

# The Influence of E-disclosure on the Ex-Ante Cost of Capital of Listed Companies in Brazil

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## Abstract

The aim of this article is to show the existence of a relationship between voluntary disclosure via corporate websites and the ex-ante cost of capital of companies listed on the BM&FBovespa. Ordinary least-squares regression equations produced the following results: (a) on average, the companies listed on the New Market showed a lower cost of capital ( $\approx 3.3$  percentage points lower); (b) on average, the companies deemed to be the most aggressive showed a higher cost of capital ( $\approx 3$  percentage points higher than the conservative companies); and (c) the metrics of corporate website disclosure did not appear to be related to cost of capital.

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### **Keywords**

Disclosure, cost capital, dissemination corporate information, corporate governance, accounting policy

## **Introduction**

Among the financial decisions made by a firm, such as financing and investment, there is a governing factor, the cost of capital, known as the return demanded by investors adjusted to company risk. Accordingly, it is understood that there is a constant search for less expensive costs of capital, as these work together to increase the firm's value (Copeland et al. 2005). Grossman (1981) and Milgron (1981) argue for the full disclosure of relevant information to the buyer, for example, M&A acquirers or investors. If potential buyers know what content is relevant but suspect that the seller is withholding relevant content, then, in the absence of disclosure, the buyers will reasonably discount the value of the seller's assets to the worst case (Scott 1994). This discounting imposes an expressive cost on the seller, who then has an incentive to make more relevant information available.

However, in current practice, sellers often do not behave in this manner. That is, firms often do not have the informational content that is of interest to the market. In the last few decades, several authors have concentrated their efforts on advancing arguments that focus on factors that could mitigate the arguments of Grossman (1981) and Milgron (1981). Verrecchia (1983) and Dye (1985) proposed models highlighting the role of buyer uncertainty as the reason for management not revealing corporate data. A matter cited as among the most relevant in the context of decisions associated with investor relations are the potential benefits that a firm could obtain by providing higher levels of disclosure (Espinosa and Trombetta 2007).

One of the advantages of disclosing would be a decrease in the firm's cost of capital. However, the evidence surrounding this relationship remains inconclusive (Souissi and Khelif 2012). Examining the lack of a conclusion, Espinosa and Trombetta (2007) cite two methodological

aspects, the first of which are difficulties of measurement. Neither the cost of capital nor the quality of disclosure can be directly and expressly observed by the researcher, often rendering it necessary to fall back on individual perceptions and leading tests of this association to start from a considerable degree of subjectivity. Representing the second methodological aspect to consider are questions associated with the specification of the model; supporting the arguments put forward by Gietzman and Trombetta (2003), empirical tests have erred by disregarding the different choices companies make in terms of accounting policies.

This article aims to contribute to the literature on the effects of web disclosure on the cost of capital by discussing these two methodological issues. To measure disclosure, many authors employ indices, but the nature of these indices varies considerably among the studies. Consequently, proposals can be found based on the voluntary and mandatory aspects of disclosure (Giner 1997). Furthermore, it is unusual to find studies that effectively consider the relevance of the information for the users, for example, investors, analysts and managers (Mendes-Da-Silva et al. 2009; Mendes-Da-Silva and Onusic 2014). Therefore, in our research, efforts were focused in three areas: (a) the use of a disclosure index that includes financial and corporate management data and considers the relevance of this information for the market; (b) an estimate of the ex-ante cost of capital; and (c) the consideration of differences in accounting policies between the companies listed on the BM&FBovespa, and the classification of these policies as aggressive or conservative.

The main purpose of this study is to assess the empirical validity of the interaction equilibrium advanced by Gietzman and Trombetta (2003), which considers the cost of capital to be jointly determined by the company's level of disclosure and its accounting policy. Studies testing the empirical validity of the argument that greater disclosure implies a lower cost of capital have obtained inconclusive results (Botosan 1997; Botosan and Plumlee 2002). One explanation for this finding is the existence of a possible omission of variable bias: that is, accounting policy. According to the defence of Espinosa and Trombetta (2007), if the accounting policy is relevant, then the relationship between disclosure and the cost of capital is not monotonic.

This relationship would be negative for aggressive companies but insignificant when considering conservative companies (Artiach and

Clarkson 2011). Another belief present in the literature is that the weak link between disclosure and the cost of capital in more developed economies is due to the high degree of disclosure that is practiced in these countries and that is not observed in emerging economies (Souissi and Khlif 2012). The objective of this research is to verify the existence of negative and significant associations between corporate disclosure and the cost of capital. Therefore, four disclosure proxies are used (three by means of the corporate website and one dummy variable taken from the BM&FBovespa New Market listing), and four other proxies of the calculation of the ex-ante cost of equity capital are used in accordance with Espinosa and Trombetta (2007).

Considering the companies listed in Brazil in 2011, the main results obtained are as follows: (a) no association at all was found between disclosure via a corporate website and the cost of capital; (b) companies listed in the differentiated segment of corporate governance, known as the New Market, and classified as conservative on average have a cost of capital that is 6 percentage points lower than other companies; and (c) results were found supporting the argument that a firm's accounting policy (aggressiveness) could play a significant role in the detection of relationships between the cost of capital and disclosure. This work is organised in five sections, including this introduction. The second section presents a line of theory that supports the research. The third section details the methodological procedures, above all for obtaining the ex-ante cost of capital and the classification of the accounting policy of the company. The fourth section discusses the results, and the fifth section focuses on the final considerations of the research.

## Theoretical and Empirical Bases of the Study

The relationship between a company's level of corporate disclosure and its cost of capital has attracted significant interest from the global academic community. In the theoretical field, the negative relationship between the two variables is shown to be reasonably consolidated (Diamond and Verrecchia 1991; Easley and O'Hara 2004). Overall, since the groundbreaking work of Botosan (1997), several empirical studies on this subject have obtained results regarded in the literature as

inconclusive (Espinosa and Trombetta 2007). In this context, the technology camp has produced new and relatively inexpensive communication mechanisms, notably the Internet. Simultaneously, there is an increasing number of studies on the use of the Internet for disclosure activities and investor relations without addressing the impact of the use of the web on the firm's cost of capital (Dejéan and Martinez 2009). Therefore, in view of the needs of market-listed companies and investors, it has been deemed relevant to understand the associations between voluntary disclosure through a firm's corporate website and its ex-ante cost of capital.

