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Full adoption of IFRSs in Brazil: Earnings quality and the cost of equity capital

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ABSTRACT

The purpose of this paper is to investigate the impact of IFRS adoption on the earnings quality and the cost of equity capital of Brazilian companies. It is assumed that an increase in information contributes to a reduction in asymmetric information. A conjecture is that more efficient allocation of resources will result in a reduction in the cost of capital. The results show that the hypothesis of an increase in earnings quality after IFRS adoption holds true. The models used to analyze the equity cost of capital suggest a reduction in the cost of capital of around 7 basis points.

1. Introduction

The transition process from the Brazilian Generally Accepted Accounting Principles (BR GAAPs) to the International Financial Reporting Standards (IFRSs) occurred in two steps, in contrast to the process in the European Union countries that have adopted all the IFRSs since 2005. Since there are no reports about similar cases, the Brazilian convergence process can be characterized as unique, raising interest in investigating whether the economic consequences identified in other cases of IFRS adoption (Barth et al., 2008; Li, 2010) apply to Brazil.

In this context, the tax neutrality in accounting practices introduced by the IFRSs was achieved through a legal instrument, contributing to financial statements that are more useful to investors and creditors. Before adopting the IFRSs, financial accounting in Brazil was strongly influenced by the interests of tax rules to the detriment of other users of accounting information. Therefore, it is expected that users of accounting benefit from more informative accounting reports, which can assist them in making decisions regarding the allocation of resources in the capital market and contribute indirectly to reducing the cost of capital for public companies on the stock exchange. However, the extent to which such benefits may occur is not known, considering that the Brazilian convergence occurred in two stages, in addition to the institutional aspects that can influence the quality of financial statements.

Brazil is classified as a code law country, which provides less protection for investors, besides being a poorly developed capital market (La Porta et al., 1997). Furthermore, the Brazilian economy shows a weak institutional environment (Anderson, 1999) with corporate governance practices that do not ensure the shareholders' rights (Chong and Lopez-De-Silanes, 2012), representing a disincentive to attract foreign capital. In this context, accounting practices can serve opportunistic purposes rather than the informational needs of external users, as noted by Lopes and Walker (2012). Thus, IFRS adoption occurs in an unfavorable scenario to increase the quality of accounting information, necessitating an investigation of the benefits advertised by IFRS proponents.

Although these specific characteristics discourage the enhancement of financial information quality, the Brazilian market consists of heterogeneous companies with different economic incentives. To give an example, large companies with good investment projects

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can seek funding in the capital market at a competitive cost, provided that they are able to show transparency and protection of shareholder rights. Given the incipient nature of the Brazilian market and the need for greater funding, many Brazilian companies sought resources in the North American market through ADRs (American Depositary Receipts), and therefore had to adapt to strict corporate governance rules like the SOX (Sarbanes-Oxley Act). This group of companies also had to adapt to the USGAAP (United States Generally Accepted Accounting Principles), which can influence efforts towards the adoption of the IFRS, given the similarities between both GAAPs.

Although there is empirical evidence of an increase in the quality of accounting information due to the IFRSs (Alali and Foote, 2012; Armstrong et al., 2010; Barth et al., 2008; Chalmers et al., 2011; Cormier et al., 2009; Devalle et al., 2010; Gjerde et al., 2008; Horton and Serafeim, 2009) and a reduction in the cost of capital (Daske et al., 2008; Lee et al., 2010; Li, 2010), there are differences in the results when comparing countries of common law origin and countries of code law origin, due to the different incentives that influence the quality of financial statements (Ball et al., 2003; Soderstrom and Sun, 2007). Furthermore, other studies have shown, contrary to the results, increased information quality, such as Ahmed et al. (2013), who studied the mandatory adoption of the IFRSs in 20 countries.

Some research investigates the diverging results, including Christensen et al. (2013), according to whom there are some reasons to analyze the announced benefits of compulsory IFRS adoption cautiously: i) greater discretion in the application of the new standards, putting the announced transparency improvement at risk; ii) increasing heterogeneity among the adopting countries in the functioning of the legal system and the enforcement level; and iii) other factors that happened simultaneously, such as economic shocks and institutional and legal changes.

The findings of Armstrong et al. (2010) show that investors are concerned with the implementation of the IFRSs in code law countries. In this sense, considering that Brazil is a country of code law origin, the aim of this study is to investigate the impact of full IFRS adoption on the quality of financial statements and the cost of capital of Brazilian public companies.

This research stands out because it considers four dimensions in examining the quality of financial statements – earnings management, conditional conservatism, relevance, and timeliness – all of which are converging in terms of utility accounting. Moreover, the complete adoption period (2010 and 2011) of the IFRSs in Brazil has not been investigated. Further justification for studying this period lies in the financial statements disclosed, including economic transactions, which were not previously incorporated. Therefore, this research presents a diagnosis of full IFRS accounting information quality and its effect on the cost of capital of Brazilian public companies, concatenating two benefits associated with the IFRSs that have been intensively discussed in the literature separately but never jointly. These aspects, along with the others cited, constitute the research's originality.

In addition, it should be highlighted that the two-phased adoption by Brazil reveals yet another strategy in terms of convergence with the IFRS, offering evidence to complement studies on accounting globalization from the political viewpoint. The study by Ramanna (2013) presents important considerations in that sense, discussing the growth of the IASB's political power in recent years.

2. Motivation

2.1. Regulatory environment in Brazil and the IFRSs

Before the move from the Brazilian accounting standards to the IFRSs, financial accounting was influenced by the Federal Revenue Secretariat, regulators, and supervisory and professional associations. Thus, financial statements were not prepared in accordance with the most appropriate techniques, resulting in a loss of information quality. In this scenario, strong pressure arose from academics, market professionals, and other actors to centralize the accounting regulations in Brazil, seeking convergence with the International Accounting Standards Board (IASB). One major result was the creation of the *Comitê de Pronunciamentos Contábeis* (CPC), the main objective of which is to issue standards in consonance with the international standards. Nevertheless, the CPC's role was not only to translate the standards. More importantly, it was focused on the centralized issuing of accounting standards, representation and democratic processes. The centralization took place, as Brazilian accounting before the adoption of the IFRS was influenced by public and private entities, which caused difficulties to properly apply the standards. The centralization solved this problem, as the CPC is fully and completely independent in its deliberations.

