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Segment Reporting in Brazil: Factors Influencing the Disclosure

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Abstract

This study aims to identify the factors that influence the level of disclosure of information about operating segments of Brazilian companies. The study is initially developed from the analysis of companies' financial statements with reference to the requirements contained in Pronouncement CPC 22. Subsequently, the statistical model of multiple linear regression analysis is used. The disclosures related to 2010 and 2011 are addressed; 2010 was the first year that the disclosure was mandatory in Brazil. The study encompasses 272 companies distributed across 20 economic sectors. Hypotheses concerning 8 characteristics identified as potential factors affecting the level of disclosure, based on the theory and previous studies on the subject, are tested. No significant results were found for the characteristics "profitability", "industry concentration", "profit or loss" and "year of publication", indicating that these factors do not influence such disclosure. Overall, the results show that with respect to the level of disclosure about segments, (i) the larger the company, the higher the level of disclosure; (ii) the greater the degree of company indebtedness, the higher the level of disclosure; (iii) companies listed in the BM&FBOVESPA's Levels of Corporate Governance exhibit higher disclosure levels than the others; and (iv) companies audited by one of the "Big Four" display higher disclosure levels than those audited by "other companies". Thus, it is concluded that the characteristics of "size", "indebtedness", "corporate governance" and "audit" are factors that affect the dissemination of information about operating segments in Brazil.

Keywords: Operating segments; Disclosure; CPC 22; Segment reporting.

1. Introduction

Contributing to reduction of the information asymmetry between an entity's internal users (such as managers and executives) and its external users (such as shareholders, creditors and government) is one of the main objectives of accounting information. When individuals involved in business activities do not have the same level of information, accounting is an important tool to allow multiple users to assess the organisation's true situation (Lopes & Martins, 2005).

Given the demands of different users of accounting information, Wilson, Davies, Curtis and Wilkinson-Riddle (2001) have argued that to have a more accurate perception of the risks and opportunities that a company can provide, there is a clear need for disaggregation, greater detail and individualisation of financial information, thus enabling an understanding of the company's various components and operating segments.

Broadly, an operating segment can be understood as each unit that composes the company's operations. Examples of segments include, inter alia, sales territories, company divisions, individual customers and product lines. Hendriksen and Breda (1999) state that there is a need for disclosure of operations in accordance with the company's main segments to enable assessments that are more accurate than those based only on aggregate data (which, in general, allow less detail).

From the perspective of agency theory, the disclosure of information about operating segments constitutes an important tool to reduce information asymmetry, allowing external users access to the same data used internally in conducting activities and decision-making. Information according to business segment is useful in the decision-making process because it favours economic analysis of companies and creates more transparency in disclosures (Vasconselos & Szuster, 2003).

The phenomenon of disclosing information about operating segments can be analysed based on various theories, including the theory of disclosure. This theory seeks explanations for the phenomenon of disclosing financial information. To explain and predict reality, the theory of disclosure is based on empirical evidence and analysis models arising out of the economic theory, seeking, for example, economic reasons for disclosing certain information (Salotti & Yamamoto, 2005).

The preparation and disclosure of such information not only may generate additional costs but also may often make strategic data public (Verrecchia, 2001). However, disclosure can also benefit companies, for example, reducing the cost of capital and increasing share liquidity. In general, as explained by Dye (2001), the expectation is that the costs of disclosure are lower than its benefits.

In Brazil, the disclosure of segment information is a relatively new requirement: it has been compulsory since 2010 for public companies. Technical Pronouncement CPC 22, which regulates such matters, allows for discretion, which can prompt companies to adopt different strategies and exhibit different disclosure levels.

The recent literature shows evidence of factors that can influence the level of disclosure about segments such as size, having an auditor among the "*Big Four*", having a positive or negative net income, indebtedness level, corporate governance, industry concentration degree and/or company profitability (Troberg, Kinnunen & Seppänen, 2010; Hermann & Thomas, 1996; Harris, 1998; Kelly, 1994). However, there is little evidence of disclosure by operating segment and its determinants in the Brazilian market.

Based on the discussions presented above, the following research question arises: What factors influence the level of disclosure of information about the operating segments of Brazilian companies?

The justifications for this study are based on three key assumptions: the growing demand from society for greater transparency and accounting disclosure by companies; the potential importance of information by segment for users of financial statements and the lack of literature on the subject.

Accordingly, the objective of this study is to identify the factors that affect the level of disclosure of information about operating segments of Brazilian companies. The study examines 272 Brazilian companies that are listed on the Brazilian Securities, Commodities and Futures Exchange (Bolsa de Valores, Mercadorias & Futuros, or BM&FBOVESPA) and belong to 20 different economic sectors. The analysis encompasses 2010 and 2011; 2010 was the first year that it was mandatory for the companies to make disclosures about their segments.

This study is divided into six sections. After this introduction (first section), the theoretical framework that addresses the main factors related to segment reporting is presented. In the third section, the research hypotheses and their respective theoretical justifications are presented. In the fourth section, there is a description of the method used. The results and discussion are presented in the fifth section. Lastly, we present this study's final considerations.

