DETERMINANTS OF INTERNET FINANCIAL DISCLOSURE IN AN EMERGING MARKET: LESSONS FROM BRAZIL

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Abstract

Disclosure transparency is one of the pillars of good corporate governance. Moreover, the digital age has produced a dramatic shift in the corporate communication paradigm. As a result, companies increasingly use the Internet as a means of disseminating and disclosing financial information to shareholders, analysts and other interested capital market participants. This research examines the determinants of voluntary disclosure of financial information on the Internet by Brazilian firms. Cross-sectional analyses based on 291 non-financial companies listed on the São Paulo Stock Exchange in 2002 indicate that both firm size and the quality of corporate governance are positively related to the level of voluntary disclosure of financial information on the Internet. These results are consistent with the notion that Brazilian firms with incentives to improve financial transparency disclose more financial information on the Internet. Compared to similar Internet disclosures of U.S.-domiciled companies, this study finds that corporate governance is an incremental determinant of Internet financial disclosure for Brazilian enterprises.

Keywords: Voluntary Disclosure, Internet Disclosure, Corporate Websites, Corporate Governance

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1. Introduction

Investors and government regulatory bodies have created behavior expectations for corporations, both with respect to the treatment of shareholders and financial disclosure. These standards have developed in tandem with a shift in the corporate communication paradigm, fueled by rapid technological advances. In order to succeed in this technologically-advanced business environment, it is essential for corporations to have greater financial transparency to capital markets. Consequently, public companies are increasingly utilizing the Internet to develop closer relations with their investors, analysts, and other stakeholders. In addition, easy access to the Internet "levels the playing field" for all investors since it offers timely information to all. Therefore, it fulfills an important requirement of good corporate governance—the equitable treatment of all shareholders.

Zingales (2000) argues that, in this environment, the influence of the media should not be ignored in economics and finance research. Similarly, Dyck and Zingales (2002) contend that the information diffusion process (disclosure) is not well represented in economic models. In recent years, a growing number of stakeholders have begun searching for financial information through various media sources—particularly the Internet. Through this medium, companies can release information in a much more timely fashion than they could in the past through periodic financial reports. This rapid dissemination of financial information produces the perception of a greater degree of public transparency. By extension, this behavior contributes to the formation of a more favorable reputation among investors, which can help managers maximize firm value.

In this context, the Internet's role as a corporate communication and investor relations medium has increased considerably. Specifically, in countries with more-developed economic systems, companies use their Web pages as platforms to release financial and other useful information to a broad constituency of stakeholders (Ismail, 2000). On an international scope, some studies have explored the relations between firm characteristics (e.g., firm size, leverage, and profitability) and companies' willingness to voluntarily disseminate financial information to the market through the Internet (particularly Ettredge, Richardson and Scholz, 2002; and Brennan and Hourigan, 2000). However, the lack of standardization in how firms and investors use the Internet as well as systematic differences across countries in their level of technological development prompts our investigation of the determinants of Internet financial disclosure among Brazilian firms. We investigate predictors of Internet financial disclosure in emerging markets using data from Brazilian companies and contrast our results with

determinants of Internet disclosure among U.S.-based companies in prior research. Specifically, this study investigates relations between company characteristics (e.g. leverage, firm size, profitability and corporate governance) and the level of voluntary disclosure of financial information on corporate websites.

Brazil has well-developed financial markets and advanced technology relative to many countries. Nevertheless, Brazilian capital markets and technology are less-developed compared to countries in North American and some parts of Europe. Therefore, in order to better understand the determinants of voluntary disclosure of financial information through the World Wide Web in Brazil's emerging market, this study examines the financial disclosure practices of 291 non-financial companies listed on the São Paulo Stock Exchange (Bovespa) in the year 2002. The results indicate that both firm size and the quality of corporate governance are positively related to the level of voluntary disclosure of financial information on the Internet. The results are consistent with the notion that Brazilian firms that have incentives to improve financial transparency disclose more information on the Web. Moreover, in comparison to similar Internet disclosures of U.S.—domiciled companies (Ettredge et al., 2002), we find that corporate governance is an important incremental determinant of financial disclosures on the Internet for Brazilian enterprises.

The rest of the study is organized as follows. Section two summarizes prior related literature, while section three describes the sample and methodology. Section four presents the empirical results, and section five provides the limitations of this study and the final section contains concluding comments.

2. Background

La Porta et al. (1998) argue that the development of managerial policies related to corporate governance is just beginning to emerge in Latin America. Many different market constituencies demand financial disclosure, especially in countries with emerging economies (Gibson, 2002). Additionally, in reference to the evolution of information technology, concerns about the adoption of new forms of disclosure have begun to surface in literature. For example,

Nowadays, the most extended communication channel for financial information disclosure in local entities consists in a printed copy of the budget and the annual financial reports deposited in the entity. Even though this copy is kept for public consultation, applicants are frequently not authorized. While most local managers admit that any person that is interested may examine financial statements, various circumstances such as the lack of habit or work overload are behind their unwillingness to grant access. This difficulty to access public information considerably limits research possibilities in this field, especially when trying to gather panel data on a large number of entities. The high costs of data gathering are other important limitations of the current situation in most entities, even when access is granted. Today, the search for enhanced accessibility makes unavoidable the use of the new information technologies, namely the Internet. The use of the new information technologies has an enormous impact on the standards of availability and diffusion of information, introducing determinant advantages as readiness, low effort, and low cost in communication (Isenmann and Lenz, 2001, p. 169-178).

Although several prior studies have already examined determinants of voluntary disclosure of financial information through the Internet, this theme has been explored very little in individual nations. Moreover, prior researchers have emphasized the importance of the Internet as a disclosure medium:

The demand- and supply-side implications of the Internet for corporate disclosure are profound. If companies can use the Net to access information almost constantly and instantaneously- and investors and analysts have a thirst for such information- the obvious result will be much more continuous reporting of financial and business information. Much, if not all, of this information should be designed to help investors better estimate companies' future profitability and relative riskiness so that they can more accurately price companies' true market values (Litan and Wallison, 2000, p. 8).

