding the use of SAP as determinants of irregularities in Brazil, Smetana (2015) analyzed the relationship between the proceedings and the governance levels. The author concluded that companies listed in the B3 segments *Novo Mercado*, *Nível 1*, *Nível 2*, and *Bovespa Mais* present fewer irregularities (4%) when compared to firms in the traditional segment (96%).

In addition, non-financial variables have been adopted to analyze accounting fraud and irregularities. Some of these variables are differentiated corporate governance levels (Scalzer, Almeida, & Costa, 2008; Smetana, 2015), companies audited by one of the big four (Almeida & Almeida, 2009), the opinion in an independent audit report (Wuerges, 2010), and statistical models with the use of financial variables. Examples of statistical models are the pioneering models to predict financial hardship or bankruptcy (Beaver, 1966; Altman, 1968), the models to detect earnings manipulation and to predict results (Beneish, 1999; Beneish, Lee, & Nichols, 2013), or manipulate and manage results (Healy, 1985; Jones, 1991; Dechow, Larson, & Sloan, 2011; Wuerges, 2010; Song et al. 2014).

## **2.2 Effects of Government Shareholding**

Research highlight that even after privatization programs, the government maintains strong control over the economy (Bortolotti & Faccio, 2009; Arvate et al. 2010; Lazzarini, 2011; Brey, Camilo, Marcon, & Melo, 2014). Some of these studies focused on government control in privatized companies (Ben-Nasr & Cosset, 2014; Barbosa, Costa, & Funchal, 2012), while others analyzed the effect of government participation on the companies' financial wealth (Laffont & Tirole, 1991; Ben-Nasr & Cosset, 2014; Nossa, Nossa, & Teixeira, 2017; Santos 2019; Sousa, Neto, Andriotti & Campagnolo, 2020).

Regarding the degree of government participation in the economy, Bortolotti and Faccio (2009) studied the change in government control in privatized companies in OECD countries. They observed that even after privatization, government control was significant in 62.4% of the companies analyzed, exercised by combining two mechanisms: (i) veto power granted by golden shares; and (ii) leveraging voting power related to its investments, through devices such as pyramids. Therefore, the government maintains its influence and directs decision-making even after privatizations.

Arvate et al. (2010) obtained a similar result in their study in Brazil. They observed that, despite the numerous privatizations between 1985 and 2005, the government size remained around 20% of GDP. For the authors, federal spending increased by the same proportion as the number of ministries and political parties participating in the government coalition. Lazzarini (2011) stresses that the Brazilian political system has been structured through ties and coalitions gathering private groups. Thus, entities that establish a link with the government gain relevance in economic activities by exercising control based on shareholding as a group or consortia, securing the government's interests in power even after privatization.

Ben-Nasr and Cosset (2014) analyzed the changes in privatized companies, analyzing a multinational sample of 350 companies from 45 countries. They found that state ownership was associated with a lower quality of results, confirming the hypothesis of political interference, where the state offers lower quality information about earnings in order to expropriate corporate resources for political purposes.

On the other hand, the research by Siqueira (2018) adopted a different focus from the study by Ben-Nasr and Cosset (2014). The author tested the hypothesis of political interference in companies listed in the Brazilian stock exchange B3 (former BM& FBOVESPA). When analyzing the effects of state participation on the firms' quality of earnings, the study reached a different result from Ben-Nasr and Cosset (2014). The author observed that "the greater the state participation, the less the earnings management" (Siqueira 2018:42, our translation). This finding was justified, in part, by less pressure on Brazilian companies with government participation and because these companies are submitted to the federal control agencies, which makes all the difference.

Regarding the effects of government participation on the firms' financial wealth, Laffont and Tirole (1991) highlighted as negative aspects of this participation the (i) lack of monitoring of the capital market, due to the low incentive for investment and little concern with the performance; (ii) expropriation of investments by managers for other unplanned purposes; (iii) not being subject to bankruptcy, since the government will always bail out the company in case of financial hardships; (iv) lack of clear goals and objectives; and (v) lobbying by interest groups, who pressure the government to use public resources for their benefit. On the other hand, as positive aspects, the authors emphasized two benefits of government participation that allow the government to have internal and external control as the company's owner, (i) search for social welfare, and (ii) the search for centralized control.

Santos (2019) carried out bibliographic research of international and national studies involving a performance comparison among private, mixed, and state-owned companies, comparing performance before and after the privatization process. The author also assessed the economic-financial performance between Brazilian state and non-state-owned companies listed in B3, Nasdaq, and Nyse, from 2010 to 2017. The research concluded that non-state-owned are more profitable than state-owned companies.

### ***2.3 Government, Irregularities, and Governance***

Considering a scenario of uncertainties in companies' management because of fraud, corruption, and other irregularities, and the international crisis started in 2007, recent research works have assessed the involvement of companies with government participation in accounting and financial irregularities (Weng 2008; Arvate et al. 2010; Lazzarini, 2011; Ben-Nasr & Cosset, 2014; Yang, Jiao, & Buckland, 2017). Part of these studies analyzed the importance of having an internal control and corporate governance system in state-owned companies as a way to minimize such irregularities (Fontes Filho & Picolin, 2008; Miranda & Amaral, 2011; Fontes Filho & Alves, 2018; Yang, Jiao, & Buckland, 2017; Pereira & Souza, 2017).