### *Advantages and Disadvantages of Voluntary Disclosure*

The disclosure of information is one of the most important decisions made by the top management of listed companies because it has potential consequences. This choice assumes the need to identify net benefits arising from the trade-off between the advantages and disadvantages of the voluntary disclosure of information about the company (Sánchez et al. 2011). In the opinion of Jensen and Meckling (1976), the information that is made available can be useful in the decision-making process of shareholders and managers and can help shareholders and other stakeholders to monitor the activities of the top management. From the perspective of the Signaling Theory, according to Baiman and Verrecchia (1996), the availability of information can be recognised as a signal to the capital markets. By decreasing information asymmetry, the company can optimise financing costs and thus increase its value (Espinosa and Trombetta 2007).

However, the determinants of access to capital at reduced costs remain a controversial aspect in the literature. Along this line of discussion, whereas Francis et al. (2008) obtained results supporting the idea that more open companies achieve less burdensome access to capital, Botosan (1997) and Wang et al. (2008), analysing the associations between disclosure and the cost of capital, did not obtain evidence of benefits for the company resulting from voluntary disclosure expressed by means of a lower cost of capital. Other benefits for the company could originate in the behaviour underlying the more voluntary provision of relevant

information to the market, namely, corporate image and increased investor confidence (Babio et al. 2003); such benefits may lead to an increase in the liquidity of shares on the stock exchange (Healy et al. 1999) and access to larger amounts of financial resources (Marr and Gray 2002). However, an optimal level of voluntary disclosure assumes the identification of liquid benefits arising from the trade-off between the costs and benefits as a result of the disclosure of corporate information (Hayes and Lundholm 1996).

However, producing and disclosing information voluntarily can lead to disadvantages that outweigh the benefits (Sánchez et al. 2011: 474). Gray et al. (1990) highlight the costs associated with competitive disadvantages and political costs (e.g., taxes and limits imposed by the government on the company operations) and thus justify the reluctance of top management to disclose corporate information at levels higher than those required by law. Furthermore, with regard to the disadvantages of engaging in behaviour that is more inclined to provide information to the market, Gallhofer et al. (2007) argue that the costs associated with the disclosure of corporate information include the production and disclosure of information to the market. Therefore, these costs would be significantly reduced by disclosing information via the Internet. In addition, executives can try to avoid an information disclosure precedent that will be difficult to maintain in the future (Graham et al. 2005).

### *Information Disclosure Via the Internet*

Interest in the matter of corporate disclosure via the Internet is neither new nor restricted to the academic community. Several initiatives in the business environment can be cited as examples; for example, in 1996, Electronic Data Gathering, Analysis and Retrieval appeared in the United States as an attempt to standardise procedures. System for Electronic Document Analysis and Retrieval was created in Canada, and eXtensible Business Reporting language appeared as a language extension of eXtensible Markup Language for use in the presentation and exchange of information, principally financial. As an example of the interest of the regulatory agencies, one can cite the Financial Accounting Standards Board (2000) guidelines and the Portuguese securities commission

Comissão De Mercados De Valores Mobiliários (CMVM) (2000). Examination of the financial literature shows significant growth in the interest of the international academic community in the matter of corporate disclosure via the Internet, as shown by Petravick and Guillet (1998) in the United States, Craven and Marston (1999) in the United Kingdom, Hedlin (1999) in Switzerland, Sánchez et al. (2011) in Spain, Lattemann (2005) in Germany and Malarvizhi et al. (2009) in Canada. However, in Brazil, few studies can be found, especially when compared to the international scene (Mendes-Da-Silva et al. 2009; Mendes-Da-Silva and Onusic 2014).

Assessments by researchers such as Gallhofer et al. (2007) reveal clear potential advantages for companies that provide adequate and timely investor-friendly information via their website. A complementary view of these findings is that, compared to traditional printed means, the Internet provides many opportunities for corporate communication. Furthermore, it provides a wealth of critical and non-official information that competes with official communication channels (Paisey and Paisey 2006). Moreover, Noack (1997) highlights the fact that both the corporate costs of printing and correspondence by mail as well as investors' cost of accessing information can be significantly reduced. In contrast, the Internet enables a company to control the context with regard to the presentation of the data, emphasising the positive aspects and enabling the interpretation of potentially negative information with regard to the company (Cho and Roberts 2010).

### *The Cost of Capital and Disclosure*

The association between the cost of capital and disclosure has been the target of several works worldwide in the area of corporate finance, for example, Botosan (1997) in the United States, Richardson and Welker (2001) in Canada, Hail (2002) and Botosan and Plumlee (2002) in Switzerland and Gietzmann and Ireland (2005) in the United Kingdom. All these works begin with the belief that the disclosure negatively influences the level of the capital cost of the company. Furthermore, other works defend the idea that this association has been confirmed as negative, above all in markets characterised by low-level institutional transparency, for example, Zhang and Ding (2006) in China, Espinosa

and Trombetta (2007) in Spain, Déjan and Martinez (2009) in France and Lopes and Alencar (2010) in Brazil.

This configuration of the institutional environment (i.e., civil law countries) would motivate managers to voluntarily provide relevant information as a means of reducing uncertainty among investors, thus contributing to a greater tradability of the securities issued by the company. To that end, Brazil, an economy where little disclosure is practiced, such as China and France and contrary to the United States, Canada and the United Kingdom (Souissi and Khliy 2012: 53), represents an interesting research subject, given its growing importance for the world economy, which so far has not led to studies in this field.