Nevertheless, though Internet disclosure of financial and other information may help investors assess the profitability, risk, and firm value, prior research does not present definitive evidence on the extent to which disclosure incentives may differ in countries that are less developed technologically and whose capital markets may be less efficient.

Prior research indicates that the use of the Internet as a disclosure medium is subject to limitations. For example, an important problem with the Internet as a disclosure medium is that there is an almost complete lack of standardization and regulation in terms of what individuals or companies may post on websites (Prentice, Richardson and Scholz, 1999). In several more "mature" markets, some attempts have been made to establish guidance for financial information disclosure on the World-Wide Web. This guidance essentially considers (a) the question of authenticity and credibility of the financial information and even the reports released by the auditors (Debreceny and Gray, 1996); (b) the security and coherence between statutory financial reports and other financial information published online (Koreto, 1997); and (c) the auditors' involvement with online reports (Sheehy and Trites, 1997). Moreover, since companies have different practices and policies concerning the use of the Web

to release financial reports, the lack of standardization in the amount and form of financial information released in a digital format raises questions about the extent to which investors actually rely on this information (Westarp and Böss, 1998).

Interest in the disclosure of financial reports on the Internet is growing throughout the world. For example, the United States Securities Exchange Commission introduced EDGAR (*Electronic Data Gathering, Analysis, and Retrieval*) in 1996 to standardize Internet disclosure. At approximately the same time, Canada created SEDAR (*System for Electronic Document Analysis and Retrieval*) with the same objective. This theme has also inspired considerable interest in academic circles. Gray and Debreceny (1997) examine North American companies and conclude that more than 60% use the Web as a means of disseminating financial information. In Finland, Lymer and Tallberg (1997) find similar results, while Gowthrope and Amat (1999) find that only 19% of companies in Spain use the Web. Some studies focus solely on the disclosure of actual financial reports on the Internet. Hedlin (1999) investigates Internet disclosure in Sweden and finds that even though 83% of companies release some information on their websites, only a small minority do so in a structured form, offering graphs or other information considered important in real time.

Other themes such as content, technology, and investor support have also been the subject of study in prior research. Pirchegger and Wagenholfer (1999) compare Austrian and German companies and find that Austrian companies provided more information through electronic channels than German companies. In their examination of the determinants of financial information disclosure on the Web, Marston and Leow (1998) examine a sample of companies in the United Kingdom and find that firm size is positively related to the disclosure of financial information on corporate websites. However, this relation is not uniform across industrial sectors.

Many countries have been influenced by the adoption of legal restrictions or guidelines for corporate websites. Although less common, it is also possible to find entities that include financial reports, a full or abbreviated version of the annual report, and other documents on their websites. Useful information is also released to express the financial condition and performance of a company (long-term strategies, performance indicators, financial indices, economic and demographic statistics, etc.). While some countries have guidelines for financial information disclosure on the Internet, in other countries there is little or no guidance (Hassan, Jaffar, and Zain, 1999). Specifically, Brazil has no guidelines or rules with respect to Internet disclosure.

Some recent studies (e.g., Isenmann and Lenz, 2000; Kolk, 1999; Jones, Alabaster, and Hetherington, 1999; and Sustainability/UNEP, 1999) suggest that in Latin America financial reports are predominately published in printed media. However, there is an increasing trend toward the use of the Internet. Some of these studies are worth noting. For example, Mendes-da-Silva and Alves (2004) examine the relation between voluntary disclosure on the Internet and firm value in Brazil, Argentina, and Mexico. The results indicate a positive and significant correlation between information distribution and Tobin's q. The appendix summarizes these studies.

Currently, in Latin American countries, many companies are not adequately and effectively valued due to the perception of high levels of risk. It is clear that one of the main reasons Latin American companies are perceived to be so risky is the lack of transparency and the lack of guarantees to the equity investors, as well as the inefficiency of Latin American capital markets (which includes informational asymmetry). Moreover, many potential investors are concerned by the perception that Latin American companies have poor corporate governance. For example, a study by McKinsey & Company (2000), finds that 83% of international investors with investments in Latin America would be willing to pay a premium for companies with better corporate governance. In Brazil, their results suggest that investors would be willing to pay a premium of 22.9% for strong corporate governance. Another study conducted by Merrill Lynch compares legislation in different countries concerning the rights of minority shareholders. The study ranks the rights of Brazil's minority shareholders based on current overall legislation among the lowest (next to Germany), with only five points on a scale from zero to 17.[18]

3. Hypothesis Development

To develop the underpinnings of our predictions related to voluntary financial disclosures on the Internet in Brazil, we summarize extant research on voluntary disclosure in general and on the Internet to identify firm characteristics most likely to affect the decision to disclose information. As a result, we develop four hypotheses based on prior research, which we test using a sample of Brazilian companies in order to contrast disclosure practices on the Internet in Brazil versus those in other countries.

Leftwich, Watts, and Zimmerman (1981) find a relation between external capital suppliers and firm managers as an example of the agency relationship, where the capital suppliers represent the principals and the firm managers represent the agents. Agency theory, which derives its roots from the conflict of interests between stockholders and managers, was developed by early scholars such as

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[18] On the other hand, the study ranked the rights of minority shareholders of firms in the São Paulo Stock Exchange's "New Market" group with 15 points, which even exceeds the USA's 12 points.

Berle and Means (1932). However, agency theory in recent years frequently traces its roots to Jensen and Meckling (1976). This theory suggests that agency costs of borrowed capital depend on the nature of the objectives of the external suppliers of capital. This indicates that costs would be proportionately higher for firms with greater participation from third-party capital providers in their capital structure. Additionally, Jensen and Meckling (1976) conclude that voluntary disclosure can reduce agency costs by facilitating the capital suppliers' evaluation of a firm's ability to assume debt.