2. Theoretical Framework

2.1. AGENCY THEORY AND THE IMPORTANCE OF INFORMATION ABOUT SEGMENTS

Lopes and Martins (2005) argue that due to the emergence of companies in which property is separated from management, there is a possibility of conflicts of interest between shareholders and managers. Based on the finding that there may be discrepancies among the various parties involved in a company's activities, agency theory provides new concepts that break the paradigm of a lack of conflicts of interest in management. The main focus of this theory, according to Jensen and Meckling (1976), is on the agent-principal relationship. The agent has privileged information and its actions affect the parties' wellbeing. The problem of asymmetric information between agent and principal arises in this context, which generally benefits the former while harming the latter.

The reduction of the information asymmetry between an entity's internal and external users is characterised as one of the main objectives of accounting information (Lopes & Martins, 2005). Because individuals involved in business activities do not have the same level of information, instruments are required to allow many users to assess the organisation's true situation.

The disclosure of information by operating segments can be viewed, from the perspective of agency theory, as a tool to reduce information asymmetry because it allows external users to have access to data used internally for making decisions and conducting activities.

According to Vasconcelos and Szuster (2003), the disclosure of information by segment enables the establishment of analyses related to profitability, risks and opportunities, and improves the informational quality of financial statements by enabling multiple users to analyse in greater depth elements related to companies' operations.

The types of segments most frequently reported in financial reports are identified by Pardal (2007): products and/or services, geographic areas, customers and entities. Internationally, the disclosure of information by segment has been the subject of debates since the beginning of the 1960s, and this trend has increased over the last decades of the twentieth century and the first decades of the twenty-first century.

Vasconcelos and Szuster (2003) state that with the diversification of a company's activities, global information that lacks details about those activities does not allow a precise analysis of the organisation. However, many companies view the disclosure of segment-based information as exposing a great deal of internal information to the environment external to the organisation. This type of disclosure may be harmful because it exposes the business to other companies in the market, thus providing competitive advantage to competitors. Organisations fear that exposure of the economic-financial positions of its various segments may result in disputes with their workers or unions, along with a loss of bargaining power against customers and suppliers (Pardal, 2007).

2.2. THE APPROACH PROPOSED BY THE PRONOUNCEMENT CPC 22

In 2009, in the context of the international harmonisation of accounting standards, the Pronouncement CPC 22 — "*Informações por Segmento*" — was issued by the Accounting Pronouncements Committee (Comitê de Pronunciamentos Contábeis, or CPC), addressing the disclosure of information about operating segments in Brazil and specifying how entities shall disclose that information in annual financial statements (CPC, 2009). The pronouncement was prepared based on International Financial Reporting Standard 08 (IFRS 08 — "Operating Segments").

Prior to CPC 22, there was no standardisation in Brazil for the disclosure of this type of information. Several national companies already issued reports by segment, as shown by Vasconselos and Szuster (2003). Some of these companies disclosed voluntarily, whereas others disclosed due to the requirements of foreign markets or even regulatory agencies. For example, the National Electric Energy Agency (Agência Nacional de Energia Elétrica, or ANEEL) already required the segmentation of accounting information by companies in the electricity sector, although that agency's requirements did not reflect international rules. Cruz, Machado, Pereira and Carvalho (2011) show that by 2009, voluntary disclosure of information by segment was becoming increasingly common.

That notwithstanding, in 2009, the Securities and Exchange Commission (Comissão de Valores Mobiliários, or CVM) and the Federal Accounting Council (Conselho Federal de Contabilidade, or CFC) approved CPC 22 and made its application mandatory for the accounting periods ended from December 2010. Now, every entity is required to disclose information by segment if its debt or equity securities are publicly traded or if it is in the registration process for issuing any class of instruments in capital markets (CPC, 2009).

The Pronouncement is thus applicable to all Brazilian public companies (CPC, 2009) and defines the requirements for disclosures about products and services, geographic areas and major customers. The CPC 22 is based on principles, not on rigid impositions, which allows a high degree of subjectivity in its application and the possibility of different disclosure choices.

As Boscov (2009) argues, segmentation should reflect the criteria used in each institution's management accounting and should comply with accounting policies and internal forms of disclosure. Therefore, disclosure by segment is made in accordance with management perspective, also known as the management approach. The objective of the management approach is for the report to adhere as closely as possible to the company's reality.

According to the Accounting Pronouncements Committee (CPC, 2009), the entity should separately disclose information, for each operating segment identified in its structure, about its lines of business, products and services. Geographical information must also be provided according to country or group of countries. It is also noteworthy that the company must provide information on its degree of dependency on major customers.

Thus, the strict guidance imposed by CPC 22 involves adoption of the management standard in the disclosure of information by segment. Information transmitted to the external users of financial statements should adopt the perspective of company managers. However, this standard involves a high level of subjectivity (Boscov, 2009) and opens the possibility for companies to exhibit diverse disclosure practices (Souza & Almeida, 2013) and to adopt different approaches to disclosure.

2.3. THEORY OF DISCLOSURE AND INFORMATION ABOUT SEGMENTS

The disclosure of information about company performance is important to most users of accounting information but increases company costs such as those related to processing and preparing information in addition to the costs related to reporting strategic information (Verrecchia, 2001). Choices related to the types of information that are disclosed and their levels of detail can generate substantial impacts on users' assessments and companies' outcomes.