Arvate et al. (2010), for example, found that for OECD and Latin American countries, government size is a determining cause of corruption, as governments can use their influence on companies' decision-making to withdraw resources for their own benefit. Ben-Nasr and Cosset (2014) analyzed a multinational sample of 350 privatized companies from 45 countries and found that state ownership was associated with a lower quality of results, confirming the hypothesis of political interference, where the state offers lower quality information about earnings in order to expropriate corporate resources for political purposes.

Yang, Jiao, and Buckland (2017) observed cases of fraud disclosed by the China Securities Regulatory Commission (CSRC) and tested the hypothesis that companies with high

share concentration, including companies in which the state is a major shareholder, are more likely to commit financial fraud. They concluded that the high share concentration, common in Chinese companies, is negatively related to fraud. This is because the controlling shareholders play an important role in the corporate governance system, acting to protect investors. The results were not significant regarding frauds committed by companies with government participation in China since there was no evidence that firms in which the state is the largest shareholder are more or less likely to commit financial fraud.

Regarding internal controls and corporate governance systems in state-owned companies, Miranda and Amaral (2011) stated that these structures are important since they can avoid the agency conflict so present in this type of firm. Pereira and Souza (2017) add to the debate arguing that the state-owned companies, having to comply with public policies and social goals, face conflicts of interest. The government often directs the activity of the state-owned enterprises to support public policies, to the detriment of the shareholders and the company's interest. Santos (2019) also observes the same situation in Brazil, when the controlling shareholder appoints its administrators. Thus, there is no longer a separation between ownership and control, resulting in the expropriation of minority shareholders.

As for governance, Fontes Filho and Alves (2018) highlighted differences between private and state-owned companies. While in non-state companies, at first, there is no conflict of interest since the objective is profit, in state-owned companies, there are conflicts in relation to their objectives in a struggle to accommodate multiple stakeholders' interests. For the authors, state-owned companies have excessive discretion in using the company to reach political goals. Also, there is a lack of transparency in classified data, clarity about the goals pursued, and lack of control over the performance and achievements, which represent problems that may lead to corruption.

Such studies demonstrate that the themes of fraud and corruption have been quite common in the literature, with few studies associating government participation to irregularities analyzed by the CVM. This research recognizes a gap in the association between the government and irregularities and, therefore, tests the hypothesis (H1): companies with the government as one of the main shareholders are more likely to commit irregularities.

Therefore, factors that justify the research stand out: the increased influence and participation of the Brazilian government in economic activity (more significant in recent years), and the recent investigations by the Federal Police and the Public Ministry, with emphasis on the *Operation Car Wash*, which has shown a series of monitoring problems, both internal and external, by companies and by federal government inspection and control entities. As a result of these investigations, a set of initiatives has been adopted to improve and reinforce legislation to improving internal controls in the public sector. In the period from 2003 to 2016, for example, 34 regulations were published, with emphasis on the Anti-Corruption Law and the freedom of information law, the creation of the integrity program in public management, the institution of the leniency agreement, and the creation of the Council of Public Transparency and Combating Corruption (Silva, Sancovski, Cardozo & Condé, 2012).

### **3. Methodology**

#### **3.1 Sample**

The logit regression model was used to check if companies with government participation are more likely to commit accounting and financial irregularities. Panel data from companies listed on B3, from 2001 to 2018, was also used as 2001 saw the first adhesions of companies to the Differentiated Corporate Governance Levels (DCGL), one of the variables that make up the model.

The sample was formed by collecting information from listed companies, excluding observations without information on the variables used in the model (CGL, firms audited by

big four, and independent auditor's opinion). Also, the accounting data necessary to calculate the Z-score and M-score models were collected. The data on stock distribution showing the five major shareholders and the financial data used to calculate the Z-score and M-score indexes were extracted from the Economatica database; the data on government shareholding were taken from the list presented by Siqueira (2018). Figure 01 presents the result of the data from the research sample.

	Number of observations	
	Z-score	M-score
Number of observations in the Economatica database	8,725	8,725
(-) observations without information on the control variables:	-4,345	-4,345
DCGL	-3,725	-3,725
BIG4	-620	-620
Opinion	0	0
	4,380	4,380
(-) absence of accounting data to calculate the Z-score and M-score models.	-1,514	-1,797
(=) Total observations after exclusions	2,866	2,583

Figure 1. Sample information

Source: Elaborated by the author

### 3.2 Model

The verification that companies with government participation are more likely to commit irregularities in financial statements was carried out based on the following regression model:

$$Irregularities\ CVM_{i,t} = \beta_0 + \beta_1 GOV_{i,t} + \beta_2 NGC + \beta_3 (GOV \times NGC)_{i,t} + \sum_k \beta_k Controls_{i,t} + \varepsilon_{i,t} \quad (1)$$

### 3.3 Irregularities

The irregularity, represented here by the Administrative Sanctioning Proceedings (SAP) judged by the CVM, is the model's dependent variable. The variable assumes a value of 1 if the company  $i$  in the year of the event  $t$  was accused of committing any irregularity, and in the year of judgment  $t$  was convicted for the irregularity committed; and the value 0, for the other cases, in which the company did not commit an irregularity or the CVM's judgment acquitted all those involved.

For the analysis of the regression model's dependent variable (1), the data were extracted from the file containing the primary information of SAP, made available by the Coordination of Administrative Processes, and complemented with research directly from the CVM website. The total number of irregularities directly or indirectly related to accounting irregularities was considered to calculate the regression models due to the effect on transparency and the asymmetry of information to the market. Financial irregularities were also examined due to the impact of securities in financial markets and how their results affected shareholders.