Although there is a considerable body of research regarding the relation between voluntary disclosure of financial information and financial leverage, a general consensus has not been reached on the subject. Specifically, while some studies suggest a positive relation between voluntary disclosure and leverage (Mitchell, Chia and Loh, 1995; Hossain, Berera, and Rahman, 1995), others do not support this conclusion. For example, several researchers do not find a significantly positive relation between leverage and the level of disclosure of financial information (Mckinnon and Dalimunthe, 1993; Aitken, Hooper and Pickering, 1997); and Brennan and Hourigan, 2000). Some even suggest there might be a significantly negative relation between leverage and disclosure (Meek, Roberts, and Gray, 1995). Since the results of these studies are inconclusive, we examine the relation between leverage and voluntary disclosure of financial information on the Internet. Thus, our first hypothesis is:

H₁:*Financial leverage is positively associated with the level of voluntary disclosure of financial information on the Internet.*

There is mixed evidence about the relation between disclosure of financial information and performance. Better-performing companies have the incentive to signal their performance and therefore, would have an additional incentive to voluntarily disclose information (Lev and Penman, 1990; Lang and Lundholm, 1993; Clarkson, Kao, and Richardson, 1994). On the other hand, managers of poorly performing firms may have incentives to disclose unfavorable information (e.g. earnings forecasts) in order to avert legal liability (Skinner, 1994; Baginski et al., 1994). Ettredge et al. (2002) and Ashbaugh et al. (1999) find that in their respective sample of U.S. firms, there is no relation between firm performance and voluntary disclosure on a firm's website. However, there is no reason to assume that this result will necessarily apply to firms in an emerging market. Therefore, to investigate this relation among Brazilian firms, our second hypothesis follows:

H₂: *The amount of information disclosed on a firm's website is not related to its performance.*

Cox (1985), Waymire (1985), Clarkson, Kao and Richardson (1994), and others have found a positive relation between firm size and the level of voluntary

disclosure. In addition to having greater incentives for Web-based dissemination, larger firms likely have smaller relative costs if some of the costs are fixed (Ettredge et al. 2002). Finally, Ashbaugh et al. (1999) hypothesize that economies of scale suggest large firms are more likely to post financial reports on corporate websites. Ettredge et al. (2002) find that larger firms are more likely to disseminate additional information at a corporate website than smaller firms in a study of U.S.-based firms. Therefore, we hypothesize the following:

H₃: *The amount of information disseminated on a firm's website is positively related to the firm's size.*

As corporate governance improves, firms are more likely to show higher levels of transparency (or reduced information asymmetry) by providing more critical information to the market (Richardson, 2000). Eng and Mak (2003) find a significant relation between the quality of corporate governance and the level of voluntary disclosure. Using a cross-section of Hong Kong firms, Gul and Leung (2003) also find a significant relation between the quality of corporate governance and the level of voluntary disclosure. Therefore, we hypothesize the following:

H₄: *The amount of information disseminated on a firm's website is positively related to the quality of the firm's corporate governance policies.*

We now turn our attention to explaining the methodology, sample selection, and testing of these hypotheses.

Methodology

Sample, Data, and Variables

Several factors affected the size and composition of our final sample. We began by examining all non-financial companies listed on the São Paulo Stock Exchange (Bovespa) in June, 2002.[19] We then obtained the dependent variables by visiting and exploring each corporate website following the Ettredge, Richardson, and Scholz (2002) methodology. Two different researchers visited each website to code the dependent variables. We then compared and reconciled the two independent observations for each company. Based on this process, 418 companies comprised the initial sample, of which 127 did not have a website or were not found in the *Economática®* database. Thus, the final sample includes 291 firms, distributed across 18 business sectors, as shown in Table 1.
[Insert Table 1 about here]

We examine a variety of website characteristics, identified by Ettredge, Richardson, and Scholz (2002)

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[19] We excluded the 21 financial listed companies following Ettredge et al. (2002).

in interviews with directors of investor relations. We use these Web characteristics to measure the level of disclosure of financial information. These characteristics comprise the dependent variables of the study. We define the variables and explain the scoring criteria in Table 2.

[Insert Table 2 about here]

We follow Ettredge, Richardson, and Scholz (2002) in dividing the Web characteristics into two categories: (1) required disclosures (REQ) comprised of the records most frequently requested by analysts or investors and (2) voluntary disclosures (VOL). As explained above, we coded these variables by visiting each corporate website, between August and October of 2002. We create two variables to summarize the scores for each one of the two information categories (REQ and VOL) by summing the points from each of the individual variables, following Ettredge et al. (2002). For example, the REQ variable for firm *i* is calculated as the sum of the scores identified for the required disclosures that firm *i* voluntarily provides on its website. The required disclosures are: (1) the annual report, (2) the quarterly report, (3) other regulatory filings, and (4) a link to the CVM (the *Commissão de Valores Mobiliários,* which is the Brazilian equivalent of the U.S. Securities and Exchange Commission), because their website offers information that may not be included in the annual reports. Similarly, we calculate the variable VOL is calculated as a measure of the level of voluntary disclosure (i.e., those items not mandated to be filed with a regulatory body). VOL is computed as the sum of the scores for the characteristics considered in this category as listed in table 2. Finally, the INDEX variable for firm *i* is calculated as the sum of REQ and VOL. Table 3 provides a frequency distribution of the information found on corporate websites and Table 4 presents descriptive statistics for the three dependent variables.

[Insert Tables 3 and 4 about here]

Following Ettredge et al. (2002), we examine the relation between several firm characteristics and the company's level of Web disclosure. The firm characteristics we examine following prior literature are (1) financial leverage, LEV, (2) return on assets in the previous year, ROA, and (3) firm size, lnSIZE.[20] We also include a variable to proxy for the quality of the firm's corporate governance practices. In order to increase the quality of firms listed on the Bovespa in several specific areas (corporate governance, disclosure, liquidity, etc.), the exchange began classifying firms based on their willingness to voluntarily adopt more stringent requirements in all of these areas. Firms classified in the "new market" category adopt the highest level of compliance. They adopt US GAAP or IAS, strict corporate governance requirements, liquidity requirements, and other standards similar to those required on the NYSE.