The decision of whether to disclose as much information as possible is a major issue in the business world. Entities often reduce the amount of information available to protect themselves from their competitors, disregarding the potential importance of disclosure in reducing the cost of capital, consolidating market image and increasing share liquidity, among other factors (Solomon & Solomon, 2006).

Explaining the phenomenon of the disclosure of financial information is the primary focus of the theory of disclosure. The investigation is conducted from several perspectives, encompassing, for example, the study of the effect of disclosure of financial statements in stock prices and the explanation of the economic reasons that certain information is disclosed (Salotti & Yamamoto, 2005). Disclosure plays a significant role in accounting and disclosure models, establishing a link between the release of financial reports and their economic consequences (Verrecchia, 2001).

Considering that under certain circumstances, company management has the option of whether to disclose particular information and may make different choices about company financial reports, there is a line of research specifically focused on this issue within the theory of disclosure (Dye, 2001). Disclosure can be understood as the process of making information available to external users that helps them make decisions.

The approach of the theory of disclosure is to explore, describe and explain the phenomenon of information disclosure. The market may interpret non-disclosure as unfavourable information. Thus, if there are no disclosure costs, the company is encouraged to disclose all information possible. However, if disclosure costs increase, the disclosure level tends to decrease (when the costs outweigh the benefits, disclosure no longer pays off). The total absence of disclosure costs is assumed only on a theoretical level to illustrate the relationship between such costs and the level of disclosure (Verrecchia, 2001).

The theory of disclosure has a strong framework in that it understands and explains information disclosure, especially voluntary disclosure, and can be extended to cases in which either disclosure is non-obligatory or one can choose one of several ways to make the disclosure. Accounting choices related to disclosure cause companies to disclose at different levels in cases in which there is discretion to judge the types and quantities of information made available. According to the theory of disclosure (Verrecchia, 2001), several factors may influence the level of accounting-information disclosure, including company profit, size, corporate governance, presence of controlling shareholders, profitability and indebtedness.

Considering that the disclosure of information by segment may reflect different strategies (given the discretion involved and the decisions relating to disclosure), the question of understanding the conditions under which a company will (or will not) disclose this type of information arises. According to Verrecchia (2001), there is a disclosure balance that considers both the maximisation of the company's market value and the costs of disclosure. A number of studies indicate that practices related to information disclosure by segment may be partially determined by many fundamental factors. According to Troberg, Kinnunen and Seppänen (2010), the literature suggests a trade-off between the benefits of informing capital markets about company value and the ownership costs incurred by informing rivals.

2.4. EMPIRICAL EVIDENCE ABOUT THE DISCLOSURE OF REPORTS BY SEGMENT

Generally, international studies indicate that segment-related information is important to users, although there are deficiencies in disclosure practices in various countries. Some studies specifically address the factors that influence companies to publish information by segment.

Bradbury (1992), analysing companies in New Zealand, shows that the decision to publish information by segment is positively influenced by company size and level of indebtedness. McKinnon and Dalimunthe (1993) show that for Australian companies, the shareholding structure, the size and the sector to which the company belongs are related to decisions to disclose information by segment.

Semper and Beltran (2002) analyse, for Spanish companies, whether factors such as size and indebtedness affect the disclosure of segment information by activity and geographic area. The results show that indebtedness is positively related to information disclosure by segment (and no significant relationship is found for company size).

Hermann and Thomas (1996) investigate whether the country, size, sector and capital markets where companies are listed are factors that influence the quality of segment-related information disclosed by European companies. The results show that the quality of segment-related information is related to company size, the country and the capital market and that there is no significant relationship between information quality and the sector in which the company operates.

Harris (1998) investigates the relationship between the degree of competitiveness of the market and the policy of information disclosure by segment, addressing American companies. The results show that companies in sectors with lower levels of competition are less likely to disclose information by segment than are companies in highly competitive sectors. In turn, Kelly (1994) provides evidence, based on a sample of companies from Australia, that there is a positive correlation between profitability and voluntary disclosure about segments.

Although the international debate on the disclosure of financial information by segment is shown to be academically broader, in Brazil there is still no solid body of studies related to the disclosure of information by operating segment, indicating a gap in this area of study. Nevertheless, emphasis can be provided to studies such as Cruz et al. (2011), which analyses the explanatory notes of companies listed on the New Market of the BM&FBOVESPA and notes that companies audited by one of the "Big Four" have a lower degree of intensity in disclosing the future impact of the application of normative guidance on information by segment.

Schvirck and Gasparetto (2011) have shown that companies with higher levels of governance tend to be more willing to voluntarily disclose information by segment. Silva and Pinheiro (2012) have tested which variables impact the level of information disclosure by segment in a sample of Brazilian companies and have found a statistically significant result only for the variable of total assets, indicating that size influences a wider scope of disclosure.

Souza and Almeida (2013), addressing companies listed on the BM&FBOVESPA, find an absence of significant differences between the level of information disclosure by segment of companies belonging to more competitive sectors and the level of disclosure of companies belonging to less competitive sectors. Finally, the study by Aillón, Silva, Pinzan and Wuerges (2013), which also examines a sample of Brazilian companies, concludes that companies with positive outcomes tend to disclose more information per segment than do companies with negative outcomes. The other variables tested in the study (including performance, indebtedness and corporate governance) were not significantly correlated with the level of disclosure.

