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JOSÉ RICARDO SANCHEZ FILHO

ANALYSIS OF THE LONG-TERM EFFECTS OF THE VOLUNTARY OFFER OF THE BID RULE ON STOCKS LISTED IN THE BRAZILIAN STOCK EXCHANGE

Rio de Janeiro

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Dissertação de Mestrado apresentada ao Instituto COPPEAD de Administração, da Universidade Federal do Rio de Janeiro, como parte dos requisitos necessários à obtenção do título de Mestre em Administração.

ORIENTADOR: André Luiz Carvalhal da Silva, Ph.D.

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“You miss 100% of the shots you don’t take”,

Wayne Gretzky

To my family and to my fiancée, for encouraging

me to take shots in life.

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ABSTRACT

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Corporate governance has been undoubtfully one of the most important fields of study in capital markets in the last decade. Due to its capillarity, different stakeholders are somehow impacted by corporate governance. Related to this topic is the so-called tag-along rights (also known as mandatory bid rule), which emerges in a company takeover and consists in acquirers granting to non-controlling shareholders a price offer similar the one made to the company's controllers (usually ranging from 80% to 100% of the price offered to controllers). Therefore, tag-along can be viewed as a protection to minority shareholders. The Brazilian law 10303/2001 establishes that acquirers must offer to non-controlling common shareholders a purchase price corresponding to 80% of the price offered to controlling shareholders. In this context, the goal of this research is to analyze if both common and preferred shares of companies that offer minority shareholders better terms regarding tag-along rights than what is stipulated by law (i.e., a voluntary offer of the bid rule) have their return, liquidity and volatility significantly affected on the long-term. Using unbalanced panel data models constructed using data from 2002 to 2015, the analysis performed here shows evidence that the voluntary offer of the bid rule significantly affects common shares' liquidity and volatility. No evidence was found of this voluntary benefit affecting shares' return.

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SUMMARY

1. INTRODUCTION

Corporate governance is made of numerous factors. It dictates the board of directors' election and composition, executive hiring, monitoring and compensation, takeover defenses and ownership structure. Although it has always been an important subject, in the last decades it has been increasingly discussed, especially due to major corporate scandals, such as Enron, Tyco, Siemens, Volkswagen and, more recently, Petrobras. In all these cases, weak corporate governance was present. Recently enacted regulations, such as Sarbanes-Oxley in the United States, suggest the fact that strong corporate governance is essential for companies and financial markets to operate efficiently.

One of the key issues corporate governance tries to address is the principal-agent problem. A principal-agent relationship arises from the segregation of ownership and control, when one entity delegates decision making or control to another entity. The entity receiving the power (agent) generally has an asymmetric information advantage over the entity making the delegation (principal). The problem arises when the agent uses the information advantage for their own interests to the detriment of the interests of the principal.

There are two major types of principal-agent forms in corporate business. The first one is between shareholders and managers of the company. The investors (principal) put money in the company and delegate business decisions to the managers (agent). How do investors make sure that managers are not investing in bad projects or using money for private benefits, such as manipulating board of directors to extract excessive compensation, or spending money in lavish restaurants and hotels during business trips? How do the investors get managers to return part of the profits to them?

The second type of principal-agent is between majority shareholders and minority shareholders. In many countries, expropriation of minority shareholders by the controlling shareholders is extensive (La Porta et al., 2000). Because there is usually a mismatch between cash flow rights and voting rights between stock classes, controlling

shareholders can, for instance, cut down dividends payments if that is in their best interest.

Minority shareholders play an import role in well-functioning capital markets. They improve liquidity and reduce firm's cost of equity. Investors are willing to finance firms when their rights are enforced. Following this reasoning, corporate governance can be seen as a set of rules created to protect minority investors against the expropriation by managers and majority shareholders. Tag-along rights were introduced in this context. In the event of a control transfer, tag-along rights give the minority shareholders the right to be part of the transaction, forcing the acquirer to buy their shares at a fair price and in the same negotiation.

In Brazil, tag-alongs rights (usually known in the literature as mandatory bid rule) are ruled by the Law 10.303 of 2001. This law establishes that the acquirer must extend the purchase offer to the minority common shareholders, granting them at least 80% of the purchase price offered for the controlling shareholders. Although the law does not estate the mandatory bid rule to preferred shareholders, it establishes that at least one of the following benefits must be granted them: i) minimum dividend of 3% of the shares book value; ii) dividends 10% higher than common shareholders' dividends; iii) purchase offer with a price equal to or higher than 80% of the purchase price offered for the controlling shareholders' shares (i.e., the same conditions granted by law 10303/2001 to minority common shareholders).

The objective of this research is to analyze the long-term (i.e., significantly after the day the bid rule benefit was granted) effects of the mandatory bid rule above what is required by Law 10.303/2001 (in other words, the effects of a voluntary offer of the bid rule) in Brazilian stocks listed in Bovespa. The goal is to analyze if companies that offer better conditions to minority shareholders by increased tag-along rights have their stocks affected, positively or negatively. Specifically, it has been studied these effects on stocks' return, volatility and liquidity, using Bovespa data from 2002 to 2015.

The rest of this document is structured as follows. In chapter 2, a literature review of the mandatory bid rule and its impacts on firms is given. An overview of corporate governance and the stock market in Brazil is presented in chapter 3. In chapter 4, the methodology and the data used in this study is explained. The estimators used to analyze

stocks' return, volatility and liquidity relation with the voluntary offer of the bid rule are shown in detail in this chapter, followed by a discussion of the panel data collection procedures and of the characteristics of the sample of companies used in the analysis. The results obtained with the regressions and a discussion of these results in shown chapter 5. Finally, the conclusion, commentaries and perspectives for future work are given in chapter 6.

2. LITERATURE REVIEW

Much has been discussed in the literature about the importance of corporate governance for firms and for the overall economy of a country. Better corporate governance is typically associated with more equality among stakeholders, greater access to funding, lower cost of capital and better firm performance. In turn, all these benefits foster economic development (Claessens, 2006).

There are many definitions of corporate governance available in the literature. As an example of such, (Mcenally e Kim, 2012) define corporate governance as “the system of principles, policies, procedures, and clearly defined responsibilities and accountabilities used by stakeholders to overcome conflicts of interest inherent in the corporate form.”. However, under the finance umbrella, corporate governance scope is usually centered on protecting outside investors against expropriation by insiders (controlling shareholders and managers) (Claessens e Yurtoglu, 2013).

The expropriation of outsiders by controlling shareholders can happen in diverse ways. (López De Silanes et al., 2000) described as “tunneling” the agency problem between controlling and minority shareholders that consists in the extraction of private benefits by the controlling shareholders at the minority shareholders’ expense. The risk of expropriation of minority shareholders by large, controlling shareholders is an important principal-agent issue in most countries (Claessens et al., 2002). As pointed by (López De Silanes et al., 2000), this expropriation can take the form of self-dealing transactions, such as (a) hiring friends or family members as executives and paying them excessive compensation, (b) making personal loan guarantees, and (c) making abnormal intercorporate transactions with another company also owned by the controlling shareholder (asset sales and transfer pricing); but the expropriation can also happen with no asset transfers taking place, where insider trading, issuing dilutive shares or making meaningless acquisitions that destroy firm value are common examples.

According to (Porta et al., 2002), investors should be willing to pay premium prices for stocks that are issued by firms that offer more protection against expropriation of wealth. Therefore, it is intuitive that increased investor protection should be positively

related with firm value. Since strong corporate governance advocates for increased transparency and rules that protect shareholders, investors would be willing to keep providing funds for companies. By attracting minority investors, enhanced corporate governance is therefore also expected to increase market liquidity and contribute to capital markets development. There are many studies in the literature pointing in this direction, such as (Chavez e Silva, 2006; Chung et al., 2010).

Many authors have suggested that minority investors protection is paramount for an efficient capital markets. (Porta et al., 2002) found that countries with laws and regulations more protective of minority investors have more developed capital markets. This result is corroborated not only by (Leal, 2004; Chavez e Silva, 2006), which suggest minority protection is fundamental for achieving efficient capital markets, but also by (Leuz et al., 2003), which found evidence that earnings manipulation by managers is negatively related to minority shareholders rights and legal enforcement, suggesting that protecting minority shareholders improves financial reporting quality and enhances capital markets efficiency. On the other side, when investors protection is lacking, there are many studies suggesting the underdevelopment of capital markets, compromising external finance as firms' source of capital and restraining economic growth (Porta et al., 1997). A well-developed capital markets foster economic growth by, among many benefits, allocating capital more efficiently and distributing risks between actors (Levine, 1997).