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[20] The natural log of the book value of total assets at the beginning of the year.

Firms classified in the Level 1 and Level 2 categories adopt most of the "new market" requirements, but different subsets. Therefore, we include an additional variable, CORPGOV, coded one for firms in the new market, level 1, and level 2 classifications and zero otherwise. This variable distinguishes between firms with high corporate governance standards from those with lower corporate governance standards. Table 5 defines how each independent variable in our empirical models is constructed.

[Insert Table 5 about here]

Empirical models

We test our hypotheses by examining two empirical models. The first model, equation (1), examines how firm characteristics affect the *level* of financial disclosure on the Internet, INDEX. Specifically, this model examines the relations between each of the firm characteristics LEV, lnSIZE, ROA, and CORPGOV affects the firm's level of voluntary disclosure of financial information via its corporate website. Accordingly, the significance of the estimated coefficients on these four explanatory variables test hypotheses, H_1, H_2, H_3, and H_4, respectively.

$$INDEX_i = \delta_0 + \delta_1 LEV_i + \delta_2 \ln SIZE_i + \delta_3 ROA_i + \delta_4 CORPGOV_i + \xi_i \quad (1)$$

The second model, equation 2, examines the extent to which these same firm characteristics affect the probability that a firm will voluntary choose to disclose each of the specific types of financial information defined in Table 2 on its corporate website. Specifically, we examine the effects of LEV, ROA, lnSIZE, and CORPGOV on the probability that the firm will disclose each type of individual financial disclosures on its corporate website, Π_i. Thus, model 2 employs a logistic regression model as follows:

$$\ln\left(\frac{\Pi_i}{1-\Pi_i}\right) = \eta_0 + \eta_1 LEV_i + \eta_2 \ln Size_i + \eta_3 \ln ROA_i + \eta_4 CORPGOV_i + \upsilon_i$$
$$(2)$$

where,

$$\Pi = \left(\frac{1}{1 + e^{-(\eta_0 + \eta_1 LEV_i + \eta_2 \ln Size_i + \eta_3 \ln ROA_i + \eta_4 CORPGOV_i)}}\right)$$

4. Empirical Results

Table 6 presents pairwise correlations among all variables in our models. These pairwise correlations suggest that all three voluntary disclosure variables (REQ, VOL, and INDEX) are positively related to all of the firm characteristics we examine except leverage, LEV. This suggests that larger, more profitable firms with stronger corporate governance mechanisms in place voluntarily disclose more financial information on the Internet. The results also indicate the firm size is significantly positively associated with all other dependent variables except

for leverage. This suggests that larger firms are more profitable and have better corporate governance practices.[21]

[Insert Table 6 about here]

We next investigate our hypotheses in a multiple regression framework in which we regress our (dependent) voluntary disclosure variables on the four key firm characteristics and control variables and present these results in Table 7. The first regression examines the effects of these firm characteristics on the extent to which firms disclose their regulatory financial reports (annual reports, quarterly reports, etc.) on their corporate websites. Because of the significant correlations between the independent variables detailed in table 6, we compute the variance inflation factors (shown in table 7) and find that multicollinearity is not a significant issue with this dataset. Consistent with hypotheses 3 and 4, larger firms and firms with stronger corporate governance practices disclose more of their regulatory reports online. However, we find no evidence that either leverage or profitability affect the level of disclosure of regulatory financial reports. These results are similar to those of Ettredge et al. (2002) and Ashbaugh et al. (1999) for U.S.-based companies.[22]

[Insert Table 7 about here]

The second regression explores the extent to which these firm characteristics affect the level of disclosure of voluntary, non-regulatory financial information on corporate websites. Again, consistent with hypotheses 3 and 4, we find that larger and better governed firms are more likely to voluntarily disclose other non-regulatory financial information on their websites. However, we again find no evidence that either leverage or profitability affect firm's disclosure of these types of non-regulatory financial information. Finally, the third regression examines the effects of the four firm characteristics on firms' overall level of financial disclosure on corporate websites. Consistent with the first two regressions, the results suggest a positive relation between both firm size and the level of the firm's corporate governance standards and the level of financial disclosure on the Internet. However, we again find no evidence that either leverage or profitability affect Internet disclosure. Figure 1

provides a graphical view of the relations among firm size, corporate governance, and Internet disclosure.

[Insert Figure 1 about here]

The results presented in Table 7 and Figure 1 investigate the effects of firm characteristics on the *level* of voluntary disclosure. However, we are also interested in each firms' decision to voluntarily disclose (or not disclose) each particular type of financial information on the Internet. We employ a separate logistical regression to estimate the probability that each of the 17 different voluntary disclosure items (listed in Table 2) will be disclosed on the Internet by our sample companies. As an example, in our sample of Brazilian firms, we find 144 instances in which the firm decides to voluntarily disclose their annual report on the Internet and 147 instances in which firms decide not to disclose their annual report online. Prior research suggests two appropriate statistical tests for evaluating the accuracy of logistic regressions. First, Hair et al. (1998, p. 314-325) evaluate the significance of their final model using a Chi-square test of the change in the log value of the probability of the basic model, which is comparable to the F-test in a multiple-regression framework. In addition, the *Hosmer and Lemeshow* test compares observed and predicted classifications. According to Bertucci, Guimarães, and Bressan (2003), one of the advantages of logistic regression analysis is that it is only requires information about whether an event has occurred rather than the actual level of a particular variable. Thus, it allows the use of a dichotomized dependent variable. Based on this dichotomized value, the estimated logistic model predicts the probability of an event occurring or not. If the predicted probability is greater than 0.50, the observation is classified as a company predicted to voluntarily disclose. If the probability is less than 0.50, the observation is classified as a company predicted not to disclose. The Chi-square test of the model verifies whether the coefficients for all of the explanatory variables, except the constant term, are zero. Table 8 provides the results for the logistic regressions and 8 reports highly significant Chi-square statistics for all but one voluntary disclosure variable. We note that in all but one case, firm size is a significant predictor (at less than a 0.10 level of significance) of whether the firm chooses to voluntary disclose these items. In addition, corporate governance is a significant predictor of eight of the voluntary disclosure variables (at less than a 0.10 level of significance). This suggests that firm size and corporate governance not only help explain the extent of overall Internet financial disclosure but can also explain whether or not managers choose to disclose a particular item on their corporate websites.