## Procedure

### *Group of Companies Studied and Variables*

From the same list of 40 items of market interest discussed in detail by Mendes-Da-Silva and Onusic (2014), this work uses four disclosure variables, three of them obtained from a check of 40 items made available by the companies studied on their corporate websites, weighted by the mean score obtained from consultation (using a electronic questionnaire on internet) with 18 analysts registered on the BM&FBovespa. Following the method adopted by Mendes-Da-Silva and Onusic (2014), indices of the disclosure of financial information ( $I_{fin}$ ), which included 17 items, and governance information ( $I_{gov}$ ), which included 23 items, were constructed for a total of 40 corporate disclosure (*e-Disc*) items, all of which are listed in Table 1. For example, all companies that disclose Quarterly reports, including financial reports count 10.1 points, because each item was judged according a scale from 0 to 11 points, where 0 = irrelevant item and 11 = very relevant item.

In this way, between August and October 2011, 300 websites were examined, yielding a total of 5,210 examined items ( $40 \times 128$  corporate websites). The fourth dependent variable is a dummy that is given a value of 1 if the company is listed on the New Market and zero otherwise. It is worth highlighting that each website was visited simultaneously by the researchers as a means of minimising possibly ambiguous

**Table 1.** Indices of Voluntary Disclosure Via the Corporate Website

#	Information	Freq.	%	$\chi^2$	Mean Weight for Disclosure <sup>(a)</sup>
<i>Panel A: Categories of financial information</i>					
1	Quarterly reports, including financial reports	120	93.8		10.1
2	General view of the performance of the company (FAQ, recent facts, quick news)	120	93.8		9.9
3	Calendar of events of interest to the investor (e.g., dividend distribution)	120	93.8	*	10
4	Financial information in a language other than Portuguese	119	93		9.7
5	Full annual report	117	91.4		10
6	Other CVM (Securities Commission) files (e.g., Reference Form)	117	91.4		9.6
7	Coverage by analysts	113	88.3		8.7
8	Text of the most recent financial news	110	85.9		10
9	Commentaries and presentations (e.g., quarterly performance road shows)	106	82.8		8.9
10	Current share prices of the company in markets where they are traded	103	80.5		9.7
11	History of share prices	101	78.9		9.6
12	Most recent monthly financial data	95	74.2		10.6
13	Link to the Securities Commission – CVM website	79	61.7	*	6.9
14	Information detailing a profit reinvestment plan	66	51.6		10.1
15	Discussion of the advantages for an investor of holding shares in the company	51	39.8		8
16	Information about their broker(s) (address or direct link)	41	32		7.3
17	Link to share data on another website	28	21.9		6.7

*(Table 1 continued)*

(Table 1 continued)

#	Information	Freq.	%	$\chi^2$	Mean Weight for Disclosure <sup>(a)</sup>
<i>Panel B: Categories of corporate governance</i>					
1	Text on the concept of corporate governance	116	91		7
2	Names of the members of the board of directors	115	90		8.8
3	Structure of the board of directors	115	90		9.9
4	Composition of the share capital of the company	111	87		10.2
5	Investor portal on the home page	107	84		9
6	Information disclosure policy to the markets	105	82		9
7	Professional qualification of the directors and advisors	105	82		9.7
8	Reference to good corporate governance practices adopted	104	81		9.6
9	Rules of conduct for executive directors	96	75		8.1
10	Reports on the social responsibility of the company	92	72		8.1
11	Working rules of the board of directors	90	70		9.6
12	Procedures for the selection and election of directors and advisors	88	69		9.1
13	Ratings assigned (classification of corporate governance and securities issued)	76	59		9.7
14	Explicit description of the powers of the directors	66	52		9
15	Investor kit (basket of information of interest to the investor)	64	50		9.6

16	Where the company is listed and financial statements in accordance with national standards	60	47	101
17	Publication of the role and position of the board members	57	45	7.2
18	Description of the conditions of independence of the board members	52	41	9.2
19	Fees paid to audit firms	43	34	7.7
20	Description of the relationship between directors and shareholders	40	31	9.2
21	Disclosure of positions of board members in other companies	32	25	7
22	Remuneration (detailed) of directors and advisors	27	21	9.6
23	Directors' interests in the capital of the company	24	19	9.6

**Source:** Constructed by the authors based on an examination of corporate websites ( $N = 128$ ) conducted between August and October 2011.

**Note:** This table shows the frequency (in descending order) with which the information categories were found on the corporate websites and the average relevance scores assigned (between August and October 2011) to each information category in the opinion of the corporate information users, i.e., rating agencies, securities brokers and pension funds. The last column shows the test statistic of  $\chi^2$  for independence with regard to the listing of the company in the trading sector of the New Market. <sup>\*\*\*</sup> $p < 0.01$ ; <sup>\*\*</sup> $p < 0.05$ ; <sup>\*</sup> $p < 0.1$ . <sup>(a)</sup> This column shows the average relevance score for each corporate information category given by market agents (8 brokers, 2 rating agencies and 8 fund managers). 0 = irrelevant item; 11 = very relevant item.

interpretations of the content provided by the companies. In June 2011, 525 companies were listed on the BM&FBovespa, of which 193 were not considered (because they were more regulated and thus were under more obligations with regard to disclosure, which could bias the results). The websites of 17 companies were not identified. Thomson Reuters provided data on future profit estimates for only 128 of the remaining 314 companies. Therefore, the final group comprised 128 non-finance companies, 83 (64.8 per cent) of which were listed on the New Market, that were distributed between 17 industrial sectors. A maximum time of 15 minutes was given for the exploration of each corporate website, as the items must be available and organised in such a way as to be easily found by those interested. Responses from users of corporate information were collected using an electronic questionnaire sent over the Internet.