What the democratic processes are concerned, the production of the financial standards involved six entities that enhance the strength of the adoption process of the IFRS. These are: i) CFC – Federal Accounting Council, the supreme representative of accountants; ii) APIMEC NACIONAL – Association of Capital Market Investment Analysts and Professionals; iii) BM & FBOVESPA – São Paulo Stock Exchange; iv) FIPECAFI – Foundation Institute for Accounting, Actuarial and Financial Research (affiliated with FEA/USP), representing the academy; v) IBRACON – Institute of Independent Auditors in Brazil; vi) ABRASCA – Brazilian Association of Publicly-Traded Companies. Therefore, the Brazilian model follows the model that has been most productive around the world: the financial information preparers, auditors, analysts, intermediaries and the academy joint to produce a single standard. Thus, we believe that the IFRS contributed to enhance the quality of the Brazilian information environment, as a result of the application of technical determinations acknowledged as superior in different countries that investigated the effects of the IFRS. In that sense, the investors, analysts and other information users benefit from this change. Nevertheless, empirical tests are needed to verify this expectation.

To understand the IFRS adoption process in Brazil better, it is necessary to describe the standards that were applied in two stages: i) partial adoption in 2008 and 2009; and ii) full adoption as of 2010.

There were 15 accounting standards in 2008 and 2009, and 3 were from Brazil: CPC 9, CPC 12, and CPC 13. In addition, IAS 32 and IAS 39 have not been fully adopted, allowing us to conclude that not all the financial instrument requirements were applied at

this stage.

The full IFRS adoption resulted in the application of more 30 technical pronouncements, implying new recognition, measurement, and disclosure practices. This stage exerted more significant effects on the profit and equity of Brazilian companies, since, on average, both increased, respectively by R$270.364.000 and R$653.985.000.[1] These increases came from the new accounting practices that occurred in the period of full adoption, with as yet uninvestigated effects, unlike the partial adoption, which has already been analysed (Lima, 2011; Vieira et al., 2011; Castro, 2012; Silva and Nardi, 2014). The increases represented coherent evidence to Fifield et al. (2011), who studied the IFRS adoption in the UK, Ireland, and Italy.

However, in contrast to the situation in Europe, which adopted the IFRSs in full in 2005, Brazil decided to adopt them in two stages, which may have influenced the application and interpretation of the international standards by professionals, due mainly to the longer preparation and the study of the impact on local accounting. Some research (Larson and Street, 2004; Tokar, 2005; Neidermeyer et al., 2012) has listed the challenges associated with the IFRS adoption process, including the difficulty in applying trusted and reliable international standards due to cultural issues and lack of training, among others. For example, the IFRSs have an English origin in the common law tradition, an accounting system based on principles that require a certain degree of judgement in addition to the responsible use of subjectivity in the application of accounting standards. In addition, the accountants have to follow a new approach, given the major responsibility in the choice and application of accounting estimates and assumptions, in contrast to what was observed before the IFRSs, mainly due to the strong influence of tax legislation. Thus, the change from a rules-based system (BR GAAPs) to one based on principles (IFRSs), when carried out in two stages, can mitigate the possible adverse effects resulting from the IFRS adoption. These adverse effects may be caused by the change in the GAAPs without the right preparation and guidance of persons involved in the adoption process of the IFRSs (Larson and Street, 2004; Tokar, 2005; Schipper, 2005).

These challenges were described by Larson and Street (2004), such as the presence of underdeveloped capital markets, which can be seen as a restriction on the adoption of international standards, due to the low number of potentially interested investors. In addition, the authors found overall satisfaction with the local GAAPs, with the accounting oriented for tax purposes. They observed complexity in the application of some international standards, resulting in a lack of technical and practical knowledge, which occurred with Financial Instruments (IAS 39), Impairment of Assets (IAS 36), Deferred Income Taxes (IAS 12), Employee Benefits, like pensions (IAS 19), and others. For Poland, the authors described the reluctance of local authorities, based on the fear of losing sovereignty or authority with respect to accounting standards.

Recent studies have investigated the factors that influence the decision of a country to adopt the IFRSs or not. For example, Clements et al. (2010) reported that, the larger the country, the less likely it is to adopt the international standards. Moreover, Neidermeyer et al. (2012) found empirical evidence that cultural aspects also influence the adoption process. For instance, the authors observed that code law countries tend to take more time to adopt the IFRSs.

The adoption of the IFRSs in Brazil, a code law country, was confronted with many challenges, such as organizational changes, especially regarding the role of the accountant. For example, the implementation of international standards may require multidisciplinary treatment due to greater interaction with other areas of the organization, generating greater knowledge about the company's business. Consequently, the accountant may engage in more active behavior and participate in strategic meetings.

However, when the pressures to change are higher than the adaptive capability, people tend to suffer, especially when the process of change is perceived as a loss generator. These adverse effects may occur due to organizational changes after the implementation of new legislation, which justifies one GAAP change accompanied by reflection, study, and preparation.

Finally, in contrast to the European Union, which requires the IFRSs only for consolidated financial statements, in Brazil, companies have to disclose their consolidated and individual financial statements according to the IFRSs. This difference entails implications for the accounting information systems companies use for the purposes of disclosure, which can give preference to information according to the IFRSs. In Brazil, there is a broad service in this respect, requiring companies to comply with both types of accounting reports.

Therefore, considering that there are no reports of similar cases, the Brazilian convergence can be characterized as unique, arousing interest in investigating whether the economic consequences observed in other countries are applicable to Brazil.

In this context, it is expected that the financial statements, which were previously heavily influenced by tax legislation, will be more useful to investors and creditors, as well as being predicted by the conceptual framework.

2.2. Hypothesis development

The starting point of the development of hypotheses can be regarded as the research developed by Barth et al. (2008), which observed an increase in the quality of financial statements. However, IFRS implementation is influenced by legal and institutional aspects (Holthausen, 2009; Soderstrom and Sun, 2007; Walker, 2010). In this sense, Burgstahler et al. (2006) provide evidence that the level of EM is higher in countries where enforcement is poor.