3. Research Hypotheses

The 8 hypothesis tested in this study are based on theoretical discussions and previous empirical evidence related to the disclosure of information about segments. Next, the description of the hypotheses is presented, along with a brief summary of their relevant theoretical justifications.

- **Size (SIZ)**

H1: Larger companies have higher levels of information disclosure about segments than do smaller companies.

Larger companies have a greater ability to afford potential costs related to the process of information disclosure compared to smaller companies. According to Verrecchia (2001), this lack of disclosure costs assumes full disclosure and the higher the costs to provide information, the lower the disclosure levels. Although the disclosure of information presupposes higher costs for companies, those costs are proportionately higher for small companies compared to large companies (Semper & Beltran, 2002).

- **Indebtedness (IND)**

H2: Companies with higher indebtedness levels have higher levels of disclosure of information about segments than do companies with lower indebtedness levels.

According to agency theory (Jensen & Meckling, 1976), agency costs associated with the conflict of interest between creditors and shareholders increase with the level of indebtedness. For high indebtedness levels, creditors require more data to reduce the asymmetry of information related to knowledge of the company's situation and to help predict future cash flows and the ability to make payments. A higher disclosure level may, in this case, decrease company creditors' perception of risk. Therefore, it is assumed that in targeting decreased risk perception by creditors, companies with high indebtedness indices have higher disclosure levels. Companies that are more indebted tend to disclose more information because they need to provide more data to their capital providers, which tend to strongly monitor management (Lanzana, 2004).

- **Profitability (REN)**

H3: Companies with higher profitability have higher levels of disclosure of information about segments than do companies with lower profitability.

There is a trade-off between the costs of revealing confidential information and the potential benefits of informing the capital markets, thus reducing reduce information asymmetries. According to Troberg, Kinnunen and Seppänen (2010), it is beneficial for highly lucrative companies to inform the capital markets about the segments that make up their "excellent" overall performance, and these benefits outweigh the disclosure costs. Thus, these companies tend to retain less information (because the benefits outweigh the potential competitive damage), to avoid problems arising from information asymmetries attributable to adverse selection (Lang & Lundholm, 1993).

- **Industry concentration (IC)**

H4: Companies in sectors with a high degree of concentration have lower levels of disclosure of information about segments than do companies in sectors with a low degree of concentration.

A high degree of industry concentration is likely to discourage the disclosure of confidential information because the costs of disclosure begin to exceed its benefits. The level of competition in the market acts as a disciplining factor, a type of force that limits the presentation of inaccurate disclosures and the concealment of accounting information by companies (Balakrishnan & Cohen, 2011). Harris (1998) argues that the higher the industry concentration, the greater the fear of disclosing strategic information, and companies in low competitive environments prevent disclosures about segments with the aim of protecting their abnormal profits.

- **Profit or loss (PL)**

H5: Companies with positive net income have higher levels of disclosure of information about segments than do companies with negative net income.

Aillón et al. (2013) argue that there is a tendency to conceal data in the explanatory notes to information about segments (thus suppressing information disclosure) when organisations do not report positive outcomes (profits). This fact could indicate an attempt to conceal the inefficiency of some managers and to safeguard strategic information that could benefit the company's competitors. Agency and reputation costs encourage managers to hide the low performance of certain segments, thus avoiding exposure (Berger & Hann, 2007). Therefore, when companies report losses, the tendency is to reduce their levels of disclosure about segments, thus avoiding providing details about the poorly performing segments.

- **Corporate governance levels (CG)**

H6: Companies that adhere to BM&FBOVESPA's Levels of Corporate Governance have higher levels of disclosure of information about segments than those that do not adhere to the Levels.

The incentive to adopt good corporate governance practices includes the goal of reducing the degree of information asymmetry that theoretically exists in the principal-agent relationship. Information disclosure is considered one of the pillars of corporate governance, according to Murcia (2009). Thus, there is a greater propensity to disclose information per segment by companies that implement better corporate governance practices. This view is reinforced by the fact that companies that participate in different levels of governance at BM&FBOVESPA already make certain commitments regarding the disclosure of additional information to the market (Lanzana, 2004). Thus, where there is a precedent for additional disclosure, the cost of disclosing information per segment is smaller.

- **Audit (AUD)**

H7: Companies audited by the "Big Four" have higher levels of disclosure of information about segments than companies audited by "other" firms.

As discussed by Murcia (2009), companies that choose auditors within the "Big Four" group (Deloitte Touche Tohmatsu, Ernst & Young, KPMG and PricewaterhouseCoopers) tend to have better disclosure because "Big Four" auditors are usually more demanding with respect to disclosure required by accounting standards. Large audit firms may influence the quality of disclosure and encourage companies audited by them to disclose more information (Archambault & Archambault, 2003). In addition to encouraging better disclosure from their clients, audit firms belonging to the "Big Four" group tend not to associate with clients that have low disclosure levels, and these characteristics can be extended to disclosure per segment.

- **Year of disclosure (YEA)**

H8: Companies have lower levels of disclosure of information about segments in the first year of mandatory disclosure compared to disclosure during the second year.