### *Estimate of the Cost of Capital of a Particular Company*

In accordance with the arguments of Francis et al. (2005), the cost of equity capital (a dependent variable in this research) is an ex-ante metric that reflects expectations about the returns offered by the company and thus is not directly observable. The various works concentrating their efforts on obtaining estimates of the cost of equity capital use price and profit estimates made by analysts, implementing these metrics in the evaluation model. Therefore, from these estimates are drawn the values for the cost of equity capital with an internal rate of return equal to the current prices of the shares and to a sequence of expected earnings derived from analysts' expectations. In this study, for the purposes of the proxy of the ex-ante cost of equity capital, four different calculation procedures were used, namely,  $r_{riv}$ ,  $r_{peg}$ ,  $r_{peg}$  and  $r_{mpeg}$ , as detailed in the following. A fifth measurement was also used, obtained from the average of the four metrics ( $r_{avg}$ ). Among the various procedures suggested for the estimate of the ex-ante cost of equity capital of the company, for example, Botosan (1997), one of the least expensive in terms of necessary data is that adopted by Espinosa and Trombetta (2007) and formalised in (1):

$$P_t = \frac{\hat{x}_{t+2} - \hat{x}_{t+1}}{(r_{peg})^2} \quad (1)$$

in which  $r_{peg}$  is the ex-ante cost of equity capital, where *peg* refers to the price–profit growth model (Ohlson and Juettner-Naroth 2005),  $\hat{x}_{t+1}$  is the average earnings per share (EPS) (estimated by analysts for the company in the following financial year) and  $\hat{x}_{t+2}$  is the average EPS estimated by analysts for the company in the second following financial year. In this way, the ex-ante cost of equity capital in December 2011 is calculated starting from the estimated EPS for the end of 2012 and 2013, available on the Thomson Reuters database.

In this example, the price  $P_i$  of the share belonging to the *i*th company is observed on the last business day of 2011. In the same manner used by Espinosa and Trombetta (2007), four measures of the ex-ante cost of equity capital were assumed based on the forecast earnings of the company, initially by means of the procedures recommended by Gebhart et al. (2001). According to these authors, the price of the company’s shares,  $P_{it}$ , could be expressed as the book value ( $bv_t$ ), adding the residual earnings ( $x_t$ ), discounted from the cost of capital ( $r_e$ ) of the company, as shown in (2). For the practical purpose of estimating  $r_e$ , it is necessary to have an explicit definition of a forecast period. The relationship between the cost of equity capital, future earnings and company’s share price at a determined date can be expressed by (2):

$$P_{it} = bv_t + \sum_{\tau=1}^{+\infty} \frac{E_t[x_{t+\tau} - r_e bv_{t+\tau-1}]}{(1 + r_e)^\tau} \tag{2}$$

$$P_{it} = bv_t + \sum_{\tau=1}^{+\infty} \frac{E_t[(ROE_{t+\tau} - r_e)bv_{t+\tau-1}]}{(1 + r_e)^\tau} \tag{2.1}$$

where  $bv_t$  is the book value at time *t*,  $E_t[\ ]$  is the expectation based on information available at time *t*,  $X_{t+\tau}$  is the net earnings for the period *t* +  $\tau$ ,  $r_e$  is the cost of equity capital and  $ROE_{t+\tau}$  is the return on the net equity of the company for the period *t* +  $\tau$ .

Equations (2) and (2.1) are identical to the discounted dividend model but express the value of the company in terms of accounting numbers in an infinite series. This limitation requires a ‘terminal value’ (TV) to obtain a value of  $r_e$ . Therefore, according to Gebhardt et al. (2001), a three-phase approach is used to calculate intrinsic value. First, explicit estimates of earnings were used (a consensus of EPS used by analysts) for the next three years (2012–2014). Second, earning’s forecasts were

obtained for the years 2015 and 2016 by means of a linear interpolation comparing the ROE of the company in equation (i) with the moving average of the ROE of the sector for the five preceding years ( $EPS_{t,2015} = FROE_{t,2015} * bv_{2014}$ ). Finally, for the third step, a total period of 5 years was used to calculate the cost of equity capital, as it addresses the reference period of company evaluations made in Brazil and, according to Espinosa and Trombetta (2007), the results obtained had not differed significantly over a period of 5 to 15 years. An estimate of the infinite horizon for each company is shown as

$$P_t = bv_t + \frac{FROE_{t+1} - r_e}{(1 + r_e)} bv_t + \frac{FROE_{t+2} - r_e}{(1 + r_e)^2} \hat{bv}_{t+1} + TV \quad (3)$$

where

$bv_t$  is the book value for year  $t$ .

$\hat{bv}_{t+\tau}$   $bv_{t+\tau-1} + FEPS_{t+\tau} - FDPS_{t+\tau}$ , where  $FDPS$  is the forecast for dividends per share for year  $t + \tau$  estimated using the current payout rate ( $k$ ). Specifically, it is assumed that  $FEPS_{t+\tau} = FEPS * k$ .

$r_e$  is the estimated cost of capital.

$FROE_{t+\tau}$  is the estimated ROE for year  $t + \tau$ . For the first two years, this variable is calculated as  $FRPS_{t+\tau} / bv_{t+\tau-1}$ , where  $FEPS$  is the average of the EPS estimates gathered from the I/B/E/S platform made available by Thomson Reuters for year  $t + \tau$  and  $bv_{t+\tau-1}$  is the book value per share for year  $t + \tau - 1$ . Beyond the third year, the FROE is estimated using a linear interpolation with the average ROE for the industry.

For a  $T$  horizon, the terminal value is given by

$$TV = \sum_{\tau=3}^{T-1} \frac{\hat{x}_{t+\tau} - r_e}{(1 + r_e)^\tau} bv_{t+\tau-1} + \frac{FROE - r_e}{r(1 + r)^{T-1}} bv_{t+T-1} \quad (3.1)$$