However, an adaptation period is expected for firms that adopt the new standards, which are subject to transactions that are not properly accounted for under the IFRSs. Moreover, research (Agoglia et al., 2011; Maines et al., 2003; Nelson et al., 2002) finds that the greater the precision of the accounting system, the greater the aggressiveness of financial reporting. Thus, considering that the GAAP transition in Brazil is a transition from a rule-based system to a principle-based one, the actions for aggressive disclosure may be limited.

[1] The income and equity increased by approximately USD 475,931,000 and USD 1,151,232,000, considering the average quotation of the reporting period.

Although there are favorable aspects to increased EM, it is believed that the IFRSs may result in financial statements that are more useful for users and less susceptible to aggressive financial reporting. Therefore, financial statements would be closer to the concept of faithful representation in the framework. The study by Barth et al. (2008) suggests that the adoption of the IFRSs implies less earnings management.

Thus, the hypothesis of earnings management can be defined as follows: **H_1–Full adoption of the IFRSs provides a reduction in the EM levels in the financial statements of Brazilian public companies**.

Another discussed feature is conservatism. Although Barth (2008) questions the presence of conservatism in financial statements, since it is not a qualitative characteristic of the IASB framework, this concept is rooted in the IFRSs, for example in the impairment test, justifying the study of conservatism within the scope of the quality of financial statements.

Although the Brazilian accounting model has incentives to be conservative, it was mainly influenced by the tax authorities; in addition, it did not include accounting practices that allow the economic and financial situation of the firm to be seen by using the financial statements. In this sense the adoption of the IFRSs has applied standards that allowed economic transactions that increased the informational content of financial statements, and, presumably, the conservatism from the investors' perspective. For example, the use of fair value allows the recognition of both gains and losses in income, which was not possible in the Brazilian model. This result is consistent with Ball et al. (2000), who investigated whether the properties of accounting information, notably timeliness and conservatism, vary according to the institutional characteristics of the countries, for example the legal origin: code or common law. The findings revealed that code law origin countries have less timely and conservative accounting numbers in relation to those with the common law origin.

In this context, the earnings quality (EQ) literature considers the existence of conservatism to be reflected in the quality of the financial statements. Therefore, the next hypothesis is: **H_2–Full adoption of the IFRSs provides an increase in the conservatism of the financial statements of Brazilian public companies**.

After presenting the hypotheses for management and conservatism, the expectations can be analyzed regarding the relevance of accounting information. Relevance is one of the qualitative characteristics of accounting information in the framework, defined as a characteristic that can make a difference in the decisions made by users. There are studies in the literature (Alali and Foote, 2012; Barth et al., 2008; Chalmers et al., 2011; Cormier et al., 2009; Devalle et al., 2010; Horton and Serafeim, 2009) that investigate the relevance of information after the adoption of the IFRSs, and the findings show an increase in the relevance of accounting information. Considering that the IFRSs came from the common law, which gives priority to minority interests, the perception of increasing relevance is based on these users.

Therefore, accordingly, it is expected that the change from the GAAPs or BR GAAPs to the IFRSs implies an increase in the relevance of accounting information (value relevance), resulting in the following hypothesis: **H_3–Full adoption of the IFRSs provides an increase in the relevance of the financial statements of Brazilian public companies**.

The last qualitative characteristic studied in the framework corresponds to timeliness, which means that information is available for decision makers in time to influence their decisions.

In the Brazilian context, there is evidence of low levels of timeliness of earnings (Lopes, 2005). In this sense, if IFRS financial statements represent a set of high-quality accounting practices and the capital market understands the accounting information disclosed, then a greater amount of information content is expected due to the recognition of economic events that were not previously considered. Furthermore, economic gains and losses are recognized because of fair value (Ball, 2006; Chalmers et al., 2011).

In short, these aspects contribute to more timely accounting numbers, allowing the definition of the following hypothesis: **H_4–Full adoption of the IFRSs provides an increase in the timeliness of the financial statements of Brazilian public companies**.

Assuming an increase in the quality of accounting information, a reduction in the cost of equity capital is expected due to lower information asymmetry between firms and investors. One explanation for this relationship is based on a scenario of low informational content, hampering assessment activities, due to which investors will be reluctant to invest their funds (Burgstahler et al., 2006). In this context, countries that adopt the IFRSs can apply accounting standards that may result in high-quality financial statements, increasing transparency. Consequently, the processing costs for international investors are reduced (Hail and Leuz, 2009; Lee et al., 2010). In this scenario, it is plausible to hypothesize a reduction in the cost of capital: **H_5–full adoption of the IFRSs provides a reduction in the cost of equity capital of Brazilian public companies**.

3. Material and methods

3.1. Specification of earnings management (EM) models

One approach used to assess the quality of accounting information is through EM practices. The EM models used are i) Kang and Sivaramakrishnan (1995) or KS, ii) Dechow et al. (1995) or Modified Jones (MJ), and iii) Teoh et al. (1998) or Teoh.

The three models (KS, MJ, and Teoh) consider TA to consist of non-discretionary and discretionary components, which act as a proxy for EM. The estimation of discretionary accruals by KS tries to eliminate the methodological problems of previous models (MJ, Teoh and others), such as: i) simultaneity, ii) errors in variables, and iii) omitted variables.

The residues of KS can be used as a proxy for discretionary accruals. Consistent with the hypothesis of EM, a reduction is expected in such a proxy in 2010 and 2011, the period of full adoption of the IFRSs, showing an increase in the quality of accounting information. Furthermore, the following formula can be applied:

$$|DA_{KS\,it}| = \beta_0 + \beta_1 IFRS_{it} + \beta_2 ADR_{it} + \beta_3 BCGI_{it} + \beta_4 CF_{it} + \beta_5 DEBT_{it} + \varepsilon_{it} \quad (1)$$

where $|DA_{KSit}|$ is the discretionary accruals estimated by the KS model for firm *i* in *t*; *IFRS* is an indicator variable that equals one if period *t* belongs to the mandatory adoption and zero otherwise; *BCGI* is the Brazilian Corporate Governance Index, based on Lopes and Walker (2012), which can be seen in Appendix A; *ADR* is an indicator variable that equals one if firm *i* is cross-listed in year *t* and zero otherwise; *CF* is the operating cash flow estimated by the difference between net income and *TA* (Sloan, 1996); and *DEBT* is the total debt divided by the total equity. The variable of interest is *IFRS* because it reveals the behavior of *DA* during full adoption. Thus, it is expected that the coefficient β_1 will be negative, indicating a reduction in the level of EM.