Eccher and Healy (2003) state that the transition to new accounting standards occurs gradually, and companies make adjustments to conform to new standards. A previous lack of mandatory disclosure causes companies to not have a need to rely on either their own past statements or past statements from other companies to make disclosures. Antunes, Grecco, Formigoni and Mendonça (2012) state that companies' adaptation to the reality of implementing new accounting standards is necessary and that many professionals may encounter difficulties in interpreting and applying the pronouncements. In the second year of disclosure, companies tend to have higher disclosure levels than in the first year because they have access to other companies' previous reports and an opportunity to discuss previous disclosures.

4. Methodology

4.1. CHARACTERISATION OF THE STUDY, SAMPLE AND DATA COLLECTION

This study may be classified as a theoretical and empirical study with an explanatory character, which aims to explain the levels of disclosure about companies' operating segments. The approach is predominantly quantitative because the assumptions made (based on the theory) are tested by the application of statistical techniques.

The study population includes all Brazilian public companies active in BM&FBOVESPA to which Pronouncement CPC 22 is applicable (for such companies, disclosure of information about segments is required). According to the sector classification provided by the database Economática®, such companies can be segregated into 20 different sectors and a separate category called "others". Out of 367 active companies on the stock exchange, 272 comprise the study sample. In addition to the exclusion of the sector category "others" (excluded because of the different companies that comprise it), we also excluded companies for which the documents classified as "Complete Annual Financial Statements" for 2010 and/or 2011 were not available at the website of the Securities and Exchange Commission (Comissão de Valores Mobiliários, or CVM). Importantly, the sampling process is non-probabilistic, and the sample covers more than 74% of the active public companies on the stock exchange.

The period of analysis covers 2010 and 2011, years for which financial statements were available due to the application of CPC 22 (which became mandatory in 2010). Once the two years were investigated, 544 accounting reports were analysed.

The documentary sources used in the study consist of the "Complete Annual Financial Statements" for each of the companies in the sample. Such statements were obtained at the website of the Securities and Exchange Commission (Comissão de Valores Mobiliários, or CVM), and the data concerning the disclosure of information per operating segment were collected from the statements. In addition, secondary data are used for the composition of proxies related to the characteristics of the companies; those data were obtained through the database Economática®.

4.2. DATA ANALYSIS PROCEDURES

4.2.1. Measurement of the Levels of Disclosure of Information about Segments (LDIS)

First, the information per segment disclosed in the financial reports of the companies concerned is identified. Second, a metric for the levels of disclosure about segments is created. To perform the initial step, a checklist was created containing possible disclosure items about segments. Seven categories and 40 subcategories of disclosure were considered, which were elaborated based on the requirements of Pronouncement CPC 22 and encompass the items that would be expected to be identified in companies' financial statements. This list was applied to the financial statements of the selected companies, which permitted the identification of the presence or absence of each point covered by the Pronouncement. Thus, 40 items were verified; they are shown in Table 1.

Table 1 - Items of Disclosure about Segments

	General Information (category 1)
1	The existence of information about operating segments is mentioned.
2	Criteria for identifying the disclosable operating segments are presented.
3	The types of products and services from which each disclosable segment obtains its revenues.
4	Criteria for aggregating segments.
5	Description of the revenues included in "other segments".
	Information about geographic area (category 2)
6	Revenues from external customers attributed to the entity's host country (i.e., its domestic market).
7	Revenues from external customers attributed to all foreign countries in which the entity obtains revenues (i.e., its external market).
8	Non-current assets (except for financial instruments, deferred active income tax and social contribution, post-employment benefits and rights arising under insurance contracts) located in the host country of the entity.
9	Non-current assets (except for deferred active financial instruments, income tax and social contribution, post-employment benefits and rights arising under insurance contracts) located in all foreign countries in which the entity holds assets.
10	Information per country or subtotals of geographical information about groups of countries.
11	Information per geographic region within Brazil.
	Information about products and services (category 3)
12	Revenues from external customers in relation to each product and service, or to each group of similar products and services.
	Information about major customers (category 4)
13	Information about the degree of dependence on major customers (in the case in which revenue from transactions with a single external customer represent 10% or more of the entity's total revenue).
	Information about profit or loss, assets and liabilities [of each segment] (category 5)
14	Profit or loss.
15	Total assets.
16	Liability.
17	Revenues from external customers (or total revenue).
18	Revenues from transactions with other operating segments in the same entity.
19	Financial revenues or net financial outcome.
20	Financial expenses or detail in the case of presenting net financial outcome.