Anex (A1) presents the number of the irregularities in the sample, the way in which the regression equation (1) will be replicated, in order to consider the Z-Score and M-Score models, and the two moments of the SAP, the year of the event and the year of the CVM's judgment. In the year of the event, all processes were considered, regardless of the outcome. In the year of judgment, only those in which resulted in a penalty to someone, excluding the processes in which all those involved in the conviction were acquitted. Thus, the study assessed whether there is a difference in results when the process is initiated and at the time of CVM's decision and judgment.

#### 4. Government Participation

Government shareholding in a company  $i$  in year  $t$  constitutes the independent variable and is represented by five different dummy variables indicating the different shareholding levels that have criteria and parameters fitting the definitions of Siqueira (2018), namely: (1) GOVT1 is 1 when the government is the first shareholder with the right to vote, regardless of the stock distribution, and 0, otherwise; (2) GOVCTRL is 1 when the government has ownership position (more than 50% of the shares with voting rights), and 0, otherwise; (3) GOVT20 is 1 when the government participates with more than 20% of the voting shares, and 0, otherwise; (4) GOVT3 is 1 when the government is among the top three shareholders with voting rights, regardless of the stock distribution, and 0, otherwise; (5) GOVT5 is 1 when the government is among the top five shareholders with voting rights, regardless of stock distribution, and 0, otherwise. The regression will be replicated for each of the five levels of government participation to assess the effects of participation at different shareholding levels.

The coefficient  $\beta_1$  indicates the effect that government participation in companies listed in B3 has on irregularities. Considering hypothesis (H1), it is expected that  $\beta_1 > 0$ , that is, that companies with the government as one of the main shareholders are more likely to commit irregularities.

For this analysis, companies with government participation were those a) in which the government (Union, states, or municipalities) is the direct shareholder; b) in which there is indirect government participation through other firms, and the state appears as one of the top five shareholders and holds voting shares. The other firms were considered as companies without government participation, with mostly private capital. The levels of government shareholding were calculated based on data on the shareholder composition among the top five shareholders extracted from *Economática*. Anex (A2) shows the descriptive statistics of government participation in the companies that make up the sample. It is segregated into five levels of stock distribution, according to the Z-Score and M-Score models.

##### 4.1 Corporate Governance Levels

Differentiated Corporate Governance Levels (DCGL) is a variable of interest to assess the influences around the occurrence of irregularities in companies listed on B3. The variable assumes 1 when company  $i$  in year  $t$  falls into one of the B3 segments, *Novo Mercado*, *Nível 1*, and *Nível 2*, and value 0, if it falls into the other segments. The data of the companies that joined the DCGL considered the membership history and the information on their historical migration (from 2001 to 2018), available on the B3 website.

##### 4.2 Government Participation and Corporate Governance

The interaction of companies with government participation in any of the five levels of stock distribution with the Differentiated Corporate Governance Levels (DCGL) constitutes a dummy variable that is 1 when the company is GOVT1, GOV\_CTRL, GOVT20, GOVT3, or GOVT5 and, at the same time, it belongs to one of the B3 segments *Novo Mercado*, *Nível 1*, and *Nível 2* [ $GOVT = 1 + DCGL = 1 + (GOVT \times DCGL = 1)$ ], and 0, otherwise. Thus, a value of 0 will be considered if the company has government participation ( $GOVT = 1$ ) but does not make up the DCGL segment ( $DCGL = 0$ ) or makes up the DCGL ( $DCGL = 1$ ), but it is a company without government participation ( $GOVT = 0$ ).

The total effect of government participation on the probability of irregularities was verified for each regression by performing F tests on the coefficients of government participation dummies ( $GOV_{i,t}$ ) and coefficients of dummies of interaction between government participation and DCGL ( $GOV \times DCGL$ ) $_{i,t}$ , represented by  $\beta_1$  e  $\beta_3$ , respectively. The test hypotheses are:

$$H0: \beta_1 + \beta_3 = 0$$

$$H1: \beta_1 + \beta_3 \neq 0$$

where H0 and H1 represent the null and alternative hypotheses of the F test. The rejection of the null hypothesis implies that both coefficients impact the probability of the occurrence of irregularities.

#### 4.3 Control Variables

The control variables *company audited by a big four* (dummy variable equal to 1 if the company is audited by one of the four largest independent auditing companies, KMPG, Deloitte Touche Tohmatsu, Ernst & Young, and PriceWaterhouseCoopers; and 0 otherwise) and *independent auditor's opinion* (dummy variable equal to 1 if the audit report presents a qualified or adverse opinion and 0 if it presents a clean opinion (unqualified report), i.e., the financial statements have no restrictions or no significant exceptions) were adopted to analyze other factors potentially influencing accounting and financial irregularities in Brazilian companies with and without government participation. These two variables were complemented by Z-Score (Altman, 1968) and M-Score (Beneish, 1999) models to measure, respectively, the prediction of bankruptcy and the possibility of earnings manipulation (A brief description for Z-Score and M-Score is presented in Anex (A3).