According to (Porta et al., 1999), corporate ownership and control is concentrated in most countries. When control of the companies is concentrated, two main effects counteracts (Morck et al., 1986): the incentive effect and the entrenchment effect. The incentive effect is positive. It is the fact that when ownership is concentrated, monitoring of management becomes more efficient. On the other hand, the entrenchment effect is negative. It is related to the evidences that concentration of power makes the expropriation of minority owners by controlling shareholders easier. (Claessens et al., 2002) found empirical evidence of these effects on firm value. They found a positive correlation between cash flow rights and firm value due to concentrated ownership providing better management incentives (incentive effect). They also assigned a negative correlation between disproportional ownership structure and firm value (entrenchment effect). (Bennedsen e Nielsen, 2010) also studied the incentive and entrenchment effects.

Corroborating (Claessens et al., 2002), they found supporting evidences of these effects affecting firm value when analyzing European companies.

To study the effects corporate governance has on firms in Latin America, (Bebczuk et al., 2007) created a comprehensive corporate governance index and found a positive correlation between this index and stock prices in Latin American countries. More specifically, they found that a one point increase in their index resulted in a 6.8% increase in stock prices for mid-sized firms. Corroborating these authors, when analyzing effects that shareholder agreements have on firm valuation, (Carvalhal, 2012) found supporting evidences that the degree of investor protection is positively related to firm value.

One of the most important forms of protecting minority shareholders is the mandatory bid rule (known in some countries, such as Brazil, as tag-along rights). This rule states that, in a takeover, the acquirer of the controlling block must offer minority shareholders a fair price for their shares, usually a price greater than or equal to 80% of the price offered to controllers. Therefore, any control premium paid to the controllers will also be shared with minority shareholders. There are many relevant studies related to the mandatory bid rule in the literature, such as (Bebchuk, 1994; Bergström et al., 1997; Bebchuk e Hart, 2001).

Although simple in theory, the literature of the mandatory bid rule has been pointing to both positive and negative effects. On the positive side, firstly is the minority investors protection. (Da Silva e Subrahmanyam, 2007), showed that the mandatory bid rule strengthens the protection for minority shareholders in event of a takeover. By favoring equal treatment of all shareholders, the mandatory bid rule ensures that all shareholders will share any control premium and will have the opportunity to exit their investment. Still on the positive side of the mandatory bid rule effects, given that acquisitions will be more expensive for the acquirers, the mandatory bid rule warrants a more efficient bidding process and prevents value destroying control transfers from taking place (Schuster, 2013). Complementing (Schuster, 2013), (Wang e Lahr, 2017) found that the mandatory bid rule also reduces the time to successful completion of a takeover bid, contributing for acquisitions efficiency. However, on the negative effects side, by raising the cost of acquisitions the mandatory bid rule is likely to prevent value-increasing

transactions, which in turn can reduce the value of the companies (Burkart e Panunzi, 2003; Sepe, 2010).

Some other studies analyzed the relation between the mandatory bid rule and dual-class premiums[1]. Studying Brazilian stocks, (Nenova, 2006) found that the removal of the mandatory bid rule increases the dual-class premium due to potential gains from control that can result in the absence of this rule. Partially contradicting this author, (Da Silva e Subrahmanyam, 2007) found evidence that the dual-class premium is positively (negatively) associated with the mandatory bid rule for voting (non-voting) shares. Further, they also found evidence that the dual-class premium is significantly lower in companies that voluntarily grant the bid rule (i.e., when the bid rule is not required by law) for non-voting shares. Contradicting the latter evidence found by (Da Silva e Subrahmanyam, 2007), when analyzing stocks from Brazilian companies from 1995 to 2006, (Saito e Silveira, 2010) did not find empirical evidence that voluntary granting tag along rights influences the dual-class premium.

Contributing to the study of what effects the bid rule have on firms, (Carvalhal e Nicolau, 2009) analyzed if companies that voluntarily grant the bid rule to shareholders beyond what is required by law have their stocks' return, volatility and liquidity significantly affected in the short term (i.e., in dates close to the date that the voluntary bid rule was initiated). They used data from the Brazilian stock exchange from 2002 to 2005, and found evidence of a positive relation between the bid rule, stocks' valuation and stocks' liquidity. In contrast, they found no evidence of the bid rule decreasing stocks' volatility.

The work presented here intends to shed further light on how the bid rule affects stocks. Using panel models constructed with data from 2002 to 2015 extracted from Bovespa, the long-term effects the voluntary bid rule offer has on stocks' value, liquidity and volatility is analyzed.

[1] The dual-class premium is the difference in price of voting shares and non-voting shares of the same company

3. CORPORATE GOVERNANCE AND THE STOCK MARKET IN BRAZIL

3.1. Corporate governance in Brazil

Brazil has been perceived as a country with low investors' protection (Nenova, 2006). In the late 1990's, Brazilian corporate governance was underdeveloped. Many Brazilian public companies presented highly concentrated ownership and many of them were controlled by families or by the state (Leal e Carvalhal, 2005). In the half of 1990, a wave of privatizations of Brazilian companies started to change this ownership structure. A model of shared control with the presence of minority shareholders emerged. Later on, Bovespa introduced the premium listing segments.

The differentiated corporate governance listing segments arose in Brazil in 2000. Back then, the low investor protection environment in the country made firms that wanted to claim good corporate governance cross-list their shares in the exchanges of the United States, issuing American Depositary Receipts (ADRs). According to Bovespa, approximately 37% of the trading volume of Brazilian shares were happening in American exchanges. Evidences found by (Halling et al., 2007) help explain this issue. These authors found that firms from countries that have a low degree of investor protection have high trading activity of their cross-listed shares in the U.S.

When the Brazilian stock exchange noted it was losing trading revenues to the American exchanges, it decided to launch new premium listing segments to improve the attractiveness of the Brazilian capital markets both to investors and to firms (Leal e Maranho, 2016).

Bovespa's premium segments are a private initiative supporting better corporate governance aiming to bring the Brazilian stock market level to levels seen in developed countries. Because companies voluntarily choose to adhere to one of these segments, they can be seen as an alternative between corporate laws and regulations, which are mandatory, and corporate governance codes, which are merely recommendations (Leal e Maranho, 2016).

Three new segments were launched in 2000: Level 1 ("Nível 1"), Level 2 ("Nível 2") and New Market ("Novo Mercado"). All three segments demand enhanced disclosure

rules and better corporate governance than the usual Bovespa's listing segment, called Tradicional. The standards of the new premium segments are beyond what is established by the Brazilian Corporate Law and by the Brazilian Securities Commission. Therefore, if a company decides to be listed on one of these segments, it is voluntarily abiding to higher transparency and corporate governance practices.

Companies listed on the Level 1 segment must adopt practices that favors transparency and facilitates access to information by the investors. They must disclose more information than what is required by law, such as an annual calendar of corporate events. A minimum 25% free float is required by Level 1.

To be listed on Level 2, the same rules applied to Level 1 is required. Besides, an important complement of Level 2 is new requirements regarding tag along rights. In the event of a takeover, all common and preferred[2] shareholders must have the same treatment of the controlling block (i.e., a 100% mandatory bid rule). Another important rule of the Level 2 segment is that voting rights are granted to non-voting shares in important corporate decisions such as incorporations, spin-offs, mergers, and approval of contracts between related parties. Intending to attract foreign investors to the Brazilian stock market, Bovespa established that companies listed on Level 2 must also publish financial statements according to international accounting standards (IFRS).

The New Market segment encompasses all rules established by level 2. On top of that, the New Market prohibits companies from issuing non-voting shares. Therefore, the capital structure of companies listed on New Market is 100% comprised of voting shares. Companhia de Concessões Rodoviárias (CCR) was the first company to be listed on New Market, on early 2002.

Bovespa also has two other premium segments, Bovespa Mais and Bovespa Mais 2, which are made for small and midsize companies that want to have a first contact with the equity capital markets, raise small-size equity funds and gradually gain access to the capital markets. Table 1 shows the number of companies listed on each Bovespa's segment in the beginning of 2017.