[Insert Table 8 about here]

5. Conclusions

Similar to other countries with emerging markets in South America and elsewhere, Brazil has no rules,

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[21] Untabulated results based on additional control variables indicate that larger firms have more liquid securities and have greater market values relative to the replacement value of their assets. They also suggest that more highly levered firms have lower market values relative to replacement values and that more profitable firms have more liquid equity securities. Finally, these untabulated results suggest that firms with higher market values relative to the replacement value of assets have greater market liquidity.

[22] When we include additional control variables such as Tobin's Q and a measure of market liquidity, the results are very similar. Therefore, in order to present a parsimonious model comparable to Ettredge et al. (2002), with the addition of our corporate governance variable, we do not report these robustness tests with additional control variables in the tables.

regulations, or guidelines concerning the use of the Internet as a vehicle for disclosing financial information. Even though it is generally accepted that the Internet is a less-costly channel of communication to stakeholders than traditional methods, we find that relatively few companies utilize the Internet. In fact, only half of the companies in our sample utilize it at all. Although it is puzzling that firms that need to raise capital and maintain relationship with various stakeholders do not disclose any financial information via the Web, this study has set out to find the context where firms are willing to disclose financial information on the Internet.

We motivate our study using extant research based mainly in arguably more sophisticated financial markets (such as the U.S.). Our cross-sectional analyses based on 291 non-financial companies listed on the São Paulo Stock Exchange in 2002 indicate that both firm size and the quality of corporate governance are positively related to the level of voluntary disclosure of financial information on the Internet. Our results extend prior research examining Internet disclosures of U.S.-domiciled companies by finding that corporate governance is an important determinant of Internet financial disclosure for Brazilian enterprises. These results are consistent with the notion that larger and better governed firms are more likely to provide adequate levels of financial disclosure on the Internet for their constituents. They also suggest that, even in the absence of rules or guidelines regarding the use of the Internet for financial disclosure, Brazilian firms still have incentives to improve financial transparency by disclosing more information on the Web.

The Internet provides a quick and relatively inexpensive medium for companies to develop investor relations. However, even given recent technological developments, Internet disclosure still does not seem attractive in the eyes of managers of many major Brazilian companies based on our results. Thus, our results suggest that this is a promising area for future research. Future studies could investigate new theoretical or empirical models to consider other factors that influence companies in emerging markets to increase Internet disclosure. As corporate organizations become more complex and companies continue to operate in increasingly competitive and demanding markets with investors eager for information, increased use of the Internet as a disclosure medium will likely occur.

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Appendix

Factors Associated with the Dissemination of Financial Information on the Internet Identified in Prior Research

Authors	Country(ies), Data Source (Sample Size)	Topic	Financial Disclosure Metric	Main Results
Gray & Debreceny (1997)	USA, Fortune Industrial (50)	Disclosure of Financial Information on the Internet	-	68% of American industries provide annual reports on the Internet
Lymer & Tallberg (1997)	Finland, Helsinki S.E. (72)	Disclosure of Financial Information on the Internet	-	66% of firms provide financial information on their websites
Marston & Leow (1998)	United Kingdom, FTSE (100)	Internet Disclosure of Financial Reports	Firm Size and Industry Classification	Reports on the Web are positively related to firm size, but the results differ across industries
Deller, Stubenrath & Weber (1999)	USA, S&P (100); Germany, DAX (100); United Kingdom, FTSE (100)	Investor Relations on the Internet	-	Investor relations in the USA are better than in other countries.
Gowthrope & Amat (1999)	Spain, Madrid S.E.(379)	Internet Disclosure of Financial Reports	-	19% of firms disclose financial information on the Internet
Heldin (1999)	Switzerland, Stockholm S.E.(60)	Investor Relations on the Internet	Hyperlinks, Graphics, Number of Downloads, and Online Information	83% of firms disclose financial reports on their corporate Websites, but only some of them offer structured information and downloadable information online
Ashbaugh, Johnstone & Warfield (1999)	USA, AIMR*(290)	The Relevance of Financial Information on the Internet	Stock Returns, Proportion of Equity Owned by Individual Investors	87% of firms provide financial reports on their corporate websites. Firm size is significantly related to firms' propensity to disseminate financial reports on the Internet. There are differences in the quality of financial reports available on the Internet.
Pirchegger & Wagenhofer (1999)	Áustria, Vienna S.E.(32); Germany, DAX(30)	Internet Disclosure of Financial Reports	Content, Technology, and User Support	Large Austrian firms disclose more information than German firms.
Lymer et al. (1999)	22 countries (660)	Changes Affecting the Availability of Financial Reports	HTML and Number of Downloads	62% of firms provide some form of financial information on the Internet, 35% provide financial reports in HTML format.
Ettredge, Richardson & Scholz (2002)	USA, AIMR*(220)	Investor Relations on the Internet	Firms Size, Firm Performance, Returns and Annual Earnings	Mandatory dissemination formats are significantly related to firm size while voluntarily disclosed items are also associated with firm size, information asymmetry, and firm reputation.
Mendes-da-Silva & Alves (2004)	Brazil, Económática (91); Mexico, Económática (40); Argentina, Económática (19)	Voluntary Disclosure of Annual Reports on Corporate Websites and Firm Valuation	Firm Size, Industry Classification, and Information Accessibility on Website	Firm value is positively associated with the propensity to provide financial reports on corporate websites.

Note: S.E. = Stock Exchange;

The Association for Investment and Research provides analysts' ratings of overall disclosure quality.