The SAP data were obtained from the CVM's Coordination of Administrative Processes, and the companies that adhered to the DCGL were identified on the Brazilian stock exchange B3's website. The stock distribution of the top five shareholders and the financial data used in the calculation of the Z-Score and M-Score indexes were extracted from the Economatica database. The companies with government participation in this study were those presented by Siqueira (2018) in a list of institutional shareholders considered as *government*. The data on the independent audit report assessing the company's financial statements were obtained from Econoinfo.

### 5. Results and Discussion

The descriptive statistics Anex (A4) show low rate of irregularities (average of 2%) is consistent with Wuerges (2010), who used the AAERs published by the SEC and found that SEC detects and discloses only 1.43% of fraud cases in financial statements of American companies. Thus, the low rate of accounting irregularities (average of 2%) is consistent with the low rate presented in the qualified audit opinions in the independent audit reports, with an average of 6% of observations. This happens because qualified opinions may characterize the existence of accounting irregularities, as found by Wuerges (2010). According to the author, a company that receives a qualified audit opinion is 5.12 times more likely to be involved in fraud.

Likewise, considering that on average, 76% of the analyzed observations are audited by the big four audit companies, the low rate of accounting and financial irregularity is consistent with the results of the studies by Almeida and Almeida (2009). The authors state that publicly traded companies audited by the big four have better quality in the numbers released since they have a lower level of earnings management.

This analysis is also valid concerning the corporate governance level since, on average, 4% of the observations with irregularities belong to the segments *Novo Mercado*, *Nível 1*, and *Nível 2* and are more demanding in the quality of the financial information disclosed to the market. The remaining 96% belong to the traditional segment and are more likely to commit irregularities (Smetana, 2015).

The results of the irregularity models (equation 1) considering each level of government participation (GOVT1, GOV\_CTRL, GOVT20, GOVT3, and GOVT5) were presented in Tables 1 to 4 to segregate the time of year of the event and year of judgment, as well as the use

of the Z-Score and M-Score variables. From these tables, it is possible to analyze and interpret the influence of government participation in each situation. As an example, Table 1 shows the results of irregularities in the year of the event using the Z-Score. The numbers in the first column are the coefficients and the respective significance level (if any), considering the regression model (equation 1) and using the explanatory variable GOVT1, which assesses the propensity of companies with the government as the first shareholder to commit irregularities. These results are complemented by the results of other variables of interest and control used in the model.

The total effect of government participation on the likelihood of finding irregularities was verified for each regression by performing F tests on the coefficients of government participation dummies ( $GOV_{i,t}$ ) and interaction dummies between government participation and Differentiated Corporate Governance Level ( $GOV \times DCGL$ ) $_{i,t}$ , represented by  $\beta_1$  and  $\beta_3$ , respectively. The results are shown in panels A and D below and in the tables presenting the regressions results.

Table 1  
**Irregularities in the Year of the Event – Z-Score**

VARIABLES	PANEL A - IRREGULARITIES				
GOVT1	-0.002				
DCGLxGOVT1	-0.267				
GOV_CTRL		-0.443			
DCGLxGOV_CTRL		0.918			
GOVT20			-0.57		
DCGLxGOVT20			0.216		
GOVT3				-0.917**	
DCGLxGOVT3				0.968	
GOVT5					-0.973**
DCGLxGOVT5					1.566**
BIG4	-0.392	-0.379	-0.349	-0.294	-0.296
DCGL	-0.623**	-0.741**	-0.710**	-0.893***	-1.069***
OPINION	1.554***	1.506***	1.518***	1.518***	1.500***
Z-SCORE	-0.0122	-0.00959	-0.00803	-0.0109	-0.0118
CONSTANTE	-3.300***	-3.263***	-3.223***	-3.115***	-3.072***
N	2,587	2,587	2,587	2,587	2,587
chi2	78.32	86.3	81.52	84.89	93.16
Pseudo R2	0.097	0.098	0.099	0.105	0.109
<b>PANEL A - F TEST – IRREGULARITIES IN THE YEAR OF THE EVENT – Z-SCORE</b>					
IRREGULARITIES				Coef.	P
GOVT1+(DCGLxGOVT1)				-0.2687	0.728
GOVCTRL+(DCGLxGOVCTRL)				0.4751	0.571
GOVT20+(DCGLxGOVT20)				-0.3546	0.644
GOVT3+(DCGLxGOVT3)				0.0518	0.92
GOVT5+(DCGLxGOVT5)				0.5933	0.189

Source: Elaborated by the author

Note: \*\*\*, \*\* and \* mean significance levels of 1%, 5% and 10%, respectively. GOVT1 - Government 1<sup>st</sup> shareholder. GOV\_CTRL – Government as controlling shareholder (+ 50% of the voting shares). GOVT20 - Government with significant participation (+ 20% of the voting shares). GOVT3 - Government among the top three shareholders. GOVT5 - Government among the top five shareholders. DCGL – Differentiated Corporate Governance Levels. DCGL x GOV – Interaction of the DCGL variable with each government shareholding level. BIG4 – The independent audit is a big four. OPINION - independent auditor's opinion. Z-SCORE – prediction of bankruptcy model. M-SCORE - predictive model of earnings manipulation