[2] In Brazil, the dual-class of shares are called ordinary and preferred shares. Ordinary shares have voting rights and preferred shares are non-voting.

Table 1: Number of companies listed on each segment of Bovespa

Bovespa's Segment	# of companies listed
Tradicional	139
Bovespa Mais	13
Bovespa Mais Nível 2	2
Nível 1	28
Nível 2	19
Novo Mercado	131
Total	332

Source: Constructed using data extracted from Economatica

Annex 8.1 summarizes the most important characteristics of the premium segments of Bovespa. A more comprehensive description detailing each listing segment is given in (Carvalhal, 2012) and on Bovespa's website.

In the years following the introduction of the premium segments, several Initial Public Offerings happened in the New Market segment. Many other companies voluntarily opted to transition to this premium segment, contributing to lower the control concentration levels in the Brazilian market, as the New Market segment requires that all shares issued be voting shares (Silveira, 2009). This reconfiguration brought important corporate governance enhancements. The structure and practices of the board of directors, the disclosure of information, transparency and investor protection all had important improvements (Leal e Maranho, 2016). Nevertheless, the overall concentration of voting shares remained high, despite being lower in the premium listing segments (Sternberg et al., 2011).

As aforementioned, the premium segments enjoyed significant adherence in their first decade. Although many studies, such as (De Carvalho, 2003; Nardi e Nakao, 2009; De Carvalho e Pennacchi, 2012; De Oliveira Lima et al., 2015), found evidences that companies listed in Bovespa's premium corporate governance segments enjoy better economic performance, many companies have been recently questioning the cost-benefit of abiding to their many rules. For example, Cremer (trading symbol CREM3), a Brazilian company that produces medical, treatment and hygiene products, decided in 2014 to leave New Market and be listed in the Tradicional segment. Other companies, like Schulz, whose IPO was in 2015, simply decided to be listed on the Tradicional segment, despising the New Market and breaking the cycle of IPO's usually taking place in the New Market.

Recently, the Brazilian market has experienced many acquisitions of public companies. Amid the 2014-2017 economic turmoil the country has been through, the Brazilian currency depreciated and made Brazilian companies cheaper to foreigners, encouraging several acquisitions (Leal e Maranho, 2016). Many of the acquired companies went private, and others simply delisted from Bovespa. As evidenced in (CAPITAL ABERTO, 2015), the reduction in control concentration trend that Brazil was then going through seems to have halted.

To evaluate the overall development of corporate governance in Brazil, using publicly available information (Leal et al., 2015) constructed a Corporate Governance Index (CGI) that assess a broad spectrum of corporate governance practices. Analyzing the scores of the CGI from 2004 to 2013 that public companies in Brazil had, they concluded that the overall corporate governance quality has improved in Brazil, especially after Bovespa created the premium corporate governance listing segments in 2000. However, in the most recent years of their analysis, the average score of the CGI levelled out.

Although the benefits of good corporate governance are well known, the development of laws favoring good corporate governance is still slowly advancing in developing countries and Brazil is no exception. Bovespa's premium segments is an attempt to address this issue. Another solution has been the voluntary adoption by companies of codes of conduct based on recommended corporate governance practices (Chavez e Silva, 2006). The Code of Best Practices produced by the Brazilian Institute of Corporate Governance (IBGC) and the "Corporate Governance Recommendations" created by the Brazilian Securities Commission (CVM) are examples of compilations of recommended best practices of corporate governance. In summary, these good recommendations seek to address that:

- The board of directors protects shareholders' interests
- The rights of shareholders are protected and shareholders have a voice in governance
- The board of directors acts independently from management
- Proper procedures and controls cover management's day-to-day operations

- The firm's financial, operating and governance activities are reported to shareholders in a fair, accurate and timely manner

3.2. Brazilian Stock Market

The Brazilian stock market is the largest in Latin America and the 19th largest in the world[3]. Despite its size, the Brazilian stock market is still concentrated in a few big companies, with the 15 largest companies representing 61% of the exchange's total market capitalization[4]. Besides that, the board of directors of Brazilian companies are dominated by controlling shareholders (Leal, 2004).

Most Brazilian listed companies have two classes of shares outstanding: common stock, which have voting rights, and preferred stock, which have no voting rights. Using non-voting shares in the capital structure results in a large separation between voting rights and cash flow rights.

The high concentration of the combination high voting rights and low cash flow rights stimulates the expropriation of minority shareholders by low dividends policy (Leal e Carvalhal, 2005). According to (CAPITAL ABERTO, 2015), the number of Brazilian companies with major shareholders owning more than 50% of the voting shares was 47% in 2015.

At country-level, corporate governance practices in Brazil, including the differences between voting and non-voting shares, are established in law 6404/76. This law allows companies to issue non-voting shares up to two-thirds of the capital.

Initially, the law 6404/76 established tag along rights for all voting shares at the same price offered to the controlling shareholders. However, in 1997 this law was amended by law 9457/97. This law harmed several minority shareholders rights, and among the rules imposed by it is the revocation of the tag along rights for minority voting shareholders. It is important to note that law 9457/97 was created mainly to address the governments' privatization program needs, such as boosting government revenues when

[3] 2016 data, World Federation of Exchanges members, affiliates, correspondents and non-members, 2017.
[4] Calculated using the market capitalization of Bovespa's companies as of 06/Jul/2017.

selling state-owned companies by avoiding sharing the sale of the control premium with minority investors.

In 2001, after the privatization program of the state was completed, law 10303/01 came to undo some of the negative aspects of the previous legislation. It restated several minority shareholders' rights, such as the mandatory bid rule for voting shares at a price at least 80% of the price offered to the control block. Although preferred shareholders remained with no tag along rights, law 10303/01 established that at least one of the following rights must be granted to non-voting shares: (a) priority minimum dividend of 3% of the book value per share; (b) dividends 10% higher than the dividends on common shares; or (c) mandatory bid rule at a price at least 80% of the price offered to the control block. Nowadays, Law 10303/01 still holds.

4. METHODOLOGY

To analyze the long-term effects that the voluntary adoption of the bid rule has on stocks' return, liquidity and volatility, unbalanced[5] panel data models were used.

This chapter is divided in two sections. First, the models used are presented in section 4.1, followed in section 4.2 by a discussion of how the panels were constructed and the data collection procedures.

4.1. Description of the models

Panel data refer to data containing time series observations of many individuals (or cross-sections), which in our case are stocks. Therefore, observations in panel data involve two dimensions: a cross-sectional dimension, indicated by subscript i, and a time dimension, indicated by t.

According to (Hsiao, 2014), there are many benefits of using panel data models:

- Simplified computation and statistical inference
- More accurate inference of model parameters
- Raise sample size
- Control the impact of omitted variables
- Accommodate heterogeneity, allowing specific variables for each cross-section
- More accurate predictions for individual outcomes by pooling the data rather than generating predictions of individual outcomes using the data on the individual in question
- Uncover dynamic relationships

[5] In a balanced panel, the number of time observations is the same for all individuals. Since some stocks analyzed here lack information in one or more of the time periods, the panel is considered unbalanced.