	Information about profit or loss, assets and liabilities [of each segment] (category 5) *Contd...*
21	Depreciations and amortisations.
22	Material items of revenue and expense disclosed in accordance with item 97 of Pronouncement CPC 26.
23	Participation of the entity in the profits or losses of associates and joint ventures accounted in accordance with the equity method.
24	Expenses or income with income taxes and social contributions.
25	Non-cash items considered as material, except for depreciations and amortisations.
26	Amount of investment in associates and joint ventures accounted for by the equity method.
27	Amount of additions to non-current assets (except for deferred active financial instruments, income tax and social contribution, assets for post-employment benefits (see CPC 33, items 54 to 58) and rights arising under insurance contracts).
	Measurement (category 6)
28	The accounting basis for any transactions between disclosable segments.
29	The nature of any differences between the measurements of the profit or loss of the disclosable segments and the profit or loss of the entity before the expenses (revenues) of income taxes and social contributions and of discontinued operations
30	The nature of any differences between the measurements of assets of the disclosable segments and the assets of the entity (if not caused by the described reconciliations)
31	The nature of any differences between the measurements of the liabilities of the disclosable segments and the liabilities of the entity (if not caused by the described reconciliations)
32	The nature of any changes in previous periods in the measurement methods used to determine the profit or loss of the disclosed segment and the possible effect of those changes on the evaluation of the profit or loss of the segment
33	The nature and effect of any asymmetrical allocations to disclosable segments
	Reconciliation (category 7)
34	Total of the revenues of the disclosable segments and the revenues of the entity
35	Total of profit or loss values of disclosable segments with the profit or loss of the entity before expenses (revenues) of income tax and social contribution and of the discontinued operations (or the reconciliation of the total of profit or loss values of segments with the profit or loss of the entity after those items)
36	The total assets of the disclosable segments with the assets of the entity
37	The total liabilities of the disclosable segments with the liabilities of the entity, if the liabilities of the segments are disclosed
38	Total amounts of any other material items of information evidenced by disclosable segments with the corresponding amounts of the entity
39	Identification and description of all material reconciliation items, separately
40	Restatement of previously disclosed information

Source: Prepared by the authors, based on the disclosure items of CPC 22 (CPC, 2009).

The presence of each of the items in the financial statements (specifically in the explanatory notes) of the companies examined is verified. The first step is to identify the explanatory note(s) that specifically involve information per operating segment and then to examine the note(s) in detail to identify and classify the information contained in the note(s).

Next, to measure the different disclosure levels identified from the application of the checklist, the variable Level of Disclosure of Information about Segments (LDIS) is created, which represents the level of disclosure about the company's operating segments. In each of the items for analysis (Table 1), the value 1 was attributed for the presence and 0 for the absence of information (subcategory). These values were chosen to measure the overall disclosure level without assigning weights to different items because the measurement thus reflects the perception of all users together, without privileging a particular group.

LDIS corresponds to the sum of the values assigned to the items. Thus, a LDIS was obtained for each company (which could range between 0 and 40). The value 0 (zero) indicates that the company did not provide any of the subcategories, whereas the value 40 (forty) represents the disclosure of all of the subcategories. Thus, if a company did not mention the existence of operating segments in the notes, it obtained an LDIS equal to 0. If the company provided disclosure related to all items encompassed by the Pronouncement, it had an LDIS equal to 40. Thus, each company receives an individual LDIS for each year analysed that represents its disclosure level.

4.2.2. Econometric Model

To test the hypotheses concerning the potential factors affecting the level of disclosure about segments, the statistical technique of multiple linear regression is used. Next, the variables that make up the hypotheses of the study and the proxies used are described:

- Size (SIZ): metric variable represented by the natural logarithm (Ln) of the total assets of each company;
- Indebtedness (IND): metric variable represented by the index of participation of debt capital, calculated by dividing the liabilities (debt capital) by the net equity (own capital);
- Profitability (REN): metric variable represented by the index of return on assets (ROA), calculated by dividing the net income by the total assets;
- Industry concentration (IC): metric variable represented by the Herfindahl-Hirschman index (HH), calculated by summing the squares of the individual market share (percentage share) of the companies for the sector in which they operate. The HH was calculated using the total assets according to the method described by Souza and Almeida (2013).
- Profit or Loss (PL): dummy variable with a value of 1 if the company reported net profit in the corresponding year and a value of 0 if it reported a loss.
- Corporate Governance (CG): dummy variable with a value of 1 if the company is listed in one of the Corporate Governance Levels of the BM&FBOVESPA (New Market, Level 1 or Level 2), and 0 otherwise.
- Audit (AUD): dummy variable with a value of 1 if the company is audited by one of the “Big Four” (KPMG, PricewaterhouseCoopers, Deloitte Touche Tohmatsu and Ernst &Young) and a value of 0 if it has been audited by other audit companies.
- Year (YEA): dummy variable with a value of 1 for 2010 (first year of mandatory disclosure) and 0 for 2011.

The dependent variable is LDIS, calculated from the results obtained in the first stage of the study, as described in the previous subsection.

The equation model applied to test the hypotheses proposed in this study is described by Equation 1:

$$LDISi = \alpha + \beta 1\ SIZi + \beta 2\ INDi + \beta 3\ RENi + \beta 4\ ICi + \beta 5\ PLi + \beta 6\ CGi + \beta 7 AUDi + \beta 8\ YEAi + \mu \quad (1)$$

LDISi is the Level of Disclosure of Information about Segments of company i; α is the intercept of the line; β*1* to β*8* are the angular coefficients; SIZ, IND, REN, IC, PL, CG, AUD and YEA are the independent variables, and μ is the error term of the regression.

The choice was a classical linear regression model (CLRM) estimated by the OLS (Ordinary Least Squares) method. Data analysis is obtained by applying the POLS (Pooled Ordinary Least Squares) method. The POLS approach was chosen because observations on only 2 different years are encompassed.