Table 2  
**Irregularities in the Year of Judgment – Z-Score**

VARIABLES	PANEL B - IRREGULARITIES
GOVT1	-0.0184
DCGLxGOVT1	1.353*

GOV_CTRL			-0.874		
DCGLxGOV_CTRL			2.175**		
GOVT20				-0.783	
DCGLxGOVT20				1.941**	
GOVT3					-0.721
DCGLxGOVT3					1.716**
GOVT5					-0.775*
DCGLxGOVT5					1.639**
BIG4	-0.663**	-0.589**	-0.561*	-0.526*	-0.516*
DCGL	-1.119***	-1.129***	-1.233***	-1.381***	-1.376***
OPINION	1.469***	1.399***	1.419***	1.433***	1.427***
Z-SCORE	-0.268	-0.283	-0.292	-0.306	-0.307
CONSTANTE	-3.979***	-3.944***	-3.894***	-3.841***	-3.816***
N	2,669	2,669	2,669	2,669	2,669
chi2	112.7	114.2	115.8	120.2	120.3
Pseudo R2	0.14	0.14	0.142	0.143	0.143
<b>PANEL B - F TEST – IRREGULARITIES IN THE YEAR OF JUDGMENT – Z-SCORE</b>					
IRREGULARITIES				Coef.	P
GOVT1+(DCGLxGOVT1)				1.3351	0.015**
GOVCTRL+(DCGLxGOVCTRL)				1.3004	0.061*
GOVT20+(DCGLxGOVT20)				1.1584	0.031**
GOVT3+(DCGLxGOVT3)				0.9945	0.041**
GOVT5+(DCGLxGOVT5)				0.8634	0.075*

Source: Idem Table 1 and panel A.

When analyzing the results of companies with government participation in isolation, i.e., without interacting with another variable (GOVT1, GOV\_CTRL, GOVT20, GOVT3, and GOVT5), it was observed that, in general, there is no significant difference that confirms an influence of government participation in the existence of irregularities (Tables 1, 2 and 4), corroborating Yang, Jiao, and Buckland (2017) findings in their study in China. However, when considering the use of a predictive variable for earnings management (M-Score), especially in the year of the event (Table 3), companies with government participation were less likely to commit irregularities. This result is consistent with the study by Siqueira (2018), who identified that companies with government participation have lower levels of earnings management, as they have no incentive to maximize profits and results, a quite common aspect in private companies.

Table 3  
**Irregularities in the Year of The Event – M-Score**

VARIABLES	PANEL C – IRREGULARITIES				
GOVT1					-0.365
DCGLxGOVT1					0.451
GOV_CTRL					-15.13***
DCGLxGOV_CTRL					16.01***
GOVT20					-1.418*
DCGLxGOVT20					1.394
GOVT3					-1.211**
DCGLxGOVT3					1.323
GOVT5					-1.250**
DCGLxGOVT5					1.868**
BIG4	-0.548*	-0.438	-0.414	-0.387	-0.39
DCGL	-0.877**	-0.900***	-0.856**	-0.954***	-1.138***
OPINION	1.630***	1.584***	1.603***	1.655***	1.642***
M-SCORE	-0.0029	0.0582	0.0589	0.0527	0.058
CONSTANTE	-2.766***	-2.761***	-2.684***	-2.631***	-2.579***
N	1,818	2,152	2,152	2,152	2,152
chi2	67.37	2,650.20	72.53	72.1	82.2

Pseudo R2	0.112	0.129	0.121	0.123	0.126
<b>PANEL C – F TEST – IRREGULARITIES (YEAR OF THE EVENT)– M-SCORE</b>					
IRREGULARITIES				Coef.	P
GOVT1+(DCGLxGOVT1)				0.0565	0.943
GOVCTRL+(DCGLxGOVCTRL)				0.885	0.311
GOVT20+(DCGLxGOVT20)				-0.0246	0.975
GOVT3+(DCGLxGOVT3)				0.1124	0.852
GOVT5+(DCGLxGOVT5)				0.618	0.257

Source: Idem Table 1 and panel A.

Table 4

**Irregularities in the Year of Judgment – M-Score**

VARIABLES	PANEL D - IRREGULARITIES				
GOVT1	-0,351				
DCGLxGOVT1	2.007**				
GOV_CTRL		-14.99***			
DCGLxGOV_CTRL		16.40***			
GOVT20			-1,227		
DCGLxGOVT20			3.031***		
GOVT3				-0,753	
DCGLxGOVT3				2.565***	
GOVT5					-0,781
DCGLxGOVT5					2.463***
BIG4	-0.828***	-0.729**	-0.728**	-0.715**	-0.709**
DCGL	-1.372***	-1.262***	-1.627***	-1.929***	-1.909***
OPINION	1.509***	1.461***	1.445***	1.513***	1.517***
M-SCORE	0.146	0.142	0.148	0.148	0.151
CONSTANTE	-3.773***	-3.812***	-3.703***	-3.694***	-3.669***
N	1,990	1,990	1,990	1,990	1,990
chi2	61.33	2,105.60	71.85	73.84	73.78
Pseudo R2	0.1252	0.1327	0.1379	0.1379	0.1358
<b>PANEL D – F TEST – IRREGULARITIES IN THE YEAR OF JUDGMENT – M-SCORE</b>					
IRREGULARITIES				Coef.	P
GOVT1+(DCGLxGOVT1)				1.6558	0.009***
GOVCTRL+(DCGLxGOVCTRL)				1.4074	0.078*
GOVT20+(DCGLxGOVT20)				1.8042	0.004***
GOVT3+(DCGLxGOVT3)				1.812	0.004***
GOVT5+(DCGLxGOVT5)				1.6822	0.007***

Source: Idem Table 1 and panel A

However, the interaction between the five levels of government participation (GOV) and the variable DCGL, significant and positive results, are observed for Z-Score and M-Score in the year of judgment (Tables 2 and 4). This result indicates that companies at any level of government participation, especially those in segments with DCGL, are more likely to be involved in irregularities. The F test coefficients confirm this finding, especially in the year when irregularities are judged (panels B and D), indicating a greater influence of government participation in irregularities (significance of 5% and 10%).