3.2. Specification of conditional conservatism models

The first model to observe conservatism is based on Basu (1997):

$$EARN_{it} = \alpha + \beta_1 DR_{it} + \beta_2 \mathrm{Re}\, t_{it} + \beta_3 DR_{it} * \mathrm{Re}\, t_{it} + \varepsilon_{jt} \quad (2)$$

where EARN is the earnings per share (EPS) for firm *i* in year *t*; Ret is the year *t* stock return for firm *i*, measured from four months after the end of year *t-1* to four months after the end of year *t*; and DR is a dummy variable that assumes the value of one if the stock return is negative and zero otherwise.

The interpretation of the model should be as follows: if the earnings are conservative, then it is expected that the sum of coefficients β_2 and β_3 will be greater than β_2. To analyze IFRS adoption, the IFRS dummy was added to the equation, in addition to the variables ADR and BCGI. It is expected that the Basu coefficient (β_3) will rise when the IFRS dummy is added, revealing more conservatism.

The second model used to estimate conservatism also originates from Basu (1997). According to the author, conservatism implies anticipating future losses, which are recognized in the current earnings. Therefore, future profits are immune to current bad news, taking them to satisfactory levels, that is, exempting them from bad news. The author defines this phenomenon as the reversal of the reduction in current income (due to bad news) in the next fiscal year.

$$\Delta EARN_{it} = \alpha + \beta_1 D\Delta EARN_{it-1} + \beta_2 \Delta EARN_{it-1} + \beta_3 D\Delta EARN_{it-1} * \Delta EARN_{it-1} + \varepsilon_{jt} \quad (3)$$

$\Delta EARN_{it}$ is the change in earnings from fiscal year *t-1* to *t*, scaled by the book value of total assets; $D\Delta EARN_{it-1}$ is a dummy variable that assumes the value one if the prior year change $\Delta EARN_{it-1}$ is negative; and the variable $D\Delta EARN_{it-1} * \Delta EARN_{it-1}$ corresponds to the variation of earnings for companies that have reduced earnings. The main interpretation of the model consists of comparing coefficient β_2 and coefficient β_3. If companies recognize the bad news beforehand (*t-1*) and reverse the effect in the following fiscal year (*t*), coefficient β_3 should be negative, showing the timely recognition of losses.

The IFRS dummy was added to the original model to evaluate the effect of international standards on persistent and timely recognition of financial statements. Consistent with the conservative hypothesis, the coefficient associated with the IFRSs is expected to present a negative sign and greater magnitude, showing an additional effect.

3.3. Specification of the value relevance model

An approach similar to that of Easton (1999) and Lopes (2005) can be adopted to investigate the relevance of accounting information in the Brazilian market. The model adopted is:

$$\frac{P_{it}}{P_{it-1}} = \alpha_{0t} + \beta_{1t} \frac{BV_{it}}{P_{it-1}} + \beta_{2t} \frac{EARN_{it}}{P_{it-1}} + \varepsilon_{it} \quad (4)$$

where P_{it} is the stock price of firm *i* 3 months after fiscal year *t*, scaled by P_{it-1}; the purpose of deflating is to reduce the problems of scale, as posited by Brown et al. (1999); BV_{it} is the book value of equity per share, also scaled by P_{it-1}, at the end of year *t* for firm *i*; and $EARN_{it}$ is the earnings per share at the end of year *t* for firm *i*, also scaled by P_{it-1}. The application of this equation allows the analysis of the relevance of financial statements to the capital market. However, the aim is to investigate their relevance in the full adoption of the IFRSs; accordingly, the equation was estimated using interactions with the IFRS dummy.

3.4. Specification of the timeliness model

To evaluate timeliness, the following specification was applied:

$$\mathrm{Re}\, t_{it} = \alpha + \beta_1 EARN_{it} + \beta_2 (EARN_{it} - EARN_{it-1}) + \varepsilon_{it} \quad (5)$$

where Ret_{it} is the year stock return of firm *i* measured from four months after the end of year *t-1* to four months after the end of year *t*; $EARN_{it}$ is the earnings per share of firm *i* for year *t*, deflated by P_{it} to reduce scale problems. The timeliness model is based on the relationship between earnings and stock returns. The accounting information is timely when the stock return on *t* reflects the earnings variation between *t* and *t-1*. Thus, one can say that the information is timely when β_2 is statistically significant.

By focusing the analysis on the research problem, the analysis of the timeliness of full IFRS financial statements can be performed through an interaction between the variables of the original model and the IFRS dummy. It is expected that after introducing the IFRSs, the accounting information will be timelier, which can be observed by an increase in the coefficient generated by the interaction between ($EARN_{it} - EARN_{it-1}$) and the IFRSs.

3.5. Specification of the difference-in-differences (DD) model for the cost of equity capital

The companies were divided into two groups: firms that have voluntarily adopted international standards (VOL) and those that have adopted them because of being mandated to do so (MAN); these are presented in Appendix A.