Regarding the assumptions of regression, the Jarque-Bera test (JB) was used to test the normality of residuals. For the multicollinearity of the variables, the VIF (Variance Inflation Factor) statistic was used. The Breusch-Pagan test was used for the homoscedasticity of the residuals, and if the heteroscedasticity problem was found, White’s correction, which has robust standard errors, was used (it fixes the standard errors of the coefficients, making them consistent for heteroscedasticity). The results presented correspond to the regression estimated by the “Enter” method, and the level of significance was defined as 1%.

5. Results And Discussion

5.1 LEVELS OF DISCLOSURE ABOUT SEGMENTS AND APPLICATION OF THE ECONOMETRIC MODEL

Initially, results were obtained in relation to the variable LDIS, which represents a company’s level of disclosure of information per operating segment. This variable corresponds to the total items disclosed by the companies among the 40 subcategories of analysis, as previously described (subsection 4.2.1). Table 2 presents the descriptive statistics of the LDIS obtained for the companies in each of the years and overall (both years).

Table 2 - Descriptive Statistics of the Level of Disclosure of Information about Segments (LDIS)

Description	*2010*	*2011*	*Overall (both years)*
Average	8.76	9.64	9.20
Standard error	0.50	0.51	0.36
Median	7.00	9.00	7.00
Standard deviation	8.31	8.43	8.37
Minimum	0.00	0.00	0.00
Maximum	27.00	28.00	28.00

Thus, it can be observed that in 2010, the average LDIS was 8.76, a value far from the possible total of 40 items to be disclosed (according to CPC 22). In 2011, the average was 9.64, still a relatively low value, although there was an increase. The median was 7 in 2010 and 9 in 2011; these are also values that represent a low LDIS. There were some companies that did not even mention the existence of information per segment (in both years), which makes their minimum value 0. In turn, the company that displayed the highest disclosure had an LDIS of 27 in 2010, and the one that displayed the highest disclosure in 2011 had an LDIS of 28. Considering both years simultaneously, the average was 9.20 and the median LDIS was 7.

Subsequently, the econometric model (described in subsection 4.2.2) was applied to test the 8 hypotheses concerning the factors that affect the level of disclosure per segment. This model has the LDIS as a dependent variable (for each company in each year) and the proxies corresponding to the characteristics covered by the hypotheses as independent variables.

Initially, the correlations between the study variables were tested, seeking to identify the existence of multicollinearity among the independent variables. To calculate the degree of association among the variables, Pearson correlation coefficients were calculated. The variables do not show sufficiently large correlation coefficients to infer the existence of multicollinearity problems because none of these coefficients exceeded 0.5. The absence of multicollinearity was confirmed by the VIF statistic, which was below 1.58 for all variables (values lower than 5.0 indicate the absence of multicollinearity).

After testing the correlation among the variables, it was possible to apply the proposed econometric model. Regarding the normality of the variables and the residuals, it is possible to resort to the Central Limit Theorem, which states that, for "large" samples (more than 30 observations), the distribution of the averages is approximately normal. Considering that more than 500 observations were used for each variable, normal distribution can be assumed. The problem of heteroscedasticity was identified and corrected using White's covariance matrix. The final results of the model are presented in Table 3.

Table 3 - Results of the Multiple Regression Model - Dependent Variable: *LDIS*

Variable	*Coefficient*	*Robust standard-error*	*t statistic*	*Probability*
SIZ	1.136511	0.182723	6.22***	0.000
IND	0.000622	0.000220	2.82***	0.005
REN	-0.000984	0.003185	-0.31	0.757
IC	0.292247	1.736598	0.17	0.866
PL	-1.513295	0.834839	-1.81	0.070
CG	1.712568	0.783037	2.19***	0.029
AUD	4.285652	0.857769	5.00***	0.000
YEA	0.290208	0.653804	0.44	0.657
_CONS	-9.866406	2.355903	4.19	0.000
Prob > F = 0.0000				
R^2 = 0.2330				

Note: Asterisks (***) indicate significance of coefficients at a significance level of 1%.

By analysing Table 3, the null hypothesis that R^2 is equal to zero for the regression, according to the F-statistic at a significance level of 1%, is rejected, i.e., there is at least one independent variable coefficient that is significant. The regression as a whole passes the F test, i.e., it is significant. The explanatory power of the model (R^2) is 23.30%.

It is observed that the coefficients of the variables REN, IC, PL and YEA are not significant (t-test at a significance level of 1%), indicating that the characteristics "profitability", "industry concentration", "profit or loss" and "year" of disclosure do not have a significant effect on LDIS.

In contrast, the coefficients of the variables SIZ, IND, CG and AUD are significant, indicating that the characteristics "size", "indebtedness", "corporate governance" and "audit" are determinants of the companies' LDIS.

The positive coefficient of the variable SIZ (size) shows that the larger the company, the greater the level of disclosure about segments. Similarly, the coefficient of the variable IND (indebtedness) shows that the greater the degree of indebtedness of the company, the greater the level of disclosure about segments.

The coefficient of the variable CG (corporate governance) shows that companies listed in the BM&FBOVESPA's Levels of Corporate Governance have higher levels of disclosure than companies that do not belong to it. Finally, the positive coefficient of the variable AUD (audit) indicates that companies audited by one of the "Big Four" have higher levels of disclosure than those audited by other companies.