The content of the votes in the CVM judgment of each SAP involving companies with government participation and in segments with DCGL was analyzed to endorse the results and show the consistency of the numbers calculated. This measure was carried out since it was not possible to identify a similar analysis of this type of interaction to use as a reference.

From 2012, Petrobrás started to absorb the fuel price increases in the international market, with the federal government setting prices below the international market. The company had consecutive losses from 2012 to 2015, demonstrating the controlling shareholder's influence to the detriment of the other shareholders and the company (Salgado, 2018). In the judgment of SAP RJ2014/3402, the CVM fined Petrobrás for “not disclosing a

relevant fact about the adoption of a new fuel pricing methodology that it commercializes” (our translation), failing to comply with article 6 of CVM Instruction 358/2002.

In another case, Eletrobrás (SAP RJ2013/6635), the minority shareholders filed a lawsuit with the CVM against the federal government, claiming that the company had been obliged to adhere to the cost reduction program and not apply the tariffs practiced by the market, causing billions of losses to the company, which was considered by the CVM as a violation of article 115 of the S/A law, characterizing a conflict of interest.

Yet another case, SAP 09/2006, Oi (Brasil Telecom), whose partners are pension funds sponsored by state-owned companies, was also condemned for three situations: for using the company, and at its expense, sponsoring legal claims that did not aim to achieve the company’s purposes and interests; irregularly calling an extraordinary general assembly to replace the Brasil Telecom S/A’s board, as well as replacing the board of other companies in its corporate chain, with the explicit intention of privileging a specific group of shareholders, instead of the interests of the company or other shareholders; and, publishing relevant information that represented only the interest of a certain group of shareholders and not that of shareholders as a whole, as required by the rule of a relevant fact.

Likewise, in Embraer SAP’s judgment (RJ20151760), misuse of manager power was characterized when disbursing the company’s resources in favor of companies linked to the Dominican Republic. This characterized an undue advantage to acquire military aircraft from Embraer by the Dominican Republic Air Force. There was an evident deviation from administrative duties as the company’s purposes and interests were ignored. This brought serious consequences since the company was put at the epicenter of an international scandal, resulting in financial losses and a negative impact on image and business.

The evidence collected from the content of CVM’s votes in each judgment, it is possible to infer that the participation of the government as one of the main shareholders in companies, especially those with Differentiated Corporate Governance Levels (DCGL), can lead to decisions that benefit the government itself or specific groups at the expense of the company and to the detriment of minority shareholders. This conclusion is in line with the international literature (Ben Nars & Cosset, 2014; Laffont & Tirole, 1991).

Regarding the control variables, the irregularities are positively related to the audit opinions, at a significance level of 1%, in practically all the models analyzed, whether in the year of the event or in the year of judgment. This confirms Wuerges’ (2010) results that a company that received a qualified opinion in the audit report is 5.12 times more likely to be involved in accounting fraud because an adverse or qualified opinion suggests financial misstatements and does not follow accounting standards. When companies are audited by a big four, the negative and significant results indicate that they are less likely to commit irregularities. According to Almeida and Almeida (2009), these companies have a lower degree of discretionary accruals, which mitigates the practice of earnings management.

As for companies with a high level of governance, the result is consistent with those found in the study by Smetana (2015). From the total of SAP that CVM convicted of irregularities associated with compliance, 4% are from listed companies belonging to the segments *Novo Mercado*, *Nível 1*, *Nível 2*, and *Bovespa Mais*, and the other 96%, of the traditional market. For the author, “companies that have an effective compliance program have a mitigating effect on corrupt practices” (Smetana 2015:15, our translation).

Both Altman’s Z-Score index (1968), used in the literature to predict bankruptcy or flag companies with financial difficulties, and Beneish’s (1999) M-Score index, used as an indicator of earnings manipulation, did not show any degree of significance showing the influence on irregularities.

## 6. Final Considerations

The purpose of this research was to assess whether companies with government participation are more likely to commit accounting and financial irregularities. The results show that companies with government participation, when analyzed in isolation, did not present, in general, significant differences that confirm the propensity to be involved in irregularities, corroborating the results found by Yang, Jiao, and Buckland (2017) in China.

However, when companies at any level of government shareholding interact with those in segments with Differentiated Corporate Governance Levels (DCGL), it is observed that companies with government participation and DCGL are more likely to commit irregularities than companies without government participation in the same segment.

The analysis of CVM's decisions in the judgment of the SAP involving these companies shows that the government, as a controlling shareholder, has directed decisions towards meeting the country's macroeconomic and social policies or the interests of specific groups. These interests prevail over the goals of other shareholders and the company, which is in line with the international literature (Ben Nars & Cosset, 2014; Laffont & Tirole, 1991).

Concerning the control variables, the significant results show their influence on the irregularities, corroborating the literature and confirming the applicability of such variables as a proxy for the analysis of irregularities judged by the CVM. Thus, companies audited by a big four are less likely to commit irregularities (Almeida & Almeida, 2009), and the same happens in the case of firms with a higher level of corporate governance (Smetana, 2015). On the other hand, a qualified audit opinion is a sign of irregularity (Wuerges, 2010).