The econometric model adapted from Li (2010) to investigate the effect of the IFRSs on the cost of equity capital is:

$$\begin{aligned} r_{PEG_{it}} = {} & \alpha_0 + \alpha_1 * dummyformandatoryIFRSadopters + \alpha_2 * dummyforpost - mandatoryadoptionperiod \\ & + \alpha_3 * \text{dummyformandatoryIFRSadopters*dummyforpost} - \text{mandatoryadoptionperiod} + \alpha_4 * \text{AD}R_{it} + \alpha_5 * \text{BCG}I_{it} \\ & + \alpha_6 * \text{SIZE}_{it} + \alpha_7 * \text{RETVAR}_{it} + \alpha_8 * \text{LEV}_{it} + \sum_{j}^{j-1} \phi_j Ind + \varepsilon_{it} \end{aligned} \tag{6}$$

The variables used to assess the impact of the adoption of international standards on the cost of capital are: i) the cost of equity capital estimated by model price earnings growth (PEG):

$$\begin{aligned} r_{PEG} &= \sqrt{\frac{eps_{t+1}}{P_1} \times growth_{t+2}} \\ growth_{t+2} &= \frac{eps_{t+2} - eps_{t+1}}{eps_{t+1}} \end{aligned} \tag{7}$$

where r_{PEG} is the cost of equity capital, eps_{t+1} refers to the earnings per share in $t + 1$, P_1 is the stock price at t, and $growth_{t+2}$ is the growth rate of earnings at $t + 2$ compared with $t + 1$ (Easton, 2004). The choice of this model is justified by its validity observed for the Brazilian market (Ohlson and Lopes, 2007); ii) "mandatory IFRS adopters" is a dummy that takes the value one if the company had begun the process of adopting the IFRSs on December 31, 2010; iii) "post-mandatory adoption period" is another dummy variable that takes the value one for the adoption period (2010–2011); iv) ADR_{it} is a dummy variable taking the value one if the company issues ADR; v) BCGI_{it} is a corporate governance index developed by Lopes and Walker (2012); vi) SIZE_{it} is the natural logarithm of total assets; vii) RETVAR_{it} is the standard deviation of monthly returns for shares for one year with the aim of capturing the volatility of shares; viii) LEV_{it} is financial leverage computed as the total liabilities divided by the total assets at the year end; and ix) Ind is a dummy variable indicating a firm's industry membership (Li, 2010).

Dummy ii) shows the difference in the cost of equity capital between the two groups (mandatory versus voluntary adoption). Dummy iii) shows the trend of an increase or a decrease in the cost of equity capital, corresponding to a temporal effect. The multiplication of dummies ii) and iii) reveals the true impact of mandatory adoption on the cost of equity capital by controlling the temporal effect. Thus, a negative relationship is expected between this interactive variable and the cost of equity capital, indicating a reduction in the cost of equity capital in the period of mandatory adoption.

3.6. Specification of the cost of equity capital and earnings quality model

To assess the relationship between earnings quality and the cost of equity capital in the full adoption of the IFRSs, it was decided to adopt the discretionary accruals from the KS model as a representative variable of earnings quality. Therefore, in the context of full adoption of the IFRSs, the model can be defined as:

$$r_{PEG_{it}} = \alpha_0 + \alpha_1 |AD_{KS\,it}| + \alpha_2 |AD_{KS\,it}| * IFRS_{it} + \alpha_3 SIZE_{it} + \alpha_4 DEBT_{it} + \alpha_5 CF_{it} + \alpha_6 ADR_{it} + \alpha_7 \text{BCG}I_{it} + \alpha_8 \text{VOL}_{it} + \varepsilon_{it} \tag{8}$$

where r_{PEGit} is the cost of equity capital of firm i in year t estimated by the PEG model; AD_{KS} is a proxy for earnings management of firm i in year t, the KS model is better than the JM and Teoh models in terms of simultaneity, errors in variables, and omitted variables, as described in Section 3.1; IFRS is a dummy that takes the value one for the period of mandatory adoption; SIZE is the natural logarithm of the total assets of firm i at the end of year t; DEBT is the total debt divided by equity, both of firm i at the end of year t; and CF is the net operating cash flow of firm i at the end of year t (Sloan, 1996).

The expected relationship between the cost of equity capital and discretionary accruals is positive, because the greater the level of earnings management, the greater the cost of equity capital. However, the full adoption of the IFRSs is expected to be an incentive to reduce discretion, consistent with the vision of a set of high-quality standards, hindering such practices (Agoglia et al., 2011; Maines et al., 2003; Nelson et al., 2002). Therefore, coefficient α_1 is expected to be positive, revealing a positive association between earnings management and the cost of equity capital. Coefficient α_2 is expected to be negative, indicating that the level of discretionary accruals is lower with the full adoption of the IFRSs. In this sense, it is expected that α_1 will be greater than $\alpha_1 + \alpha_2$, indicating that the full adoption period has a negative effect on the cost of equity capital.

3.7. Verification of the model premises

With regard to the models used to analyze the earnings quality, we chose to apply panel data, a method that combines cross-sectional and time series data, reducing the multicollinearity problems by increasing the number of observations and the degrees of freedom. However, to decide on the most appropriate specification (POOLS, fixed effects, or random effects), the Chow, LM (Lagrange multiplier) of Breusch–Pagan, and Hausman tests were applied (Fávero et al., 2009). The model in Section 3.6, which investigates the relationship between the cost of equity capital and earnings quality, received the same econometric treatment. The specification tests suggest the fixed effects model, in line with studies that normally indicate this type of specification. The reason for this rests on the

existence of individual effects among the companies studies, which represent the heterogeneity among them. The fixed effects approach captures these differences over time.

In view of the possible violation of some model premises, which could lead to inappropriate estimators due to serial correlation and heteroscedasticity problems, the estimator of the robust variation matrix was applied, given by:

$$Avar\hat{(}\hat{\beta}_{FE}) = (\ddot{X}'\ddot{X})^{-1}\left(\sum_{i=1}^{N} \ddot{X}_i' \hat{u}_i \hat{u}_i' \ddot{X}_i\right)(X'X)^{-1} \tag{9}$$

which was suggested by Arellano (1987), based on White (1984). The robust variation matrix is valid in the case of heteroscedasticity or serial correlation, given that T is small in relation to N (Wooldridge, 2002).

3.8. Description of the robustness checks

According to Bertrand et al. (2004), the DD approach can be accompanied by a serial correlation (space and time) problem. To assess the serial correlation problem, the transition period (2009 and 2010) is excluded to check whether the estimates are consistent, including the interaction term "compulsory IFRS adopters × post-adoption period", which reveals the effect of the full adoption on the cost of companies' own capital.