Based on the work performed by (Bebchuk et al., 2008), three different models were used to analyze the bid rule effects separately. The dependent variables of each model are firm Tobin's Q, shares' liquidity and shares' volatility.

$$Tobin's\ Q_{it} = \hat{\beta}_0 + \hat{\beta}_1\, ln(total\ asset)_{it} + \hat{\beta}_2\, leverage_{it} + \hat{\beta}_3 ROA_{it} + \hat{\beta}_4\, segment_{it} + \hat{\beta}_5\, tag_{it} + \varepsilon_{it} \quad (1)$$

$$Tobin's\ Q_{it} = \hat{\beta}_0 + \hat{\beta}_1\, ln(total\ asset)_{it} + \hat{\beta}_2\, leverage_{it} + \hat{\beta}_3 ROA_{it} + \hat{\beta}_4\, segment_{it} + \hat{\beta}_5\, tagON_{it} + \varepsilon_{it} \quad (2)$$

$$Tobin's\ Q_{it} = \hat{\beta}_0 + \hat{\beta}_1\, ln(total\ asset)_{it} + \hat{\beta}_2\, leverage_{it} + \hat{\beta}_3 ROA_{it} + \hat{\beta}_4\, segment_{it} + \hat{\beta}_5\, tagPN_{it} + \varepsilon_{it} \quad (3)$$

$$Liquidity_{it} = \hat{\beta}_0 + \hat{\beta}_1\, ln(total\ asset)_{it} + \hat{\beta}_2\, leverage_{it} + \hat{\beta}_3 ROA_{it} + \hat{\beta}_4\, segment_{it} + \hat{\beta}_5\, tag_{it} + \varepsilon_{it} \quad (4)$$

$$Liquidity_{it} = \hat{\beta}_0 + \hat{\beta}_1\, ln(total\ asset)_{it} + \hat{\beta}_2\, leverage_{it} + \hat{\beta}_3 ROA_{it} + \hat{\beta}_4\, segment_{it} + \hat{\beta}_5\, tagON_{it} + \varepsilon_{it} \quad (5)$$

$$Liquidity_{it} = \hat{\beta}_0 + \hat{\beta}_1\, ln(total\ asset)_{it} + \hat{\beta}_2\, leverage_{it} + \hat{\beta}_3 ROA_{it} + \hat{\beta}_4\, segment_{it} + \hat{\beta}_5\, tagPN_{it} + \varepsilon_{it} \quad (6)$$

$$Volatility_{it} = \hat{\beta}_0 + \hat{\beta}_1\, ln(total\ asset)_{it} + \hat{\beta}_2\, leverage_{it} + \hat{\beta}_3 ROA_{it} + \hat{\beta}_4\, segment_{it} + \hat{\beta}_5\, tag_{it} + \varepsilon_{it} \quad (7)$$

$$Volatility_{it} = \hat{\beta}_0 + \hat{\beta}_1\, ln(total\ asset)_{it} + \hat{\beta}_2\, leverage_{it} + \hat{\beta}_3 ROA_{it} + \hat{\beta}_4\, segment_{it} + \hat{\beta}_5 tagON_{it} + \varepsilon_{it} \quad (8)$$

$$Volatility_{it} = \hat{\beta}_0 + \hat{\beta}_1\, ln(total\ asset)_{it} + \hat{\beta}_2\, leverage_{it} + \hat{\beta}_3 ROA_{it} + \hat{\beta}_4\, segment_{it} + \hat{\beta}_5 tagPN_{it} + \varepsilon_{it} \quad (9)$$

Where, for every stock *i* and year *t*:

$$Tobin's\ Q_{it}{}^{6} = \frac{total\ asset - net\ equity + equity\ market\ value}{total\ asset}$$

$$Liquidity_{it} = \frac{number\ of\ shares\ traded}{average\ number\ of\ shares\ outstanding}$$

$$Volatility_{it} = annualized\ standard\ deviation\ of\ stock's\ daily\ \ returns$$

$$ln(total\ asset)_{it} = neperian\ logarithm\ of\ the\ company\ total\ asset$$

$$leverage_{it} = financial\ leverage, measured\ by\ \frac{debt}{total\ assets}$$

$$ROA_{it} = \frac{EBIT}{total\ assets}$$

$$segment^{7}{}_{it} = dummy\ that\ takes\ the\ value\ \ 1\ \ if\ the\ company\ is\ listed\ in\ Nivel\ 2\ or\ Novo\ Mercado\ Bovespa\ segments, and\ 0\ otherwise$$

$$tag_{it} = dummy\ that\ takes\ the\ value\ \ 1\ \ if\ the\ company\ voluntarily\ offer\ the\ bid\ rule\ to\ voting\ shares\ or\ to\ preferred\ shares, and\ 0\ otherwise$$

$$tagON_{it} = dummy\ that\ takes\ the\ value\ \ 1\ \ if\ the\ company\ voluntarily$$

[6] Similar to (Bebchuk et al., 2008), we used a simplifying version of Tobin's Q, proposed by (Kaplan e Zingales, 1997)

[7] To be listed on Nivel 2 or Novo Mercado, companies are obliged to offer the bid rule above what the Brazilian legislation establishes (annex 8.1). Therefore, the objective of this dummy is to study if companies listed in other Bovespa's segments and that voluntarily offer the bid rule have their stocks return, volatility and liquidity affected by this benefit.

$offer\ the\ bid\ rule\ to\ voting\ shares, and\ 0\ otherwise$

$tagPN_{it} = dummy\ that\ takes\ the\ value\ 1\ if\ the\ company\ voluntarily$

$offer\ the\ bid\ rule\ to\ nonvoting\ shares, and\ 0\ otherwise$

$\varepsilon_{it} = error\ term$

In the regression tables that will be shown on chapter 5, equations (1), (4), (7); (2), (5), (8); and (3), (6), (9); are named models I, II and III respectively. They refer to estimators using the tag, tagON and tagPN dummies.

The effects that the independent variables have on the dependent variables have been analyzed separately for common and preferred shares. Therefore, eighteen regressions were performed in total, nine for the common shares panel and nine for the preferred shares panel. It is important to note that for both panels, the dummies *segment*, *tag*, *tagON* and *tagPN* from stocks of the same company will be the same. For example, Petrobras, will have dummies with the same value in the common shares panel (PETR3) and in the preferred shares panel (PETR4). Besides that, the dummy *tag* acts like an OR operator, i.e., will have value 1 whenever the voluntary offer of the bid rule benefit is present in at least one class of shares (*tag* = *tagON* OR *tagPN*).

All eighteen estimators represented by equations (1) - (9) for both common and preferred shares were tested for the presence of fixed effects (likelihood F-test) and random effects (Breusch-Pagan Lagrange Multiplier test). In all models, the tests appointed the presence of both two-way[8] fixed effects and two-way random effects. It is common-practice to perform a Hausman test to help deciding which model is best when both fixed and random effects are present. Due to their simplicity when compared to two-way random effects models, two-way fixed effects models were used in this study. These models are usually good enough to control for unobservable firm characteristics affecting

[8] A one-way effect affects only one dimension, either the cross-section dimension or the time dimension. A two-way effect affects both directions simultaneously.

dependent variables. All models were specified controlling for heteroscedasticity and autocorrelation using White robust coefficient covariances.

4.2. Description of the data

The regressions were performed using data from 2002 to 2015 of stocks listed in Bovespa. Year 2002 was considered the first year in the analysis because the mandatory bid rule for voting shares was reestablished in 2001 (law 10.303/01) and became effective in 2002, as discussed in section 3.2. Data for fiscal year 2016 was still not available at the date the data collection was performed.

The data were retrieved from Economatica, a Brazilian financial information provider. From all companies listed in Bovespa, BDR's, stocks listed in Bovespa Mais[9], Bovespa Mais 2 segments and stocks traded over-the-counter were not considered in this study. In total, 1,263[10] stocks were initially considered.

To construct the samples, were considered liquid[11] stocks that had data for all variables available in at least one of the years of the 2002-2015 window, therefore the unbalanced nature of the panels (for example, one stock can have data available for all fifteen years, while other stock can have data available for only one of the years analyzed). Two panels were constructed, one for common shares and one for preferred shares. As can be seen in Table *2*, the common shares' panel has 208 stocks and the preferred shares' panel 135 stocks. In total, 343 stocks (out of the 1263 initial universe[12])

[9] Bovespa Mais and Bovespa Mais 2 are segments dedicated to small and mid-sized companies and have fewer companies listed compared to other Bovespa segments. The shares listed in these segments usually exhibit low liquidity. Please see annex 8.1 for an overview of Bovespa segments.

[10] The initial list of stocks consisted of all stocks ever listed in Bovespa. Many of these stocks were delisted from Bovespa before 2002, which were later removed by a filtering criteria applied to the sample. Companies delisted during 2002-2015 were kept on the sample.

[11] Illiquid stocks have several null daily return observations, and therefore would bias the volatility series, which is measured by the standard deviation of daily returns.

[12] Financial institutions were excluded from the final list because they do not have EBIT or net equity available in Economatica. Therefore, their Tobin's Q, ROA and financial leverage calculation are not straightforward.

from 283 different companies of stocks were analyzed. Regarding tag along rights, only 170 of the 343 stocks have the bid rule above the minimum required by law.