Figure 1. Relations between Firm Size, Corporate Governance, and Disclosure Index
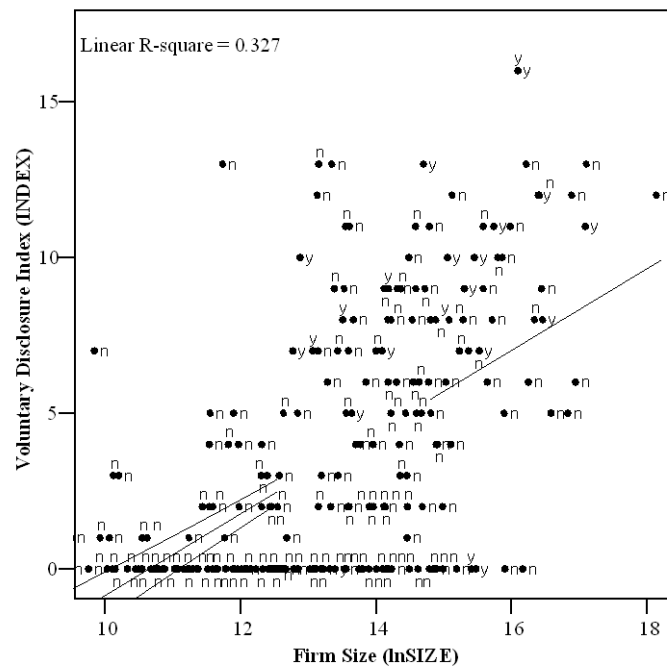
This figure illustrates the relation between the Voluntary Disclosure Index, Firm Size, and Corporate Governance

"y" = Indicator variable coded one if the firm is classified as "new market", "level 1", or "level 2" on the Bovespa Corporate Governance listing and "n" = Otherwise.

Table 1. Industry Composition of Sample Firms

Industry	Frequency	Percentage
Telecommunications	35	12.0
Other	33	11.3
Steel	30	10.3
Electric utilities	28	9.6
Chemicals	24	8.2
Textiles	20	6.9
Foods	18	6.2
Vehicles and parts	18	6.2
Electronics	17	5.8
Construction	12	4.1
Machinery	11	3.8
Paper products	10	3.4
Retail	9	3.1
Petroleum	9	3.1
Minerals and metals	8	2.7
Transportation	5	1.7
Mining	3	1.0
Agriculture	1	0.3
Total	291	100.0

Industry classifications are based on the Economática® database.

Table 2. Definitions of Dependent Variables

Category	Operational Description
Mandatory Reports	
Annual Report	= one if the site provides a complete annual report or excerpts thereof. Equals zero if no annual report information is available.
Quarterly Report	= one if the site provides quarterly reports including financial statements, and zero otherwise
Other Filings	= one if CVM documents other than the annual or quarterly report are available at the site, and zero otherwise.
Link to CVM	= one if the site provides a link to the CVM website and zero if there is no link.
REQ	= the sum of the scores of the four characteristics above.
Voluntary Disclosure	
Recent	= one if recent monthly financial data are available at the site, and zero otherwise.
Overview	= one if the site provides a high level overview of the firm's performance (highlights, fact-sheet, 'frequently asked questions'), and zero otherwise.
Language	= one if the firm provides financial information in a language other than Portuguese, and zero otherwise.
Calendar	= one if the site provides a calendar of events of interest to investors (such as earnings release dates), and zero otherwise.
News	= one if the site provides the text of recent financial news releases, and zero otherwise..
Analysts	= one if the site lists analysts and zero otherwise.
Speeches	= one if the site presents the text of speeches and presentations (such as those made at 'road shows'), and zero otherwise.
Current	= one if the site provides same-day stock prices, and zero otherwise.
Historical	= one if the site provides historical stock prices, and zero otherwise.
Link	= one if the site provides a link to stock data at a different site, and zero otherwise.
Agent	= one if the site provides information about the company's stock transfer agent (address or direct link), and zero otherwise.
Advantage	= one if the site discusses the advantages of holding the company's stock, and zero otherwise.
Reinvest	= one if the site provides information providing a dividend reinvestment plan, and zero otherwise..
VOL	= the sum of the scores of the 13 characteristics above.
INDEX	= *REQ + VOL*

Source: Adapted from Ettredge, Richardson, and Scholz (2002).

Table 3. Frequency Distribution of Disclosure Items on Corporate Websites

Data Characteristics	Frequency	% of firms disclosing	Item Category
Annual report	144	49.5	REQ
Quarterly report	115	39.5	REQ
Other	108	37.1	REQ
Overview	106	36.4	VOL
News	94	32.3	VOL
Language	86	29.6	VOL
Speeches	64	22.0	VOL
Recent	62	21.3	VOL
Current	59	20.3	VOL
Link	56	19.2	VOL
Historical	50	17.2	VOL
Calendar	33	11.3	VOL
Analyst	33	11.3	VOL
Agent	27	9.3	VOL
Link to CVM	24	8.2	REQ
Advantage	16	5.5	VOL
Reinvestment	4	1.4	VOL

See variable definitions in Table 2.

Table 4. Descriptive Statistics of Dependent Variables

Dependent Variable	Mean	Standard Deviation	Minimum	Maximum	Quartile		
					25%	Median	75%
REQ	1.340	1.457	0.000	4.000	0.000	1.000	3.000
VOL	2.370	3.248	0.000	12.000	0.000	1.000	4.000
INDEX	3.710	4.487	0.000	16.000	0.000	2.000	7.000

See variable definitions in Table 2.