In addition, the omitted variables, variable measurement errors, and sample selection bias knowingly imply endogeneity problems, resulting in biased and inconsistent estimated coefficients. Nevertheless, the application of the systemic GMM (generalized method of moments), a more robust method, can reduce the incidence of these problems, as its use does not depend on the availability of exogenous instruments for the regressors.

Thus, the systemic GMM was applied to the models that measure the accounting information quality with a view to mitigating the endogeneity problem. Nevertheless, the validity of the estimation is conditioned by compliance with the following premises:

i) Non-correlation between lags by more than one period in the endogenous regressors and the first error differences; the premise is valid if the first-order self-correlation statistic (*m1*) is negative and significant and if the second-order statistic (*m2*) is not significant;
ii) non-correlation between first lagged differences of endogenous regressors and errors and specific effects;
iii) non-correlation between strictly exogenous regressors and errors for any time period; this hypothesis can be assessed based on Hansen/Sargan's test of over-identifying restrictions (*J*), the null hypothesis of which is the joint validity of the tools used;
iv) to assess the validity of the additional premises of the systemic GMM, the Hansen/Sargan statistical test of differences was used, which consists of the difference between Hansen/Sargan's *J* statistics obtained through the systemic GMM (*J1*) and through the estimator of differences (*J2*).

The purpose of these additional tests is to verify whether the final results changed through the analysis of the variables of interest. For example, after applying the systemic GMM in Basu's (1997) timely recognition model, it is expected that the characteristics of conservatism will be observed in the earnings by analyzing the coefficients, that is, $\beta_2 + \beta_3$ is greater than β_2, including the addition of the IFRS variable. The results are provided in Section 6.

4. Sample selection

According to Soderstrom and Sun (2007), the problem of omitted variables is often present in studies investigating IFRS convergence between different countries. Thus, selecting only Brazilian companies is expected to minimize the problem regarding omitted variables.

However, the presence of illiquid stocks can represent a problem in studies using measures of market value as the dependent variable. According to Lopes and De Alencar (2010), the problem arises due to measurement errors in the variables, resulting in a low R^2. Errors in the dependent variable can be statistically independent of each explanatory variable, generating consistent and unbiased estimators, but with high variance (Wooldridge, 2002).

To avoid this problem, the sample selection was based on the theoretical portfolio of IBrX-100 from June 25, 2011, composed of 100 stocks selected from the most traded stocks on the São Paulo Stock Exchange, BM & F BOVESPA, in addition to 30 firms that adopted the IFRSs in advance.

The adjustments to determine the final sample can be observed as follows (Table 1).

For further information, please refer to Appendix A for the companies and their respective adoption periods of the IFRSs.

The data for the period 2000–2011 were collected from the following databases: Economática, Thomson Reuters I/B/E/S system, and the CVM[2] and NYSE websites. In the Thomson database, the estimates of earnings per share (EPS) were obtained for each fiscal year for the period of analysis. The consolidated financial statements and their respective reporting dates were collected from the CVM website. Furthermore, the firms issuing ADRs were determined based on the NYSE website.

[2] The Brazilian CVM or *Comissão de Valores Mobiliários* has the same role as the SEC (U.S. Securities and Exchange Commission).

Table 1
Procedures for selecting the final sample.

Stocks of IBrX-100 from June 25, 2011	100
(+) Companies that adopted the IFRSs in advance (VOL)	30
(=) Subtotal 1	130
(−) Companies repeated, which appear in the IBrX portfolio and in the VOL group	(15)
(=) Subtotal 2	115
(−) Stocks of low liquidity in the case of two shares of the same company appearing in the IBrX portfolio	(12)
(=) Subtotal 3	103
(−) Finance and insurance sector companies	(10)
(=) Companies that compose the final sample	**93**

Note: The criterion to determine whether the company reported in advance using the IFRSs is based on CVM Resolution 603, which required the adoption of all standards in financial statements in 2010; CVM is the Securities and Exchange Commission of Brazil. Thus, all companies that reported full IFRS financial statements before December 31, 2010 were added to the group VOL.

5. Empirical results

5.1. Earnings management (EM) models according to TEOH, JM, and KS

The discretionary accruals (DAs) of the TEOH, JM, and KS models, as a proxy for earnings management, were estimated for the period 2000–2011. Then, to evaluate the effect of the IFRSs on discretionary accruals, the model based on Tendeloo and Vanstraelen (2005) was applied (Table 2).

The variable of interest reveals the effect of full IFRS adoption on the behavior of DAs. The IFRS variable has a negative sign, showing that DAs, a proxy for earnings management practices, decreased in the period of full adoption although is statistically significant at 0.10. This result is consistent with the research hypothesis, which predicts a decrease in earnings management in the period of full IFRS adoption.

5.2. Analysis of conditional conservatism based on Basu's (1997) timely recognition of losses model

The following table presents the estimates for the original model and its variation taking into consideration the IFRSs (Table 3).

According to the original model, the earnings have features of conservatism, because the sum of coefficients β_2 and β_3 (0.234 + 1.123) is greater than β_2 (0.234). Although coefficient β_2 is not statistically significant, coefficient β_3, known as the Basu coefficient, measures the incremental opportunity of loss recognition in earnings relative to gains, and it is statistically significant at the 0.05 level.

When adding the IFRS variable to the original model, the variable IFRS * DR * RET reveals the existence of incremental timeliness of loss recognition, because it presents a positive and statistically significant coefficient of 0.01. Additionally, the coefficient of 2.145 is higher than the variable DR * RET, showing that the effect of conservatism is greater during full adoption, specifically in 2010 and 2011. This result confirms the research's hypothesis about conservatism, which predicts an increase in the conservatism of financial statements after IFRS adoption.

Contrary to this result, André et al. (2015) observed a reduction in the conditional conservatism after the IFRS adoption for a sample of European companies. The authors explained that the result is associated with the implementation of the impairment test, since companies that recognized impairment experienced a small reduction in conservatism in comparison with those that did not.