This relation was solved by an iterative process using Mathematica© software and produced an estimate of the ex-ante cost of capital ( $r_{riv}$ ) conditioned by the information currently available. After the proxy

suggested by Gebhardt et al. (2001) was calculated, starting from the same data, another three alternative measures were calculated for the ex-ante cost of capital based on the procedures detailed by Ohlson and Juettner-Nauroth (2005). In addition to  $r_{peg}$  and  $r_{riv}$ , two more proxies of the ex-ante cost of capital were calculated, one obtained following the price to forward earnings model ( $r_{pef}$ ) and the other following the Modified Price to Earnings Growth model ( $r_{mpeg}$ ), in accordance with equations (4) and (5), respectively, shown as follows:

$$P_t = \frac{\hat{x}_{t+1} + r_e d_{t+1} + \hat{x}_{t+2}}{(r_e + 1)^2 - 1} \tag{4}$$

$$P_t = \frac{\hat{x}_{t+2} + r_e d_{t+1} + \hat{x}_{t+1}}{(r_e)^2} \tag{5}$$

### Accounting Policy

Accruals are defined as the difference between net earnings and the net operating cash flow; that is, they are accounts that can affect the amount of earnings without necessarily changing the amount of cash in hand (cash and cash equivalents) and can be divided into discretionary accruals (DA) and non-discretionary accruals (NDA). In the opinion of Martinez (2008), there is nothing wrong with not recording accruals unless the manager increases or decreases them with the objective of changing earnings. The intention of this procedure is to enable a distinction to be made between aggressive and conservative companies, such as that adopted in the Espinosa and Trombetta (2007) study, which departs from the procedure proposed by Dechow et al. (1995), which effectively addresses the Modified Jones Model. Once the classification of the companies was completed, the DA for the *i*th company were calculated (DA<sub>*i*</sub>) as follows:

$$\text{Cons}_{it} \begin{cases} \text{DA}_{it} > 0 \rightarrow \text{Cons} = 1 (\text{aggressive}) \\ \text{DA}_{it} < 0 \rightarrow \text{Cons} = 0 (\text{conservative}). \end{cases}$$

The Modified Jones Model uses a variation of net revenue and the value of the fixed assets, starting from the assumption that NDA depend

on these variables that are measured according to the total assets. The Modified Jones Model seeks to measure total DA (current or non-current) using the variables that comprise (6) as described by Dechow et al. (1995):

$$\begin{aligned} \text{NDA}_{i\tau} = & \beta_1 \left( \frac{1}{\text{Assets}_{i\tau-1}} \right) + \beta_2 \left( \frac{\Delta \text{Rev}_{i\tau}}{\text{Assets}_{i\tau-1}} - \frac{\Delta \text{Rec}_{i\tau}}{\text{Assets}_{i\tau-1}} \right) \\ & + \beta_3 \left( \frac{\text{Ppe}_{i\tau}}{\text{Assets}_{i\tau-1}} \right) \end{aligned} \quad (6)$$

where

$\text{NDA}_{i\tau}$  is non-discretionary accruals of firm  $i$  in year  $\tau$ ,

$\Delta \text{Rev}_{i\tau}$  is the variation in the gross revenue of firm  $i$  between the years  $\tau$  and  $\tau - 1$ ,

$\Delta \text{Rec}_{i\tau}$  is the variation in accounts receivable (customers) of firm  $i$  between the years  $\tau$  and  $\tau - 1$ ,

$\text{Ppe}_{i\tau}$  is the fixed assets of firm  $i$  in year  $\tau$ ,

$\text{Assets}_{i\tau-1}$  is the total assets of firm  $i$  in year  $\tau - 1$ ,

$\varepsilon_{i\tau}$  is the regression residuals of the  $i$ th firm in year  $\tau$ ,

$\beta_1, \beta_2, \beta_3$  are the specific parameters of the  $i$ th firm.

The estimates of the parameters  $\beta_1, \beta_2$  and  $\beta_3$  in (1) are generated by means of the total accruals ( $\text{TA}_{i\tau}$ ) in (6):

$$\begin{aligned} \frac{\text{TA}_{i\tau}}{\text{Assets}_{i\tau}} = & \beta_1 \left( \frac{1}{\text{Assets}_{i\tau-1}} \right) + \beta_2 \left( \frac{\Delta \text{Rev}_{i\tau}}{\text{Assets}_{i\tau-1}} \right) \\ & + \beta_3 \left( \frac{\text{Ppe}_{i\tau}}{\text{Assets}_{i\tau-1}} \right) + \mu_{i\tau}. \end{aligned} \quad (7)$$

The TA are calculated on the basis of the balance sheet approach, which is set out as follows:

$$\text{TA}_{i\tau} = \frac{\Delta \text{CA}_{i\tau} - \Delta \text{CL}_{i\tau} - \Delta \text{Cash}_{i\tau} + \Delta \text{Std}_{i\tau} - \text{Dep}_{i\tau}}{\text{Assets}_{i\tau-1}} \quad (8)$$

where

- $\Delta CA$  is the variance in the amount of current assets,
- $\Delta CL$  is the variance in the amount of current liabilities,
- $\Delta \text{Cash}$  is the variance in the amount of cash in hand (and cash equivalents),
- $\Delta \text{Std}$  is the variance in the amount of short-term financing and loans,
- $\text{Dep}$  is depreciation and amortisation expenses,
- Assets are total assets.

DA are based on the calculation of the difference between TA and NDA following the procedure of DeAngelo (1986) adopted by Jones (1991: 207). As a matter of fact, the TA of a previous period ( $\tau - k$ ) are used as a measure of normal TA. Abnormal accruals ( $\Delta TA$ ) are defined as the difference between the current total accrual and the normal total accrual, which in turn can be broken down into DA and NDA, as shown in the following:

$$TA_{it} = NDA_{it} + DA_{it} \quad \therefore DA_{it} = TA_{it} - NDA_{it} \quad (9)$$

### Other Independent Variables

The ex-ante cost of capital is only an empirical proxy for the non-observable cost of equity capital. According to Espinosa and Trombetta (2007: 1383), Gebhardt et al. (2001), Hail (2002) and Chen et al. (2004), one means of justifying the validity of this proxy is to study its relationship to other variables that reflect the firm's risk factors as perceived by investors. Therefore, the chosen control variables are derived from works found in the literature. The following risk characteristics were considered in the analyses using a specific rationale.

*Leverage:* The cost of equity capital is an increasing function of the amount of debt in the capital structure of the firm, considering that the debt increases the volatility of future earnings. Several works document this assumption, for example, Hail (2002), Espinosa and Trombetta (2007), Botosan and Plumlee (2002) and Gebhardt et al. (2001).