This research contributes to the literature by demonstrating that – even if recent cases of fraud and corruption involving state-owned and non-state-owned companies investigated by Brazilian Federal Police suggest the opposite – government participation in companies alone is not a determining factor to assess the likelihood of a listed company to be convicted by CVM in Sanctioning Administrative Proceedings (SAP). Also, another scenario emerges when the analysis is restricted to companies in segments with Differentiated Corporate Governance Levels (DCGL). In these cases, evidence suggests that government participation positively affects the probability of a company committing irregularities. This study's contribution permeates the idea that government participation should not be associated with irregularities. However, there is a group among these companies where irregularities are more likely to occur, and these findings can assist in the control and monitoring of companies with government participation, with greater intensity for the group of companies in segments with DCGL, identifying and preventing such events.

As for limitations, this research used data on accounting and financial irregularities from secondary sources such as the SAP judged by the CVM. This choice – considering that this is not the only source to observe irregularities – limits the study to the regulatory agency's perspective, which can generate an analysis bias. Another limitation was that the analysis of companies with government participation was restricted to a) those where the government was at least among the top five shareholders based on data from Economática, and b) to Siqueira's (2018) list of institutional shareholders considered as *government* (Appendix A). Finally, the calculations of the Z-Score and M-Score models were restricted to the data available in the Economática database, and the absence of any accounting data in any period led to the exclusion of the observation from the model, consequently reducing the sample.

The study points out elements to be addressed in future research, such as (1) expanding the investigation on possible determinants of irregularities that associate companies with government participation to other variables, such as leniency agreements, corruption crimes, money laundering, and operational and accounting fraud, among other crimes; (2) assessing the irregularities associated with corporate governance existing in companies with or without government participation; (3) expanding the analysis on the effectiveness of the Z-Score and M-Score indexes as predictors of bankruptcy and earnings manipulation, respectively, in

Brazilian companies with or without government participation; and (4) broadening the analysis of the particularities of the AAER reports issued by the SEC and the SAP issued by the CVM and comparatively assess the effects of the sanctions applied in each country on the financial market, as a way of identifying opportunities to reduce the occurrence of irregularities.

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Anexs:

**A1: IRREGULARITIES FROM 2001 TO 2018**

Year	Irregularities – Z-Score						Irregularities – M-Score					
	Year of the event			Year of judgment			Year of the event			Year of judgment		
	Acc	Fin	Total	Acc	Fin	Total	Acc	Fin	Total	Acc	Fin	Total
2001	1	2	3	0	1	1	1	3	4	0	1	1
2002	0	0	0	1	1	2	0	0	0	1	1	2
2003	1	0	1	0	0	0	0	0	0	0	0	0
2004	2	2	3	0	0	0	0	0	0	1	0	1
2005	3	4	4	0	1	1	5	4	6	2	2	3
2006	4	4	5	4	2	4	5	4	5	5	3	5
2007	2	2	3	1	1	2	1	0	1	1	0	1
2008	7	3	8	1	2	2	8	3	8	0	0	0
2009	3	3	6	5	4	7	1	4	5	5	5	8
2010	2	1	2	1	0	1	2	1	2	1	0	1
2011	0	1	1	2	1	3	0	1	1	2	1	3
2012	6	1	6	1	0	1	2	1	2	0	0	0
2013	6	3	8	6	2	6	3	3	5	4	2	4
2014	9	3	10	1	0	1	5	3	6	0	0	0
2015	3	3	4	6	2	8	1	1	2	1	2	3
2016	1	1	2	3	0	3	0	1	1	3	0	3
2017	2	3	3	6	4	6	2	3	3	4	3	4
2018	0	0	0	2	5	6	0	0	0	0	4	4
<b>Total</b>	<b>52</b>	<b>36</b>	<b>69</b>	<b>40</b>	<b>26</b>	<b>54</b>	<b>36</b>	<b>32</b>	<b>51</b>	<b>30</b>	<b>24</b>	<b>43</b>

Source: Elaborated by the author

**A2: GOVERNMENT PARTICIPATION IN BRAZILIAN COMPANIES - 2001 to 2018**

	Z-SCORE		M-SCORE	
	Freq.	%	Freq.	%
<b>GOVT1: 1st shareholder</b>				
Observations with government participation	397	13.85	368	14.25
Observations without government participation	2,469	86.15	2,215	85.75
Total	2,866	100	2,583	100
<b>GOVCTRL: Controlling shareholder (+50%)</b>				
Observations with government participation	262	9.14	223	8.63
Observations without government participation	2,604	90.86	2,360	91.37
Total	2,866	100	2,583	100
<b>GOVT20: Significant participation (+20%)</b>				
Observations with government participation	438	15.28	446	17.27
Observations without government participation	2,428	84.72	2,137	82.73
Total	2,866	100	2,583	100
<b>GOVT3: Government among the top three shareholders</b>				
Observations with government participation	737	25.72	715	27.68
Observations without government participation	2,129	74.28	1,868	72.32
Total	2,866	100	2,583	100
<b>GOVT3: Government among the top five shareholders</b>				
Observations with government participation	793	27.67	762	29.5
Observations without government participation	2,073	72.33	1,821	70.5
Total	2,866	100	2,583	100

a) Altman's Z-Score (1968): predicts bankruptcy, according to equation (2):

$$Z = 0.012X_1 + 0.014X_2 + 0.033X_3 + 0.006X_4 + 0.999X_5 \quad (2)$$

Variable	Description	Source
X <sub>1</sub>	Working capital (current assets – current liabilities) / Total assets	Economática
X <sub>2</sub>	Retained earnings / Total assets	
X <sub>3</sub>	Earnings before interest and taxes (EBIT) / Total assets	
X <sub>4</sub>	Company's market value (number of shares issued times the last share price) / Total assets	Altman (1968)
X <sub>5</sub>	Sales / Total assets.	