Table 5. Definition of Explanatory Variables

Hypothesis	Variable	Description	Sources*
H_1	*LEV*	Financial leverage of firm i in year t calculated as follows: $$LEV_i = \frac{TA_t}{BVEQUITY_t}$$ where: TA = total assets; BVEQUITY = book value of equity.	Mckinnon and Dalimunthe (1993); Mitchell, Chia and Loh. (1995); Meek, Roberts and Gray (1995); Hossain, Berera and Rahman (1995); Aitken, Hooper and Pickering (1997); Brennan and Hourigan (2000);
H_2	*ROA*	Return on assets for year $t-1$. Calculated as follows: $$ROA = \frac{EBIT}{TA}$$ where: EBIT = Earnings before interest and taxes TA = total assets	Lev and Penman (1990); Lang and Lundholm (1993); Clarkson, Kao and Richardson (1994); Ettredge, Richardson and Scholz (2002).
H_3	*lnSIZE*	Natural log of total assets of the firm at the end of year $t-1$, expressed in thousands of Reais.	Cox (1985); Waymire (1985); Lang and Lundholm (1993); Ashbaugh, Johnstone and Warfield (1999); Ettredge, Richardson and Scholz (2002).
H_4	*CORPGOV*	Indicator variable coded one if the firm is classified as "new market", "level 1", or "level 2" on the Bovespa Corporate Governance listing, and zero otherwise.	Eng and Mak (2003); Gul and Leung (2003)

Note: This table defines all explanatory variables used to test the four hypotheses..
*Definitions of explanatory variables come from the Economática® database.

Table 6. Correlations Among Dependent and Dependent Variables

	REQ	*VOL*	*INDEX*	*LEV*	*LnSIZE*	*ROA*
VOL	0.788**					
INDEX	0.895**	0.980**				
LEV	0.002	-0.005	-0.003			
ln*SIZE*	0.533**	0.548**	0.572**	-0.073		
ROA	0.187**	0.151*	0.172**	-0.010	0.246**	
CORPGOV	0.231**	0.249**	0.255**	-0.002	0.245**	0.042

** Significance < 0.01 * Significance < 0.05
Minimum N = 208, Maximum N = 291
See variable definitions in Tables 2 and 5.

Table 7. Multiple Regression Analyses

Dependent Variables	Hypothesis	Independent Variables	Standardized Coefficients	t-Statistics (Adjusted-R^2)	Collinearity Statistics	
			(Beta)		Tolerance	VIF

		Constant		-6.595**		
REQ	H₁	*LEV*	0.038	0.699	0.994	1.006
	H₃	*lnSIZE*	0.490	8.449**	0.880	1.136
	H₂	*ROA*	0.062	1.106	0.939	1.065
	H₄	*CORPGOV*	0.120	2.141*	0.940	1.064
		Adjusted-R²		(0.289)		
		Constant		-7.299**		
VOL	H₁	*LEV*	0.032	0.598	0.994	1.006
	H₃	*lnSIZE*	0.490	8.748**	.880	1.136
	H₂	*ROA*	0.022	0.406	.939	1.065
	H₄	*CORPGOV*	0.221	4.075**	.940	1.064
		Adjusted-R²		(0.336)		
		Constant		-7.615**		
INDEX	H₁	*LEV*	0.036	0.683	0.994	1.006
	H₃	*lnSIZE*	0.516	9.328**	0.880	1.136
	H₂	*ROA*	0.037	0.696	0.939	1.065
	H₄	*CORPGOV*	0.197	3.682**	0.940	1.064
		Adjusted-R²		(0.354)		

** Significance < 0.01 * Significance < 0.05
N = 164
See variable definitions in Tables 2 and 5.

Table 8. Logistic Regression Analyses

Categories	Independent variables	B	S.E.	Wald	Df	Sig.	Exp(B)	R²	χ² H&L	χ²	% Pred.
Annual report	*Constant*	-9.835	1.474	44.525	1	0.000	0.000	[0.362]	2.386	76.319	73.9
	LEV	0.000	0.001	0.060	1	0.807	1.000	(0.271)	> 0.05	< 0.01	
	lnSIZE	0.723	0.110	42.923	1	0.000	2.061				
	ROA	0.019	0.018	1.090	1	0.296	1.019				
	CORPGOV	0.629	0.569	1.222	1	0.269	1.875				
Quarterly report	*Constant*	-9.919	1.509	43.211	1	0.000	0.000	[0.337]	7.897	69.043	72.2
	LEV	-0.001	0.001	0.182	1	0.670	0.999	(0.249)	> 0.05	< 0.01	
	lnSIZE	0.684	0.110	38.859	1	0.000	1.983				
	ROA	0.019	0.019	0.946	1	0.331	1.019				
	CORPGOV	0.741	0.517	2.053	1	0.152	2.097				
Other filings	*Constant*	-9.497	1.493	40.444	1	0.000	0.000	[0.320]	4.944	64.475	74.7
	LEV	0.002	0.001	4.201	1	0.040	1.002	(0.235)	> 0.05	< 0.01	
	lnSIZE	0.632	0.107	34.719	1	0.000	1.881				
	ROA	0.037	0.020	3.463	1	0.063	1.037				
	CORPGOV	0.694	0.502	1.910	1	0.167	2.002				
Link to CVM	*Constant*	-7.204	1.961	13.497	1	0.000	0.001	[0.129]	7.146	15.338	89.6
	LEV	0.000	0.002	0.008	1	0.929	1.000	(0.062)	> 0.05	< 0.01	
	lnSIZE	0.333	0.138	5.824	1	0.016	1.395				
	ROA	0.021	0.030	0.489	1	0.485	1.021				
	CORPGOV	1.194	0.538	4.928	1	0.026	3.300				
Recent	*Constant*	-5.507	1.456	14.299	1	0.000	0.004	[0.116]	7.029	17.926	82.2
	LEV	0.000	0.001	0.088	1	0.767	1.000	(0.072)	> 0.05	< 0.01	
	lnSIZE	0.265	0.105	6.428	1	0.011	1.304				
	ROA	0.031	0.022	2.004	1	0.157	1.031				
	CORPGOV	0.986	0.474	4.330	1	0.037	2.679				
Overview	*Constant*	-11.004	1.619	46.197	1	0.000	0.000	[0.372]	9.738	76.522	75.5
	LEV	0.001	0.001	0.493	1	0.483	1.001	(0.272)	> 0.05	< 0.01	
	lnSIZE	0.748	0.117	41.109	1	0.000	2.112				
	ROA	0.020	0.020	0.944	1	0.331	1.020				
	CORPGOV	0.919	0.524	3.079	1	0.079	2.507				
Language	*Constant*	-10.710	1.656	41.835	1	0.000	0.000	[0.319]	14.674	61.124	78.0
	LEV	-0.001	0.001	0.574	1	0.449	0.999	(0.224)	> 0.05	< 0.01	
	lnSIZE	0.707	0.118	35.768	1	0.000	2.027				
	ROA	0.001	0.021	0.001	1	0.972	1.001				
	CORPGOV	0.713	0.490	2.111	1	0.146	2.039				
Calendar	*Constant*	-11.976	2.200	29.628	1	0.000	0.000	[0.315]	9.032	45.888	87.1
	LEV	0.000	0.004	0.005	1	0.944	1.000	(0.173)	> 0.05	< 0.01	
	lnSIZE	0.686	0.148	21.360	1	0.000	1.985				
	ROA	0.020	0.030	0.447	1	0.504	1.020				
	CORPGOV	1.507	0.511	8.712	1	0.003	4.513				