- Beta:* The Capital Asset Pricing Model (CAPM) suggests that the non-diversifiable risk coefficient (systematic) of a share could be positively correlated with the firm's cost of capital. Previous studies are not unanimous in showing this relationship in a consistent manner, as in the study of Gebhardt et al. (2001), whereas others, such as Hail (2002), confirm the positive relationship. In this research, the beta of each share was obtained by using a market model, assuming that at least 12 observations of monthly returns are necessary over 60 months up to month  $t$ .
- Size:* The size of the firm was used as a proxy of information availability on the assumption that information is more available in large companies than smaller companies. Following this line of thought, if the company provides more information, future earnings tend to be perceived by investors and analysts as less risky, which implies a lower cost of capital. As Espinosa and Trombetta (2007) observe, this effect could be stronger in developing markets. Therefore, the expectation is a lower cost of capital for large companies than for smaller ones. The natural logarithm of the capitalisation of the firm in the market in 2011 was used as a proxy of the size of the firm.

### Specification of the Model

To test the existence of a significant association between the ex-ante cost of capital and disclosure, the ordinary least-squares (OLS) method was used by means of the model shown as follows:

$$r_{it} = \alpha + \varphi_1 \text{Disclosure}_{it-1} + \varphi_2 \text{Beta}_{it} + \varphi_3 \text{Leverage}_{it-1} + \varphi_4 \ln \text{MktValue}_{it-1} + \varphi_5 \text{Agressiveness}_{it-1} + \varepsilon_i \quad (10)$$

where

$r_{it}$  is the proxy for the ex-ante cost of capital ( $r_{pef}$ ,  $r_{peg}$ ,  $r_{mpeg}$ ,  $r_{riv}$ ).

Disclosure	is the proxy for voluntary disclosure via the web indicator ( $eDisc, IGov, I_{fin}$ ).
Beta	is the coefficient of systematic risk.
Leverage	is the financial leverage index.
lnMarket Value	is the natural logarithm of market capitalisation.
Aggressiveness	is the dummy variable that assumes a value of 1 for aggressive companies (positive DA, i.e., $DA_{it} > 0$ ) and 0 otherwise. The standardised DA value in z-scores was used.

## Results

With regard to the empirical results attained, initially the estimate of the cost of capital highlighted by the method adopted in the model for  $r_{pef}$  (the lower of the four calculations) suggests that, on average, the cost of capital was in the region of 8.4 per cent, as shown in Table 2.

Table 3 shows the descriptive statistics of the independent variables adopted in the research.

Table 4 shows the matrix correlations between the variables (dependent and independent) used in the study. Note that among the various

**Table 2.** Descriptive Statistics for Estimates of the Implicit Ex-Ante Cost of Capital

Variable	N	Mean	Min.	Percentile			Max.	Std. Dev.
				$Q_1$	$Q_2$	$Q_3$		
$r_{peg}$	128	0.146	0.037	0.109	0.138	0.175	0.529	0.062
$r_{pef}$	73	0.084	0.006	0.056	0.078	0.107	0.363	0.047
$r_{mpeg}$	68	0.145	0.067	0.113	0.132	0.161	0.414	0.057
$r_{riv}$	44	0.173	0.007	0.041	0.085	0.158	3.088	0.459

**Source:** Authors' calculations.

**Notes:**  $r_{pef}$  is the estimate obtained from the Price to Forward Earnings Model),  $r_{peg}$  is obtained from the Price to Earnings Growth Mode and,  $r_{mpeg}$  is derived from the Modified Price to Earnings Growth Model. All of these estimates are obtained by means of the use of some restrictive assumptions for the parameter used to evaluate the Abnormal Earnings Growth Model.

**Table 3.** Descriptive Statistics of the Independent Variables

Variable	N	Mean	Min.	Percentile			Max.	Std. Dev.
				25	50	75		
Disclosure index <i>e-Disc</i>	128	247.75	0	204.08	251.05	301.43	354.10	68.96
Disclosure index $I_{fin}$	128	120.29	0	105.83	124.10	139.10	155.80	29.41
Disclosure index $I_{gov.}$	128	127.46	0	97.65	130.65	160.50	198.30	43.51
Beta risk coefficient	128	0.90	-0.20	0.60	0.90	1.18	1.80	0.39
Financial leverage	128	1.696	-52.37	1.529	2.100	3.041	30.677	8.415
In Market Capitalisation	128	14.67	12.17	13.78	14.64	15.44	18.28	1.18

**Source:** Authors' calculations.

**Notes:** This table shows the descriptive statistics of the independent variables used in the research.

**Table 4.** Correlation Matrix Between the Variables Studied

	$r_{nv}$	$r_{peg}$	$r_{pof}$	$r_{mpog}$	e-Disc	$I_{Fin}$	$I_{Gov}$	Beta	Lev	lnMktVal	DAGG
$r_{nv}$	0.132										
$r_{peg}$	-0.16	0.085									
$r_{pof}$	-0.02	0.280***	0.742***								
$r_{mpog}$	-0.13	0.066	-0.038	-0.019							
e-Disc	-0.05	0.089	-0.038	-0.08	0.919***						
$I_{Fin}$	-0.16	0.044	-0.035	0.017	0.964***	0.781***					
$I_{Gov}$	0.002	0.241***	-0.033	-0.02	-0.016	-0.004	-0.023				
Beta	-0.02	-0.061	0.109	0.106	0.128	0.132	0.114	-0.04			
Lev	-0.17	-0.286***	-0.148	-0.159	0.086	0.079	0.083	0.057	0.086		
lnMktVal	-0.10	0.037	0.197*	-0.005	-0.009	0.021	-0.029	-0.02	-0.16*	-0.103	
DAGG	0.093	0.024	-0.21*	-0.293**	0.028	0.011	0.036	0.036	-0.096	-0.179**	0.259***

**Source:** Authors' calculations. \*\*\* $p < 0.01$ ; \*\* $p < 0.05$ ; \* $p < 0.1$ .

proxies for the ex-ante cost of capital, only  $mpeg$  was significantly correlated with two others,  $r_{peg}$  and  $r_{pef}$ . This finding suggests a certain independence between these metrics.