Table 2: Composition of the sample

Panel	# of stocks	# of stocks voluntarily offering the bid rule
Ordinary shares	208	141
Preferred shares	135	29
Total	343	170

Most of the companies from the sample are listed on either Tradicional or Novo Mercado segments. Table 3 only includes companies that were still listed in Bovespa when the data collection was performed.

Table 3: Bovespa's listing segments of companies from the sample

Segment	# of companies
Tradicional	54
Nível 1	19
Nível 2	10
Novo Mercado	122
Total	205

Creating the tag along dummies was the most time-consuming part of the database construction. In the past, the information regarding the initial date of when companies started offering tag along beyond what is established by law was available on Bovespa's website. However, this is not the case anymore. To identify which companies, for which classes of shares, and the date when they voluntarily started offering the bid rule[13], the following procedure was followed:

i. Companies listed on Novo Mercado or N2 segments must extend the bid rule to minority shareholders (see annex 8.1 for the comparative of Bovespa's listing rules). The date when these companies were listed on

[13] It is important to note that the differentiated tag along can be related to the price of the bid (higher than the 80% legally required for minority common shareholders) or to the extension of the right to preferred shares.

these segments was considered as the initial date of the voluntary bid rule offer

ii. Companies listed on N1 or Traditional segments are not obliged by listing rules to offer the bid rule to minority shareholders. To identify which companies listed on these segments do offer the rule:

   a. Check if these companies are listed on the ITAG[14] index

   b. If not listed on ITAG, check the tag along rights information in the corporate charter of each company

iii. To identify the date when companies listed on N1 or Traditional segments started offering differentiated tag along above the minimum:

   a. Check the investors relation website of each company for information regarding the historic of tag along rights

   b. If the voluntary bid rule offer start date is not present on the company investors relation website, check all corporate charters, from the oldest to the most recent, to detect when the voluntary bid rule offer information is first showed and then consider the date of this corporate charter as the voluntary offer of the bid rule start date

iv. Finally, if after steps (i), (ii) and (iii) was still not possible to identify the tag along rights rule, the IPO prospect of the company was checked. If no information on the IPO prospect was found, the company was considered as not offering differentiated tag along

The respective dummies tag, tagON and tagPN were set to 1 in the year the voluntary offer of the bid rule to the respective share class initiated. The dummy for all

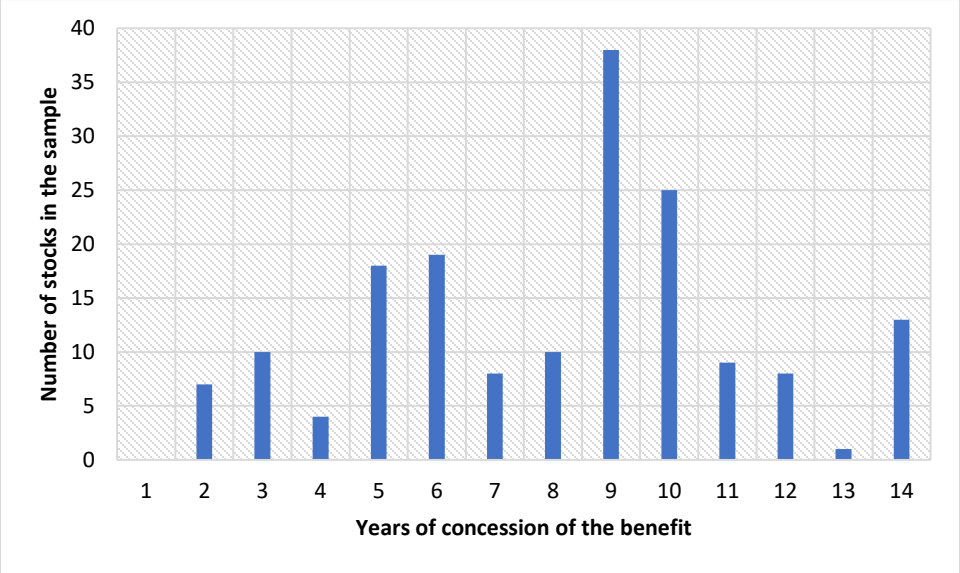
[14] ITAG is a Bovespa index composed of stocks that have differentiated tag along rights and that fit some listing criteria.

years following this date were also set to 1. Because many companies were listed or delisted in the 2002-2015 window, the variables of the models were only considered in the years the respective company was listed in Bovespa.

Although rare, some companies can opt to revoke the voluntary offer of the bid rule. In the final sample used however, no companies revoked the benefit. Despite that, some companies can leave Bovespa's special listing segments to go to the Tradicional segment. There were some cases like this in the sample, but companies kept the mandatory bid rule intact after changing listing segments (Cremer - CREM3 - for example).

Since the objective of this research is to study the effects of the voluntary offer of the bid rule on the long-term, it is important to analyze the distribution of the duration of this benefit in the 170 stocks in the sample that offer it (Figure 1).

Figure 1: duration in years of the voluntary offer of the bid rule of stocks in the sample



On average, the stocks in the sample that have the differentiated tag along rights offered the benefit in 8.12 years of the 14 years analyzed (2002-2015). The median of the duration of the benefit is 9 years. These values characterize the long term (i.e., significantly after the day the bid rule benefit was granted) nature of the study presented here.

5. RESULTS

The regressions performed are arranged in tables according to the following:

- Type of panel (common or preferred shares)
- Independent variable (Tobin's Q, Liquidity and Volatility)
- Model type: I for dummies detecting the voluntary tag along on common and on preferred shares, II for dummies detecting the voluntary tag along on common shares only, and III, for dummies detecting the voluntary tag along on preferred shares only

First, the results for the common shares is presented, followed by the results obtained with the models applied to the preferred shares' panel.

5.1. Common shares

As Table 4 shows, in the 2002-2015 horizon all dummies that detect the voluntary offer of tag along above the minimum required by law have no statistical significant effect in determining common shares' return (measured by Tobin's Q). Regarding the other independent variables, the financial leverage is statistically significant at the 1% confidence level, positively affecting shares' return.

As can be seen on the common shares' correlation matrix (annex 8.2), the only independent variable that is high-positively correlated with Tobin's Q is financial leverage. On the other hand, ROA is the only independent variable high-negatively correlated with Tobin's Q.

Table 4: Tobin's Q determinants - common shares

The dependent variable is Tobin's Q of each firm, calculated as (total asset - net equity + equity market value)/total asset. The coefficients were calculated using unbalanced panel data estimators, specified with two-way fixed-effects. The data series includes 208 stocks, from 2002 to 2015.

	I	II	III
Total Asset	0.06 (0.90)	0.06 (0.90)	0.06 (0.90)
Financial Leverage	4.20*** (0.00)	4.20*** (0.00)	4.20*** (0.00)
ROA	-3.22 (0.65)	-3.22 (0.65)	-3.22 (0.65)
Bovespa Segment	0.06 (0.89)	0.10 (0.81)	0.09 (0.75)
Tag along	0.06 (0.90)		
Tag along ON		0.00 (1.00)	
Tag along PN			-0.12 (0.87)
N° obs	1,848	1,848	1,848
Adj. R²	0.94	0.94	0.94

The *p-values* are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source: the authors

When it comes to liquidity, however, it can be seen in Table 5 that the *tag* and *tagON* dummies have statistical significance. The voluntary adoption of the bid rule is significant at the 5% confidence level and positively related to the determination of common shares' liquidity both in models I and II.. Besides the tag along dummies, Bovespa's segment, measured by the dummy detecting if the company is listed in Nível 2 or Novo Mercado, is the only independent variable that is significant in determining common shares' liquidity (positive coefficient and 1% significance level in model III).

Table 5: Liquidity determinants - common shares

The dependent variable is shares' liquidity, calculated as number of (shares traded)/(average number of shares outstanding in each year). The coefficients were calculated using unbalanced panel data estimators, specified with two-way fixed-effects. The data series includes 208 stocks, from 2002 to 2015.