Categories	Independent variables	B	S.E.	Wald	df	Sig.	Exp(B)	R²	χ²H&L	χ²	% Pred.
News	*Constant*	-6.346	1.284	24.428	1	0.000	0.002	[0.172]	16.938	31.477	73.0
	LEV	0.001	0.001	0.304	1	0.581	1.001	(0.122)	> 0.01	< 0.01	
	LNSIZE	0.390	0.093	17.489	1	0.000	1.478				
	ROA	0.020	0.018	1.126	1	0.289	1.020				
	CORPGOV	0.791	0.464	2.902	1	0.088	2.205				
Analysts	*Constant*	-12.621	2.758	20.935	1	0.000	0.000	[0.236]	11.203	24.621	92.5
	LEV	0.000	0.005	0.005	1	0.943	1.000	(0.097)	> 0.05	< 0.01	
	LNSIZE	0.660	0.181	13.374	1	0.000	1.935				
	ROA	0.056	0.037	2.298	1	0.130	1.057				
	CORPGOV	0.847	0.621	1.864	1	0.172	2.334				

<div align="center">Table 8 Continued</div>

Categories	Independent variables	B	S.E.	Wald	df	Sig.	Exp(B)	R²	χ²H&L	χ²	% Pred.
Speeches	*Constant*	-14.496	2.293	39.950	1	0.000	0.000	[0.450]	14.225	81.185	85.9
	LEV	0.000	0.004	0.003	1	0.955	1.000	(0.286)	> 0.05	< 0.01	
	LNSIZE	0.900	0.156	33.343	1	0.000	2.460				
	ROA	0.016	0.028	0.335	1	0.563	1.016				
	CORPGOV	2.023	0.544	13.831	1	0.000	7.560				
Current	*Constant*	-11.488	1.941	35.032	1	0.000	0.000	[0.299]	9.745	48.788	84.6
	LEV	0.001	0.003	0.054	1	0.816	1.001	(0.183)	> 0.05	< 0.01	
	LNSIZE	0.690	0.133	26.881	1	0.000	1.994				
	ROA	0.019	0.026	0.559	1	0.455	1.020				
	CORPGOV	0.957	0.498	3.696	1	0.055	2.603				
Historical	*Constant*	-11.623	2.062	31.777	1	0.000	0.000	[0.260]	5.139	38.182	88.0
	LEV	0.000	0.003	0.016	1	0.898	1.000	(0.147)	> 0.05	< 0.01	
	LNSIZE	0.687	0.141	23.762	1	0.000	1.988				
	ROA	0.009	0.028	0.096	1	0.757	1.009				
	CORPGOV	0.611	0.524	1.360	1	0.244	1.843				
Link	*Constant*	-8.400	1.705	24.275	1	0.000	0.000	[0.175]	7.745	26.426	84.6
	LEV	-0.001	0.002	0.663	1	0.416	0.999	(0.104)	> 0.05	< 0.01	
	LNSIZE	0.472	0.119	15.667	1	0.000	1.604				
	ROA	0.012	0.025	0.255	1	0.614	1.012				
	CORPGOV	0.784	0.492	2.535	1	0.111	2.190				
Agent	*Constant*	-8.820	2.250	15.371	1	0.000	0.000	[0.133]	9.669	13.983	92.1
	LEV	0.001	0.003	0.056	1	0.813	1.001	(0.056)	> 0.05	< 0.01	
	LNSIZE	0.431	0.155	7.730	1	0.005	1.539				
	ROA	0.021	0.033	0.380	1	0.538	1.021				
	CORPGOV	0.866	0.599	2.089	1	0.148	2.378				
Advantage	*Constant*	-9.440	2.952	10.226	1	0.001	0.000	[0.116]	10.333	8.318	95.9
	LEV	0.001	0.003	0.050	1	0.823	1.001	(0.034)	> 0.05	< 0.100	
	LNSIZE	0.450	0.206	4.778	1	0.029	1.568				
	ROA	-0.028	0.046	0.353	1	0.553	0.973				
	CORPGOV	0.994	0.755	1.735	1	0.188	2.702				
Reinvest	*Constant*	-13.204	5.334	6.127	1	0.013	0.000	[0.197]	4.786	7.500	98.3
	LEV	0.001	0.011	0.003	1	0.960	1.001	(0.031)	> 0.05	> 0.05	
	LNSIZE	0.583	0.351	2.763	1	0.096	1.791				
	ROA	0.028	0.079	0.131	1	0.717	1.029				
	CORPGOV	1.738	1.053	2.723	1	0.099	5.686				

Cox-Sneel R^2 in parenthesis and Nagelkerke R^2 in brackets

H&L = Hosmer e Lumershow

See variable definitions in Tables 2 and 5.