Among disclosures via corporate website proxies, none showed an association with any of the metrics of the cost of capital. However, the listing of the firm on the BM&FBovespa's *Novo Mercado*, the fourth disclosure proxy, showed significant correlation coefficients with  $r_{pef}$  and  $r_{mpege}$ . These results may suggest that a greater propensity to provide corporate information via the corporate website does not entail a decrease in the cost of capital.

A more aggressive accounting policy expressed by DA shows the correlation of only one cost of capital metric,  $r_{pef}$ . With regard to the regression analysis, it should be considered that for the fit diagnosis of the estimated regressions, the metrics adjusted R-squared, Akaike Information Criterion (AIC) and the significance of the  $F$  statistic were employed and are reported in the lower portion of Table 5 for each estimated model. Statistics for evaluation of multicollinearity, that is, variance inflation factor (VIF) and tolerance, were examined, and no findings suggested the existence of problems of this nature in any of the models as reported in Table 5.

In the case of the estimated regressions, none of the 3 Internet disclosure proxies ( $e-Disc$ ,  $I_{gov}$  and  $I_{fin}$ ) showed estimates of significant parameters when regressed against any of the four metrics of the cost of capital,  $r_{rif}$ ,  $r_{pef}$ ,  $r_{peg}$  and  $r_{mpege}$ . However, as shown by Table 6, the proxy of the cost of capital that obtained results from the explanatory model closest to the idea of negative association of the level of disclosure was  $r_{pef}$ , even though the most aggressive companies tend to experience a greater level of demand for return by investors. Note that on average, the companies listed on the New Market obtained estimated values for their cost of capital that were 3.3 percentage points lower ( $\hat{\phi}_5 \approx -0.033$ ;  $p < 0.01$ ) than companies listed outside this special BM&FBovespa segment.

Furthermore, on average, the companies judged to be more aggressive showed a cost of capital 3 percentage points above the companies judged to be conservative. This result supports the notion that a greater willingness to provide corporate information reduces the cost of capital and, furthermore, that this relationship is more significant among aggressive companies ( $\hat{\phi} \approx 0.03$ ;  $p < 0.05$ ). With regard to the explanatory

**Table 5.** Estimated Parameters for the Ex-Ante Cost of Equity Capital

Independent Variables	Proxies of Ex-ante Cost of Capital		
	$r_{pef}$	$r_{peg}$	$r_{mpeg}$
Constant	0.195*** (0.072)	0.349*** (0.068)	0.343*** (0.093)
1. Beta risk coefficient	-0.002 (0.013)	0.041*** (0.013)	-0.008 (0.016)
2. Financial leverage	0.001 (0.001)	0.000 (0.001)	0.001 (0.001)
3. In Market Capitalisation	-0.007 (0.005)	-0.016*** (0.005)	-0.012* (0.006)
4. Aggressiveness (DA)	0.030** (0.011)	0.002 (0.011)	0.012 (0.014)
5. New Market listing	-0.033*** (0.012)	-0.006 (0.011)	-0.044*** (0.015)
$R^2$ Adjusted	0.115	0.116	0.095
N	73	128	68
F	2.871**	4.335***	2.403**
Akaike Information Criterion (AIC)	-240.29	-357.5	-197.5

**Source:** Authors' calculations.

**Notes:** This table shows a summary of the estimated parameters (regression by the OLS method) for three cost of equity capital proxies:  $r_{pef}$ ,  $r_{peg}$  and  $r_{mpeg}$  (No significant parameters for the proxy  $r_{rif}$  were obtained).  $r_{pef}$  is the estimate obtained from the Price to Forward Earnings Model,  $r_{peg}$  is obtained from the Price to Earnings Growth Model and  $r_{mpeg}$  is derived from the Modified Price to Earnings Growth Model. All of these estimates are obtained using some restrictive assumptions for the parameter of the evaluation of the Abnormal Earnings Growth Model. \*\*\* $p < 0.01$ ; \*\* $p < 0.05$ ; \* $p < 0.1$ . The bracketed figures are the standard error in the estimate of the coefficient of each independent variable.

model of  $r_{peg}$ , a positive and significant association of the beta coefficient of the firm with the cost of capital measured by this proxy was found ( $\hat{\phi} \approx 0.041$ ;  $p < 0.01$ ), suggesting, as indicated in the literature, a positive correlation between the systematic risk coefficient of the firm with its cost of equity capital.

These results support the indications found by Lopes and Alencar (2010) in the Brazilian market, although those authors only considered companies with the highest liquidity on the stock market, which in itself

could constitute a bias in the selection because trade ability is associated with company size. Moreover, in the explanatory model of  $r_{peg}$  (Table 5), it is noted that larger companies (ln *Market Capitalization*) obtained a lower cost of capital ( $\hat{\phi} \approx -0.016$ ;  $p < 0.01$ ), thus also supporting the argument of Espinosa and Trombetta (2007) that firm size is a proxy for information availability and thus the tendency for future earnings to be perceived as less risky by investors, leading to less discounting of the firm's future cash flows.

Furthermore, according to these authors, this relationship would be more pronounced in developing markets such as Brazil. On considering the explanatory model of proxy  $r_{mpeg}$  as estimated for  $r_{pef}$ , a positive signal was found for the estimated coefficient of the New Market variable ( $\hat{\phi} \approx -0.041$ ;  $p < 0.01$ ). In addition, similarly to that found in the estimates obtained for the explanatory model of  $r_{peg}$ , the size of the firm, expressed by market capitalisation, was found to be significantly and negatively associated with the cost of capital ( $\hat{\phi} \approx -0.012$ ;  $p < 0.1$ ), supporting the arguments of Espinosa and Trombetta (2007) for the validity of company size as a proxy for the availability of information to the market, as previously discussed in the results obtained for the explanatory model of  $r_{peg}$ .

Table 6 is presented to discuss the assertion of Espinosa and Trombetta (2007) on the complementarity between the choices of accounting policy and voluntary corporate disclosure, according to which exclusive focus on only one of these channels of communication could compromise the results of tests of the association between disclosure and cost of capital (Dhaliwal et al., 1979).