	I	II	III
Total Asset	-0.04 (0.55)	-0.04 (0.51)	-0.03 (0.64)
Financial Leverage	0.00 (0.41)	0.00 (0.41)	0.00 (0.44)
ROA	-0.11 (0.55)	-0.11 (0.55)	-0.10 (0.58)
Bovespa Segment	0.32 (0.18)	0.30 (0.21)	0.58*** (0.00)
Tag along	0.33** (0.02)		
Tag along ON		0.35** (0.01)	
Tag along PN			0.04 (0.65)
N° obs	1,855	1,855	1,855
Adj. R²	0.57	0.57	0.56

The *p-values* are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source: the authors

Finally, regarding volatility, it can be seen in Table 6 that the voluntary adoption of the bid rule is significant at the 1% and 5% confidence level, in models I and II respectively, and negatively related to the determination of common shares' volatility. Besides the tag along dummies, the only independent variable significantly effecting volatility is firm size, measured by the logarithm of total assets (10% significance level and negatively affecting shares' volatility).

Table 6: Volatility determinants - common shares

The dependent variable is volatility, measured as the annualized standard deviation of stock's daily returns. The coefficients were calculated using unbalanced panel data estimators, specified with two-way fixed-effects. The data series includes 206 stocks, from 2002 to 2015.

	I	II	III
Total Asset	-0.04*	-0.04*	-0.05*
	(0.09)	(0.10)	(0.08)
Financial Leverage	0.00	0.00	0.00
	(0.66)	(0.66)	(0.66)
ROA	-0.14	-0.14	-0.14
	(0.34)	(0.33)	(0.34)
Bovespa Segment	0.00	0.00	-0.06
	(0.96)	(0.98)	(0.46)
Tag along	-0.08***		
	(0.01)		
Tag along ON		-0.08**	
		(0.02)	
Tag along PN			-0.04
			(0.23)
N° obs	1,321	1,321	1,321
Adj. R²	0.57	0.57	0.57

The *p-values* are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source: the authors

5.2. Preferred shares

Differently from the regressions of the common shares panel, where the voluntary adoption of the bid rule affected the determination of stocks' liquidity and volatility, the regressions of the preferred shares panel showed no statistical significance in any of the coefficients of the tag along dummies (Table 7, Table 8 and Table 9).

Comparing Tobin's Q models applied to common shares to Tobin's Q models applied to preferred shares, besides both models showing statistical significance in the financial leverage coefficient, the latter models showed statistical significance also in the total assets and in the return on assets coefficients (Table 7).

As can be seen in annex 8.3, financial leverage is the only independent variable high-positively correlated to Tobin's Q, similarly to what was observed in the correlation matrix of the common shares panel.

Table 7: Tobin's Q determinants - preferred shares

The dependent variable is Tobin's Q of each firm, calculated as (total asset - net equity + equity market value)/total asset. The coefficients were calculated using unbalanced panel data estimators, specified with two-way fixed-effects. The data series includes 135 stocks, from 2002 to 2015.

	I	II	III
Total Asset	-0.22***	-0.22***	-0.22***
	(0.01)	(0.01)	(0.01)
Financial Leverage	1.05***	1.05***	1.05***
	(0.00)	(0.00)	(0.00)
ROA	0.54***	0.54***	0.54***
	(0.01)	(0.01)	(0.01)
Bovespa Segment	0.27	0.13	0.20
	(0.14)	(0.45)	(0.23)
Tag along	-0.09		
	(0.44)		
Tag along ON		0.07	
		(0.49)	
Tag along PN			-0.08
			(0.53)
N° obs	1,371	1,371	1,371
Adj. R^2	1.00	1.00	1.00

The *p-values* are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source: the authors

Finally, The Bovespa Segment dummies have statistical significance determining preferred shares' volatility in all three models (Table 9). The other control variables (total asset, financial leverage and ROA) also seem to have no effect on the determination of the preferred shares liquidity and volatility.

Table 8: Liquidity determinants - preferred shares

The dependent variable is shares' liquidity, calculated as number of (shares traded)/(average number of shares outstanding in each year). The coefficients were calculated using unbalanced panel data estimators, specified with two-way fixed-effects. The data series includes 135 stocks, from 2002 to 2015.

	I	II	III
Total Asset	-0.26 (0.20)	-0.24 (0.23)	-0.26 (0.20)
Financial Leverage	0.00 (0.53)	0.00 (0.54)	0.00 (0.58)
ROA	0.11 (0.63)	0.11 (0.63)	0.11 (0.61)
Bovespa Segment	0.02 (0.97)	0.31 (0.64)	-0.13 (0.72)
Tag along	-0.06 (0.88)		
Tag along ON		-0.36 (0.55)	
Tag along PN			0.26 (0.37)
N° obs	1,312	1,312	1,312
Adj. R^2	0.35	0.35	0.35

The *p-values* are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source: the authors

Table 9: Volatility determinants - preferred shares

The dependent variable is volatility, measured as the annualized standard deviation of stock's daily returns. The coefficients were calculated using unbalanced panel data estimators, specified with two-way fixed-effects. The data series includes 135 stocks, from 2002 to 2015.

	I	II	III
Total Asset	0.04 (0.46)	0.04 (0.47)	0.04 (0.45)
Financial Leverage	0.07 (0.42)	0.07 (0.41)	0.07 (0.42)
ROA	0.08 (0.56)	0.08 (0.57)	0.08 (0.56)
Bovespa Segment	-0.24*** (0.01)	-0.15** (0.02)	-0.24*** (0.01)
Tag along	0.09 (0.28)		
Tag along ON		-0.01 (0.82)	
Tag along PN			0.09 (0.30)
N° obs	859	859	859
Adj. R²	0.53	0.52	0.53

The *p-values* are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source: the authors

5.3. Discussion of the results

Contrarian to initial expectations, the voluntary offer of the bid rule only significantly affected common shares' liquidity and volatility, having no effect on shares' return. The analysis showed no significant effect of the voluntary bid rule in any of the dependent variables (return, liquidity and volatility) when the regression models were applied to the preferred shares' panel.

The analysis showed evidence that offering tag along rights beyond the minimum increases the liquidity and decreases the volatility of common shares, when dummies detecting this benefit on common or preferred shares, and on common shares only were used (models I and II in Table 5 and Table 6, respectively). In addition, when analyzing the dummies of Bovespa's listing segment, the analysis showed no statistical significance in these dummies in Table 5 and Table 6. Not only common shares from companies listed

in Nível 2 or in Novo Mercado, but also common shares from companies listed in Nível 1 or in Tradicional have their liquidity and volatility affected by the voluntary offer of the bid rule. This suggests that it is the presence of the benefit itself and not the enlistment in a special segment that affected common shares' liquidity and volatility in the models.

Although dual-class firms being more common in Brazil than in any other country, the Brazilian stock market is dominated by few big companies with concentrated voting shares ownership (as discussed in section 3.2). (Bebczuk et al., 2007) suggested that the excessive concentration of control hinders hostile takeovers. In this regard, this could be one possible explanation for the voluntary offer of the bid rule having no effect on shares' returns. Voting shares generally have a smaller free-float and lower trading activity than non-voting shares because the first are held by controlling shareholders. Because it is usually the trading activity of minority investors that determines stock movements, and since the mandatory bid rule would only benefit the minority investors in a transfer of control, there is no apparent reason for these investors to pay premium prices for these shares if a takeover possibility is believed to be low.

Nevertheless, the results found here partially contradicts the literature, where many studies performed using Brazilian stock market data found significant relationships between the voluntary grant of the bid rule and firm value. To further investigate this issue, the sample used in this work was reduced to consider a shorter time window (2002-2005 versus 2002-2015) in order to try to replicate the study performed by (Carvalhal e Nicolau, 2009). The new results obtained are shown in Annex 0. When comparing the results, only the preferred shares' return in model II (Annex 8.4.4) coincided with the results from those authors. The differences between the results probably stem from the data collection procedures and differences in sample size, besides the presence here in the models of the Bovespa Segment dummy. The results found in the reduced sample confirmed the reduction in volatility in common shares found using the complete 2002-2015 sample (Table 6 and Annex 8.4.3).

To mitigate potential survivorship bias in the sample used in this work, companies that were listed or delisted in the 2002-2015 window were also included in the sample (variables for the years preceding listing and following delisting were excluded). Another issue that should be noted is that the results found here should be interpreted having in

mind that the sample used is composed mainly by big capitalization companies. Stocks of small companies in Bovespa usually have low liquidity. Including them in the sample would bias the results, since two of the dependent variables used in the regressions (volatility and liquidity) would be distorted[15].