Figure 2. Description of variables used in the Z-Score model.

Source: Elaborated by the author

b) Beneish's (1999) *M-Score*: the model consists of eight financial indices that allow identifying if the financial statements of a company have been manipulated, according to equation (3).

$$M = -4.84 + 0.920DSRI + 0.528GMI + 0.404AQI + 0.892SGI + 0.115DEPI - 0.172SGAI - 0.327LVGI + 4.679TATA \quad (3)$$

Variable	Description	Source
<b>DSRI</b>	<b>Days Sales in Receivables Index:</b> (Receivables <sub>t</sub> / Sales <sub>t</sub> ) / (Receivables <sub>t-1</sub> / Sales <sub>t-1</sub> )	Economática  Beneish (1999)
<b>GMI</b>	<b>Gross Margin Index:</b> (Gross margin <sub>t</sub> ) / (Gross margin <sub>t-1</sub> )	
<b>AQI</b>	<b>Asset Quality Index:</b> {1 - [(Current assets <sub>t</sub> + PP&E <sub>t</sub> ) / Total assets <sub>t</sub> ]} / {1 - [(Current assets <sub>t-1</sub> + PP&E <sub>t-1</sub> ) / Total assets <sub>t-1</sub> ]}	
<b>SGI</b>	<b>Sales Growth Index:</b> Sales <sub>t</sub> / Sales <sub>t-1</sub>	
<b>DEPI</b>	<b>Depreciation Index:</b> [Depreciation <sub>t</sub> / (Depreciation <sub>t</sub> + PP&E <sub>t</sub> )] / [Depreciation <sub>t-1</sub> / (Depreciation <sub>t-1</sub> + PP&E <sub>t-1</sub> )]	
<b>SGAI</b>	<b>Sales, General, and Administrative expenses Index:</b> (Sales, general, and administrative expense <sub>t</sub> / Sales <sub>t</sub> ) / (Sales, general, and administrative expense <sub>t-1</sub> / Sales <sub>t-1</sub> )	
<b>LVGI</b>	<b>Leverage Index:</b> (Short and long term debt <sub>t</sub> / Total assets <sub>t</sub> ) / (Short and long term debt <sub>t-1</sub> / Total assets <sub>t-1</sub> )	
<b>TATA</b>	<b>Total Accruals to Total Assets:</b> [(Net profit <sub>t</sub> - Operational cash flow <sub>t</sub> ) / Total assets <sub>t</sub> ] / [(Net profit <sub>t-1</sub> - Operational cash flow <sub>t-1</sub> ) / Total assets <sub>t-1</sub> ]	

Figure 03: Details of variables for the M-score model

Source: Elaborated by the author

#### A4 – DESCRIPTIVE STATISTICS

Variable	Z-SCORE			M-SCORE			Z-SCORE AND M-SCORE				
	N	Average	Std.	N	Average	Std.	Min	0,25	Mdn	0,75	Max
Irreg. Total (1)	2,866	0.02	0.15	2,583	0.02	0.14	0	0	0	0	1
Irreg. Total (2)	2,866	0.02	0.14	2,583	0.02	0.13	0	0	0	0	1
GOVT1	2,866	0.14	0.35	2,583	0.14	0.35	0	0	0	0	1
GOV_CTRL	2,866	0.09	0.29	2,583	0.09	0.28	0	0	0	0	1
GOVT20	2,866	0.15	0.36	2,583	0.17	0.38	0	0	0	0	1
GOVT3	2,866	0.26	0.44	2,583	0.28	0.45	0	0	0	1	1
GOVT5	2,866	0.28	0.45	2,583	0.3	0.46	0	0	0	1	1
DCGL	2,866	0.54	0.5	2,583	0.5	0.5	0	0	1	1	1
BIG 4	2,866	0.76	0.42	2,583	0.79	0.41	0	1	1	1	1
OPINION	2,866	0.06	0.24	2,583	0.05	0.22	0	0	0	0	1
Z-SCORE	2,866	1.12	2.37				0.01	0.32	0.58	1.03	16.27
M-SCORE				2,583	-2.45	1.26	-5.71	-3.02	-2.56	-2.03	1.76

Source: Elaborated by the author

Note: (1) Irregularities in the year of the event. (2) Irregularities in the year of judgment. GOVT1 - Government 1<sup>st</sup> shareholder. GOV\_CTRL - Government as controlling shareholder (+ 50% of the voting shares). GOVT20 - Government with significant participation (+ 20% of the voting shares). GOVT3 - Government among the top three shareholders. GOVT5 - Government among the top five shareholders. DCGL - Differentiated Corporate Governance Levels. BIG4 - The independent audit is a big four. OPINION - independent auditor's opinion. Z-SCORE - prediction of bankruptcy model. M-SCORE - predictive model of earnings manipulation.