Table 2
Estimates for the model based on Tendeloo and Vanstraelen (2005).

$$|AD_{KS\,it}| = \beta_0 + \beta_1 IFRS_{it} + \beta_2 ADR_{it} + \beta_3 BCGI_{it} + \beta_4 CF_{it} + \beta_5 DEBT_{it} + \varepsilon_{it} \quad (3)$$

Variables	Coefficients	t
C	−0.005	−0.13
IFRS	**−0.007**	**−1.70***
BCGI	−0.001	−0.05
ADR	−0.032	−3.45***
CF	0.004	1.93***
DEBT	−0.001	−1.37
N. Obs.	545	
R^2 Adjust.	0.01	
F Statistic	2.97**	

Note: the coefficients were estimated according to the fixed-effect specification; $|AD_{KS}|$ are the discretionary accruals estimated using the model by Kang and Sivaramakrishnan (1995), a proxy for earnings management; IFRS is a dummy variable equal to one for observations in 2010 or 2011 and zero otherwise; BCGI is a corporate governance index based on Lopes and Walker (2012); ADR is a dummy variable equal to 1 if the company issues ADR; CF is the net operating cash flow of firm i at the end of year t; and DEBT is the total debt divided by equity of firm i at the end of year t. Coefficients ***, **, and * are statistically significant at the 0.01, 0.05, and 0.10 level, respectively.

Table 3
Estimates generated for the timely recognition model of losses according to Basu (1997) and its variations.

$EARN_{it} = \alpha + \beta_1 DR_{it} + \beta_2 \mathrm{Ret}_{it} + \beta_3 DR_{it} * \mathrm{Ret}_{it} + \varepsilon_{jt}$ (4)

Variables	Original Coefficients/t	IFRS Coefficients/t
C	1.859/(8.22)***	1.826/(6.23)***
DR	−0.671/(-2.72)***	−0,964/(-3.60)***
RET	0.234/(0.47)	0.241/(0.47)
*DR * RET*	**1.123/(2.29)****	0.457/(1.33)
IFRS		0.123/(0,41)
*IFRS * DR*		0.884/(2.34)**
*IFRS * RET*		0.050/(0.27)
*IFRS * DR * RET*		**2.145/(3.00)****
Industry	No	Yes
N. Obs.	742	742
Adjusted R^2	0.03	0.03
F Statistic	9.40***	4.35***

Note: the coefficients were estimated according to the fixed-effect specification; *EARN* is equal to the earnings per share of company i for year t; *DR* is a dummy equal to one when the stock return is negative and zero if it is positive; *RET* is the return of the stock price for company i in year t; and *IFRS* is a dummy variable equal to one for observations in 2010 or 2011 and zero otherwise. Coefficients ***, **, and * are statistically significant at the 0.01, 0.05, and 0.10 level, respectively.

5.3. Conditional conservatism analysis based on Basu (1997) and the gains and losses transitory components model

The estimates for the original model of transitory components of gains and losses and its variations can be observed in the following table (Table 4).

The estimates for the original model do not reveal timely recognition of losses for the sample, given that the variable $D\Delta EARN_{t-1}$ * $\Delta EARN_{t-1}$ is not statistically significant and has a positive sign. However, when considering the IFRS dummy, the variable of interest given by $D\Delta EARN_{t-1}$ * $\Delta EARN_{t-1}$ * *IFRS* is statistically significant at the 0.01 level and has a negative sign, as predicted by the model. This result reveals timely recognition of losses in the full adoption period of the IFRSs, as foreseen in the research hypothesis concerning conservatism.

5.4. Value relevance analysis

The value relevance of accounting information is investigated through the basic model and its interactions with the variables IFRS, ADR, and BCGI (Table 5).

Because the EARN variable is statistically significant at the 0.01 level, it is appropriate in the context of the Brazilian capital market for use as a value relevance proxy for accounting information.

When considering the interaction between the dummy IFRS and EARN, the EARN * IFRS variable presents statistical significance

Table 4
Estimates generated for the component model of transitory gains and losses according to Basu (1997) and its variations.

$\Delta EARN_{it} = \alpha + \beta_1 D\Delta EARN_{it-1} + \beta_2 \Delta EARN_{it-1} + \beta_3 D\Delta EARN_{it-1} * \Delta EARN_{it-1} + \varepsilon_{jt}$ (5)

Variables	Original Coefficients/t	IFRS Coefficients/t
C	0.012/(3.13)***	0.016/(1.46)
$\Delta EARN_{t-1}$	−0.089/(-1.20)	−0.123/(-1.23)
$D\Delta EARN_{t-1}$	0.012/(1.01)	0.023/(1.59)
$D\Delta EARN_{t-1}$ * $\Delta EARN_{t-1}$	**0.037/(0.42)**	0.075/(0.69)
$\Delta EARN_{t-1}$ * *IFRS*		0.048/(0.40)
$D\Delta EARN_{t-1}$ * *IFRS*		−0.054/(-2.31)**
$D\Delta EARN_{t-1}$ * $\Delta EARN_{t-1}$ * *IFRS*		**−0.482/(-3.74)****
Industry	No	Yes
N. Obs.	797	797
Adjusted R^2	0.04	0.05
F Statistic	1.15***	2.94***

Note: the coefficients were estimated according to the fixed-effect specification; $\Delta EARN$ refers to the difference between earnings in t and earnings in t-1; $D\Delta EARN_{t-1}$ is a dummy variable taking the value one if the prior year change $\Delta EARN_{t-1}$ is negative; and *IFRS* is a dummy variable equal to one for observations in 2010 or 2011 and zero otherwise. Coefficients ***, **, and * are statistically significant at the 0.01, 0.05, and 0.10 level, respectively.