[15] Low liquidity stocks have several null daily return observations, which would bias the volatility variable downwards.

6. CONCLUSION

Much has been debated about the impact that good corporate governance has on firms. Despite many known benefits, the development of laws favoring good corporate governance is still slowly advancing in developing countries. One of the solutions has been the voluntary adoption of codes of conduct by companies. In Brazil, the special governance listing segments created by Bovespa is an initiative in this direction that has been working. The number of Brazilian companies choosing to migrate to or to be initially offered to the public in any of these special segments has increased in the past years. In numbers, from 332 companies currently listed in Bovespa, 28 are listed in Nível 1, 19 are listed in Nível 2 and 131 are listed in Novo Mercado. Therefore, the companies listed in the special segments already outnumber the ones listed in the Tradicional segment.

There is a consensus in the literature that the expropriation of minority shareholders is more likely at firms with poor corporate governance provisions. Therefore, one of the most critical issues in corporate governance that researchers have been interested in is how protecting minority shareholders can benefit companies.

Among the forms of protecting minority shareholders are the tag along rights (also known as mandatory bid rule). Tag along rights in Brazil are ruled by law 10303/2001. This law stipulates the mandatory bid rule only for voting shares for a price at least 80% of the price offered to the controlling block. However, this does not apply to non-voting shares. According to this law, companies must grant at least one of the following rights to preferred shares: (a) priority minimum dividend of 3% of the book value per share, (b) dividends 10% higher than the dividends of voting shares, (c) mandatory bid rule at least 80% of the control block price.

To shed further light in the impacts the mandatory bid rule has on firms, this work analyzed if the voluntary offer of the bid rule has long-term effects (i.e., affecting stocks significantly after the day the bid rule benefit was granted) in Brazilian stocks' return, liquidity and volatility. Using data from 2002 to 2015, unbalanced panel data estimators were constructed using a sample of 208 voting shares and 135 non-voting shares, totaling 283 different companies analyzed.

The models were constructed using Tobin's Q as proxy for stock's return, and ROA, financial leverage, firm size (measured by total assets) as independent variables, similar to what was proposed by (Bebchuk et al., 2008). To control the models for Bovespa's listing segments, a dummy detecting if the company is listed in Nível 2 or Novo Mercado was also included as independent variable. The impacts on voting and non-voting shares were studied separately.

Differently from the initial expectations and contradicting evidences previously found on the literature, no significant relations were found by the regressions between the returns of stocks and the voluntary offer of the bid rule (Table 4, Table 7).

When it comes to shares' liquidity, the models showed significant positive relations between the liquidity of voting shares and the voluntary offer of the bid rule when dummies detecting the tag rule benefit on voting or non-voting shares, and on voting shares only were used (models I and II in Table 5). Finally, significant negative relations were found between voting shares' volatility and the voluntary offer of the bid rule (Table 6).

All significant relationships found here are supporting evidence previously found in literature that good corporate governance is associated with enhanced capital markets' metrics (i.e., stocks presenting higher liquidity and lower volatility of returns).

No significant evidences were found in the non-voting shares panel regarding the voluntary offer of the bid rule and the dependent variables (shares' return, liquidity and volatility).

According to (Saito, 2003), it is reasonable to expect that the value of tag along rights are correlated to the probability of occurrence of a takeover. Therefore, despite no relations in the long-term between the voluntary offer of the bid rule and firm value was found in this work, it is possible that relations between these variables exist in the short-term, as previous authors that used event studies, such as (Nenova, 2006; Da Silva e Subrahmanyam, 2007; Carvalhal e Nicolau, 2009) have shown. Applying a similar approach to that used by these authors to data that includes more recent years is subject to future work.

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8. ANNEXES

8.1. Comparative of Bovespa's listing segments

	BOVESPA MAIS	BOVESPA MAIS NÍVEL 2	NOVO MERCADO	NÍVEL 2	NÍVEL 1	TRADICIONAL
Características das Ações Emitidas	Permite a existência somente de ações ON	Permite a existência de ações ON e PN	Permite a existência somente de ações ON	Permite a existência de ações ON e PN (com direitos adicionais)	Permite a existência de ações ON e PN (conforme legislação)	Permite a existência de ações ON e PN (conforme legislação)
Percentual Mínimo de Ações em Circulação (free float)	25% de free float até o 7º ano de listagem	25% de free float até o 7º ano de listagem	No mínimo 25% de free float	No mínimo 25% de free float	No mínimo 25% de free float	Não há regra
Distribuições públicas de ações	Não há regra	Não há regra	Esforços de dispersão acionária	Esforços de dispersão acionária	Esforços de dispersão acionária	Não há regra
Vedação a disposições estatutárias	Quórum qualificado e "cláusulas pétreas"	Quórum qualificado e "cláusulas pétreas"	Limitação de voto inferior a 5% do capital, quórum qualificado e "cláusulas pétreas"	Limitação de voto inferior a 5% do capital, quórum qualificado e "cláusulas pétreas"	Não há regra	Não há regra
Composição do Conselho de Administração	Mínimo de 3 membros (conforme legislação), com mandato unificado de até 2 anos	Mínimo de 3 membros (conforme legislação), com mandato unificado de até 2 anos	Mínimo de 5 membros, dos quais pelo menos 20% devem ser independentes com mandato unificado de até 2 anos	Mínimo de 5 membros, dos quais pelo menos 20% devem ser independentes com mandato unificado de até 2 anos	Mínimo de 3 membros (conforme legislação), com mandato unificado de até 2 anos	Mínimo de 3 membros (conforme legislação)
Vedação à acumulação de cargos	Não há regra	Não há regra	Presidente do conselho e diretor presidente ou principal executivo pela mesma pessoa (carência de 3 anos a partir da adesão)	Presidente do conselho e diretor presidente ou principal executivo pela mesma pessoa (carência de 3 anos a partir da adesão)	Presidente do conselho e diretor presidente ou principal executivo pela mesma pessoa (carência de 3 anos a partir da adesão)	Não há regra
Obrigação do Conselho de Administração	Não há regra	Não há regra	Manifestação sobre qualquer oferta pública de aquisição de ações da companhia	Manifestação sobre qualquer oferta pública de aquisição de ações da companhia	Não há regra	Não há regra
Demonstrações Financeiras	Conforme legislação	Conforme legislação	Traduzidas para o inglês	Traduzidas para o inglês	Conforme legislação	Conforme legislação
Reunião pública anual	Facultativa	Facultativa	Obrigatória	Obrigatória	Obrigatória	Facultativa
Calendário de eventos corporativos	Obrigatório	Obrigatório	Obrigatório	Obrigatório	Obrigatório	Facultativo
Divulgação adicional de informações	Política de negociação de valores mobiliários	Política de negociação de valores mobiliários	Política de negociação de valores mobiliários e código de conduta	Política de negociação de valores mobiliários e código de conduta	Política de negociação de valores mobiliários e código de conduta	Não há regra
Concessão de Tag Along	100% para ações ON	100% para ações ON e PN	100% para ações ON	100% para ações ON e PN	80% para ações ON (conforme legislação)	80% para ações ON (conforme legislação)
Oferta pública de aquisição de ações no mínimo pelo valor econômico	Obrigatoriedade em caso de cancelamento de registro ou saída do segmento, exceto se houver migração para Novo Mercado	Obrigatoriedade em caso de cancelamento de registro ou saída do segmento, exceto se houver migração para Novo Mercado ou Nível 2	Obrigatoriedade em caso de cancelamento de registro ou saída do segmento	Obrigatoriedade em caso de cancelamento de registro ou saída do segmento	Conforme legislação	Conforme legislação
Adesão à Câmara de Arbitragem do Mercado	Obrigatório	Obrigatório	Obrigatório	Obrigatório	Facultativo	Facultativo