5.2 CONCLUSIONS AND ANALYSES RELATED TO THE RESEARCH HYPOTHESES

Based on the results of the analysis, it is possible to identify the factors that influence the Brazilian companies' LDIS. In Table 4, the expected signs and the results obtained for each of the hypotheses are summarised.

Table 4 - Results Obtained for the Coefficients of the Variables and Conclusions about the Hypotheses

Variable	*Expected sign for the coefficient*	*Result of the coefficient*	*Conclusion about the hypothesis*
SIZ (H1)	+	+	**Confirmed**
IND (H2)	+	+	**Confirmed**
REN (H3)	+	Not significant	Not confirmed
IC (H4)	-	Not significant	Not confirmed
PL (H5)	+	Not significant	Not confirmed
CG (H6)	+	+	**Confirmed**
AUD (H7)	+	+	**Confirmed**
YEA (H8)	+	Not significant	Not confirmed

Therefore, four of the hypotheses tested (H1, H2, H6 and H7) are confirmed. For all of the other characteristics analysed ("profitability", "industry concentration", "profit or loss" and "year" of disclosure), no significant results were obtained.

Regarding the unconfirmed hypotheses, the result related to profitability indicates that Brazilian companies' LDIS is not affected by these companies' overall profitability, unlike what was observed, for example, for Australian companies in the study by Kelly (1994) or Portuguese companies in the study by Pardal (2007). The result for "industry concentration", however, corroborates the result found by Souza and Almeida (2013), who identify no differences in the level of disclosure between companies in more and in less competitive sectors of the Brazilian market. Aillón et al. (2013) report that companies with positive outcomes tend to disclose more information per segment than do companies with negative outcomes; however, this relationship was not found for the companies in this study. In addition, although in absolute terms there has been an increase in the mean disclosure level between the years 2010 and 2011, the results for our hypothesis reveals that the difference between the disclosure levels in these years is not significant. Thus, at a significance of 1%, it cannot be stated that the disclosure levels in 2011 were higher than in 2010.

Company size is identified as a factor that affects disclosure level, a result in agreement with those obtained by Silva and Pinheiro (2012), Pardal (2007), McKinnon and Dalimunthe (1993) and Bradbury (1992). Larger companies display a higher level of disclosure because they have a greater capacity to bear the possible costs of the disclosure process. Indebtedness is also identified as one of the determining factors, reinforcing the idea that creditors require the disclosure of segment data to reduce information asymmetry. Bradbury (1992) and Semper and Beltran (2002) find similar results, although Aillón et al. (2013) obtain a non-significant result for this characteristic.

The result with respect to the variable corporate governance indicates that companies that adopt better corporate governance practices have a higher propensity to disclose segment information. This result is in line with Schvirck and Gasparetto (2011), although it differs from that of Aillón et al. (2013), who find a non-significant effect for this variable. Finally, it is observed that companies audited by one of the "Big Four" (Deloitte Touche Tohmatsu, Ernst & Young, KPMG and PricewaterhouseCoopers) have higher disclosure levels than those audited by one of the 41 other audit firms (classified as "others"). This result reinforces the idea discussed by Murcia (2009): in addition to stimulating higher disclosure levels, large audit companies tend to not associate with clients with low disclosure levels.

6. CONCLUSIONS

Factors that affect the level of disclosure of information about segments of Brazilian companies are investigated in this study, which encompasses 2010 and 2011. Initially, LDIS were identified from the application of a checklist developed based on the requirements of Pronouncement CPC 22. Subsequently, it was possible to apply the multiple linear regression model with LDIS as a dependent variable.

With respect to the characteristics that can influence the level of disclosure about segments of Brazilian companies, hypotheses based on related theories (especially agency theory and the theory of disclosure) and on previous studies relating to the topic under study were tested. Non-significant results were obtained for four of the eight characteristics investigated: "profitability", "industry concentration", "profit or loss" and "year" of disclosure. Thus, these characteristics do not significantly affect disclosure levels in Brazil.

In contrast, it was identified that the larger the company, the higher the level of disclosure about segments. Indebtedness is also identified as one of the factors that positively affects disclosure, and the higher the degree of indebtedness of the company, the greater the level of disclosure about segments.

In addition, companies listed in BM&FBOVESPA's Levels of Corporate Governance have higher disclosure levels than companies that do not belong to it, whereas companies audited by one of the "Big Four" have higher disclosure levels than those audited by other firms.

Therefore, it is concluded that the practices of disclosure of information by segment may be partly determined by fundamental factors that create different incentives for the choices of disclosure practices, as shown by the theoretical discussions presented. Furthermore, it is evident that the characteristics of "size", "indebtedness", "corporate governance" and "audit" are factors that influence the level of disclosure of information about Brazilian companies' operating segments.

It is important to highlight some limitations inherent to the method used in this study. First, the indicator used to measure the level of disclosure is prepared based on CPC 22, and therefore other points that companies may have classified as information per segment were not incorporated in the analysis. In addition, the sampling procedure used was non-probabilistic. Thus, the results and interpretations are subject to the proxies used, the companies analysed and the period of time encompassed.

Finally, it is suggested that future studies be conducted to investigate other factors that may generate differences in the level of disclosure about operating segments of the companies and to analyse the importance of such information for the users of financial statements in Brazil.

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