In other words, from finding associations with a small marginal effect to insignificant signals, works on this association could suffer from omitted variable bias. In fact, the results reported in Table 5 indicate that, considering the sub-group of companies classified as conservative, and the cost of capital measured by proxy  $r_{pef}$  the marginal effect of the New Market listing is less than that found for this variable for the sub-group of companies classified as aggressive. Furthermore, among the aggressive companies, the coefficient is greater and more significant. This result supports the argument of Espinosa and Trombetta (2007) on the relevance of considering the aggressiveness of the firm in tests of a negative relationship between disclosure and the cost of capital.

**Table 6.** Regressions for the Ex-Ante Cost of Capital (Subdivided by Aggressiveness)

Independent Variables	Aggressiveness of the Firm	
	Conservative	Aggressive
Constant	0.176*** (0.062)	0.240 (0.151)
1. Beta risk coefficient	-0.024* (0.014)	0.010 (0.022)
2. Financial leverage	0.000 (0.001)	0.002 (0.002)
3. Market Capitalisation index	-0.005 (0.004)	-0.008 (0.010)
4. New Market listing	-0.020* (0.010)	-0.053** (0.024)
R <sup>2</sup> Adjusted	0.099	0.109
N	40	33
F	2.210**	2.102**

**Source:** Authors' calculations.

**Note:** This table shows the results of the OLS regressions setting the ex-ante cost of capital as a dependent variable to the  $r_{perf}$  proxy (the only variable for which disclosure and aggressiveness were simultaneously significant). The second column shows the estimated coefficients when considering only the sub-group of companies classified as conservative. The third column shows the estimates for the sub-group of companies classified as aggressive. Comparing the results in this table provides indications that supporting the idea that consideration of company accounting policy is a relevant variable for testing the existence of associations between the cost of capital and corporate disclosure, taking into account the increase (and greater significance) of the independent variable coefficient, New Market Listing (disclosure proxy), when considering the aggressive companies.

## Final Considerations

Starting from the assumption that corporate disclosure could be significantly associated with the firm's cost of capital as advocated by Diamond and Verrecchia (1991) and Easley and O'Hara (2004), the objective of this study was to confirm the existence of associations between voluntary disclosure and the ex-ante cost of equity capital of the firm. The main contribution of this research is supported by the paucity of research on

the various means of estimating the ex-ante cost of equity capital as well as its relation with disclosure via the corporate website, especially when considering emerging economies such as Brazil. According to Gietzmann and Trombetta (2003), firms could reduce the component of adverse selection in their cost of capital by following two channels of communication: first, by choosing a specific accounting policy from the alternatives offered by the accounting rules, and second, by choosing a level of disclosure of relevant corporate information.

In the same manner as that adopted by Espinosa and Trombetta (2007), Gietzmann and Trombetta (2003) advocated that these two channels of communication could interact insofar as the choice of disclosure could depend significantly on the choice of accounting policy. Therefore, according to these authors, firms that adopt conservative accounting policies may deem it unnecessary to provide high levels of disclosure due to having pursued an accounting policy that is less prone to financial crises. Alternatively, firms that adopt aggressive accounting policies could use additional channels of disclosure as a means of mitigating the negative effect that their choice of accounting policy may have in a capital market environment. To conduct these tests, data were used from 128 companies listed in Brazil (BM&FBovespa) at the end of 2011. From a review of the literature, using dependent variables, four different metrics of disclosure were adopted, three through the corporate website, considering the relevance of 40 items of corporate information in accordance with the opinion of the market analysts registered with the stock exchange and New Market listings as proxies of disclosure. Accordingly, for greater robustness, four different methods of calculating the ex-ante cost of equity capital were employed.

In the case of the empirical results of this research, it should be emphasised that of the four variables intended to express the ex-ante cost of capital, only three showed parameters indicative of the significance of the model. Therefore, when the estimates for the proxy  $r_{perf}$  are observed, indications of the negative association between corporate disclosure (only when the New Market listing was assumed as a proxy of disclosure) and the aggressiveness of the firm are found, confirming the results and arguments of Espinosa and Trombetta (2007), who stated that these two channels of communication (corporate disclosure and accounting policy) must be considered jointly in the models because

otherwise an omitted variable bias is incurred, resulting in non-significant parameters for the negative association between disclosure and the cost of capital. To summarise, on average, companies listed in the differentiated corporate governance segment, known as the New Market, and classified as conservative reduced their cost of capital by 6 percentage points.

Nonetheless, in opposition to the argument of some works in the recent literature, for example, Mendes-Da-Silva et al. (2009) and Mendes-Da-Silva and Onusic (2014), or even guidelines issued by regulatory agencies around the world, for example, FASB (2000) and the CMVM (Securities Commission) (2000), on the existence of a negative relationship between disclosure via the corporate website and the firm's cost of capital, none of the disclosure variables obtained a significant and negative signal when regressed against any of the four cost of capital metrics. One interpretation of this finding is that investors do not attach sufficient importance to use of the website by the company for investor relations activities and use other sources of corporate information or even advice on the allocation of assets from professional investment guidance services.

In view of the relevance of the field research examined here, it is worth noting the limitations of this study. Given that websites do not have long-term memories (or files), it is difficult to analyse consistently the evolution of each firm's disclosure over time, which makes it difficult to conduct longitudinal studies. With regard to the coverage of Brazilian market analysts, few companies are the target of future analyst estimates, which makes the ex-ante cost of capital difficult to obtain unless the four methodologies employed here are taken into consideration. Other dimensions that require investigation can be noted, such as the following: (a) an analysis of the history of propensity towards corporate disclosure, such as the makeup of the board of directors; (b) a comparative analysis of the propensity of controlled and family-managed companies to provide financial information on their corporate websites and the impact of such disclosure on the firm's cost of capital; (c) an asymmetric cross-industry investigation into the willingness to provide information to the market and (d) an analysis of the questions discussed in this article using a comparative approach to explore differences between institutional environments.

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