Source: Bovespa, 2017

8.2. Correlation matrix – common shares' panel

	Financial Leverage	*Liquidity*	*ROA*	*Bovespa Segment*	*Tag*	*TagON*	*TagPN*	*Tobin's Q*	*ln(total asset)*	*Volatility*
Financial Leverage	1	-0.03	-0.78	-0.08	-0.09	-0.08	-0.01	0.97	-0.31	0.19
Liquidity	-0.03	1	0.08	0.17	0.19	0.20	-0.11	-0.02	-0.03	-0.06
ROA	-0.78	0.08	1	0.04	0.07	0.07	0.01	-0.76	0.28	-0.32
Bovespa Segment	-0.08	0.17	0.04	1	0.74	0.76	-0.27	-0.06	-0.14	-0.15
Tag	-0.09	0.19	0.07	0.74	1	0.98	0.16	-0.07	-0.07	-0.17
TagON	-0.08	0.20	0.07	0.76	0.98	1	0.07	-0.06	-0.10	-0.17
TagPN	-0.01	-0.11	0.01	-0.27	0.16	0.07	1	-0.01	0.21	-0.04
Tobin's Q	0.97	-0.02	-0.76	-0.06	-0.07	-0.06	-0.01	1	-0.26	0.17
ln(total asset)	-0.31	-0.03	0.28	-0.14	-0.07	-0.10	0.21	0	1	-0.33
Volatility	0.19	-0.06	-0.32	-0.15	-0.17	-0.17	-0.04	0	-0.33	1

8.3. Correlation matrix – preferred shares' panel

	Financial Leverage	*Liquidity*	*ROA*	*Bovespa Segment*	*Tag*	*TagON*	*TagPN*	*Tobin's Q*	*ln(total asset)*	*Volatility*
Financial Leverage	1	0.06	0.02	-0.03	-0.03	-0.03	-0.03	0.98	-0.23	0.15
Liquidity	0.06	1	0.02	0.08	0.04	0.03	0.04	0.05	0.03	0.08
ROA	0.02	0.02	1	0.02	-0.06	0.00	-0.06	0.08	0.14	-0.25
Bovespa Segment	-0.03	0.08	0.02	1	0.50	0.48	0.45	-0.03	-0.06	-0.07
Tag	-0.03	0.04	-0.06	0.50	1	0.77	0.97	-0.04	0.12	-0.01
TagON	-0.03	0.03	0.00	0.48	0.77	1	0.72	-0.04	0.12	-0.07
TagPN	-0.03	0.04	-0.06	0.45	0.97	0.72	1	-0.04	0.12	0.00
Tobin's Q	0.98	0.05	0.08	-0.03	-0.04	-0.04	-0.04	1	-0.24	0.11
ln(total asset)	-0.23	0.03	0.14	-0.06	0.12	0.12	0.12	0	1	-0.37
Volatility	0.15	0.08	-0.25	-0.07	-0.01	-0.07	0.00	0	-0.37	1

8.4. Results of the models when using the reduced sample (2002-2005 time window)

8.4.1. Tobin's Q determinants - common shares - reduced sample (2002-2005)

The dependent variable is Tobin's Q of each firm, calculated as (total asset - net equity + equity market value)/total asset. The coefficients were calculated using unbalanced panel data estimators, specified with two-way fixed-effects. The data series includes 91 stocks, from 2002 to 2005.

	I	II	III
Total Asset	0.16 (0.63)	0.16 (0.63)	0.15 (0.63)
Financial Leverage	-1.89*** (0.00)	-1.89*** (0.00)	-1.89*** (0.00)
ROA	0.90 (0.11)	0.90 (0.11)	0.91 (0.11)
Bovespa Segment	-0.32 (0.26)	-0.32 (0.26)	-0.27 (0.20)
Tag along	0.12 (0.73)		
Tag along ON		0.12 (0.73)	
Tag along PN			-0.24*** (0.00)
N° obs	324	324	324
Adj. R^2	1.00	1.00	1.00

The *p-values* are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source: the authors

8.4.2. Liquidity determinants - common shares - reduced sample (2002-2005)

The dependent variable is shares' liquidity, calculated as number of (shares traded)/(average number of shares outstanding in each year). The coefficients were calculated using unbalanced panel data estimators, specified with two-way fixed-effects. The data series includes 91 stocks, from 2002 to 2005.

	I	II	III
Total Asset	-0.22 (0.28)	-0.22 (0.28)	-0.23 (0.35)
Financial Leverage	-0.01 (0.35)	-0.01 (0.35)	-0.01 (0.42)
ROA	0.40 (0.24)	0.40 (0.24)	0.35 (0.29)
Bovespa Segment	2.75* (0.08)	2.75* (0.08)	2.32 (0.22)
Tag along	-0.92 (0.29)		
Tag along ON		-0.92 (0.29)	
Tag along PN			0.18 (0.10)
N° obs	329	329	329
Adj. R^2	0.61	0.61	0.59

The *p-values* are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source: the authors

8.4.3.Volatility determinants - common shares - reduced sample (2002-2005)

The dependent variable is volatility, measured as the annualized standard deviation of stock's daily returns. The coefficients were calculated using unbalanced panel data estimators, specified with two-way fixed-effects. The data series includes 45 stocks, from 2002 to 2005.

	I	II	III
Total Asset	0.03 (0.68)	0.03 (0.68)	0.04 (0.63)
Financial Leverage	-0.07 (0.67)	-0.07 (0.67)	-0.08 (0.64)
ROA	-0.01 (0.98)	-0.01 (0.98)	-0.02 (0.94)
Bovespa Segment	0.00 (0.89)	0.00 (0.89)	0.00 (0.95)
Tag along	-0.06* (0.08)		
Tag along ON		-0.06* (0.08)	
Tag along PN			-0.08** (0.04)
N° obs	130	130	130
Adj. R²	0.62	0.62	0.62

The *p-values* are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source: the authors

8.4.4.Tobin's Q determinants - preferred shares - reduced sample (2002-2005)

The dependent variable is Tobin's Q of each firm, calculated as (total asset - net equity + equity market value)/total asset. The coefficients were calculated using unbalanced panel data estimators, specified with two-way fixed-effects. The data series includes 125 stocks, from 2002 to 2005.

	I	II	III
Total Asset	0.00 (0.99)	0.01 (0.95)	0.01 (0.96)
Financial Leverage	1.05*** (0.00)	1.05*** (0.00)	1.05*** (0.00)
ROA	0.21 (0.15)	0.21 (0.16)	0.21 (0.16)
Bovespa Segment	0.30 (0.43)	0.17 (0.64)	0.41 (0.22)
Tag along	0.19 (0.12)		
Tag along ON		0.32*** (0.00)	
Tag along PN			0.15 (0.49)
N° obs	456	456	456
Adj. R^2	0.98	0.98	0.98

The *p-values* are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source: the authors

8.4.5. Liquidity determinants - preferred shares - reduced sample (2002-2005)

The dependent variable is shares' liquidity, calculated as number of (shares traded)/(average number of shares outstanding in each year). The coefficients were calculated using unbalanced panel data estimators, specified with two-way fixed-effects. The data series includes 125 stocks, from 2002 to 2005.

	I	II	III
Total Asset	0.33 (0.40)	0.43 (0.26)	0.38 (0.33)
Financial Leverage	0.05 (0.39)	0.07 (0.23)	0.06 (0.36)
ROA	0.03 (0.86)	-0.01 (0.94)	0.03 (0.88)
Bovespa Segment	-2.11 (0.25)	-5.88*** (0.00)	-0.97 (0.25)
Tag along	1.96 (0.28)		
Tag along ON		5.73*** (0.00)	
Tag along PN			1.54 (0.26)
N° obs	470	470	470
Adj. R²	0.76	0.78	0.76

The *p-values* are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source: the authors

8.4.6.Volatility determinants - preferred shares - reduced sample (2002-2005)

The dependent variable is volatility, measured as the annualized standard deviation of stock's daily returns. The coefficients were calculated using unbalanced panel data estimators, specified with two-way fixed-effects. The data series includes 82 stocks, from 2002 to 2005.

	I	II	III
Total Asset	0.03 (0.49)	0.03 (0.49)	0.03 (0.49)
Financial Leverage	0.03 (0.44)	0.03 (0.43)	0.03 (0.44)
ROA	-0.02* (0.07)	-0.02* (0.08)	-0.02* (0.07)
Bovespa Segment	-0.11*** (0.00)	-0.11*** (0.00)	-0.11*** (0.00)
Tag along	-0.01 (0.78)		
Tag along ON		0.00 (0.92)	
Tag along PN			-0.01 (0.78)
N° obs	272	272	272
Adj. R²	0.72	0.72	0.72

The *p-values* are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source: the authors