Table 5
Estimates generated for the value relevance model and its variations.

$$\frac{P_{it}}{P_{it-1}} = \alpha_{0t} + \beta_{1t}\frac{BV_{it}}{P_{it-1}} + \beta_{2t}\frac{EARN_{it}}{P_{it-1}} + \varepsilon_{it} \quad (6)$$

Variables	Original Coefficients/t	IFRS Coefficients/t	IFRS and ADR Coefficients/t	IFRS and BCGI Coefficients/t	IFRS, ADR, and BCGI Coefficients/t
C	1.213/(4.57)***	1.171/(6.32)***	1.184/(1.07)***	1.179/(1.07)***	1.185/(1.07)***
EARN	**0.380/(7.68)*****	0.357/(2.95)***	0.280/(2.36)**	0.280/(2.36)**	0.280/(2.36)**
BV	**−0.025/(-2.12)****	−0.025/(-1.09)	−0.025/(-1.08)	−0.025/(-1.09)	−0.025/(-1.09)
*EARN * IFRS*		**0.729/(2.31)****	0.652/(3.37)***	2.175/(3.39)***	0.664/(3.38)***
*BV * IFRS*		**−0.178/(-1.37)**	0.153/(3.07)***	−0.042/(-0.26)	0.151/(3.00)***
*EARN * IFRS * ADR*			**1.296/(6.03)*****		
*BV * IFRS * ADR*			**−0.177/(-4.96)*****		
*EARN * IFRS * BCGI*				**−1.981/(-1.61)**	
*BV * IFRS * BCGI*				**0.240/(0.93)**	
*EARN * IFRS * BCGI * ADR*					**1.965/(5.33)*****
*BV * IFRS * BCGI * ADR*					**−0.275/(-4.39)*****
Industry	No	Yes	Yes	Yes	Yes
N. Obs.	743	743	743	743	743
Adjusted R^2	0.09	0.10	0.28	0.28	0.28
F Statistic	3.77***	4.85***	9.67***	9.60***	9.67***

Note: the coefficients were estimated according to the fixed-effect specification; BV is the net equity per share of company i for period t, deflated by the price at t-1; EARN is the net earnings per share of company i for period t, deflated by the price at t-1; IFRS is a dummy variable equal to one for observations in 2010 or 2011 and zero otherwise; BCGI is a corporate governance index based on Lopes and Walker (2012); and ADR is a dummy variable equal to one if the company issues ADR. Coefficients ***, **, and * are statistically significant at the 0.01, 0.05, and 0.10 level, respectively.

at the 0.05 level, exhibiting a greater coefficient (0.729 > 0.357). The major magnitude of the estimated coefficient for IFRS * EARN allows us to affirm that this variable has more weight in explaining the stock price. Thus, the information becomes more relevant in the period of full adoption of the IFRSs, consistent with the research hypothesis concerning the value relevance of accounting information.

5.5. Analysis of the timeliness of accounting information

The timeliness model estimates are (Table 6).

The base model shows that accounting information is timely, since the interest variable given by ($EARN_{it}$-$EARN_{it-1}$) is statistically significant at the 0.05 level. This means that accounting changes investors' perceptions due to events that affect the values of firms.

Table 6
Estimates generated for the timeliness model and its variations.

$$\mathrm{Re}\, t_{it} = \alpha + \beta_1 EARN_{it} + \beta_2 (EARN_{it} - EARN_{it-1}) + \varepsilon_{it} \quad (7)$$

Variables	Original Coefficients/t	IFRS Coefficients/t	IFRS and ADR Coefficients/t	IFRS and BCGI Coefficients/t	IFRS, ADR, and BCGI Coefficients/t
C	0.317/(2.37)**	0.510/(4.10)***	0.492/(3.88)***	0.521/(4.12)***	0.495/(3.83)***
$EARN_{it}$	0.094/(0.94)	0.018/(0.24)	0.012/(0.17)	0.005/(0.08)	0.016/(0.22)
$EARN_{it} - EARN_{it-1}$	**0.223/(2.44)****	0.256/(1.98)**	0.259/(2.01)**	0.265/(2.05)**	0.257/(1.99)**
$EARN_{it}$ *IFRS		−1.231/(-2.63)***	−1.086/(-2.04)**	−5.201/(-2.95)***	−1.107/(-2.07)**
$(EARN_{it} - EARN_{it-1})$ * IFRS		**0.837/(1.84)***	1.363/(1.62)*	0.130/(0.10)	0.991/(1.36)
$EARN_{it}$ * IFRS * ADR			−0.602/(-0.84)		
$(EARN_{it} - EARN_{it-1})$ * IFRS * ADR			**−0.664/(-0.69)**		
$EARN_{it}$ * IFRS * BCGI				6.302/(2.19)**	
$(EARN_{it} - EARN_{it-1})$ * IFRS * BCGI				**1.767/(0.72)**	
$EARN_{it}$ * IFRS * BCGI * ADR					−0.802/(-0.72)
$(EARN_{it} - EARN_{it-1})$ * IFRS * BCGI * ADR					**−0.336/(-0.18)**
Industry	No	Yes	Yes	Yes	Yes
N. Obs.	545	545	545	545	545
Adjusted R^2	0.03	0.03	0.03	0.03	0.03
F Statistic	6.14***	1.71**	1.60**	1.73**	1.57**

Note: the coefficients were estimated according to the fixed-effect specification; Ret_{it} is the stock return for company *i* in year *t*; $EARN_{it}$ is the earnings per share for company *i* in year *t*; and $EARN_{it-1}$ is the earnings per share for company *i* in year *t-1*. The earnings variables were deflated by the stock price in *t-1* to reduce the scale problems. IFRS is a dummy variable equal to one for observations in 2010 or 2011 and zero otherwise; BCGI is a corporate governance index based on Lopes and Walker (2012); and ADR is a dummy variable equal to one if the company issues ADR. Coefficients ***, **, and * are statistically significant at the 0.01, 0.05, and 0.10 level, respectively.

Table 7
Estimates for the difference-in-differences model.

$$r_{PEG_{it}} = \alpha_0 + \alpha_1 * mandatoryIFRSadopters + \alpha_2 * Post - mandatoryadoptionperiod + \alpha_3 * mandatoryIFRSadopters * Post - mandatoryadoptionperiod + \alpha_4 * ADR_{it} + \alpha_5 * BCGI_{it} + \alpha_6 * SIZE_{it} + \alpha_7 * RETVAR_{it} + \alpha_8 * LEV_{it} + \sum_{j}^{j-1} \phi_j Ind + \varepsilon_{it} \quad (8)$$

Variables	Coefficients	t
C	0.3013	1.71*
SIZE	−0.0026	−0.39
RETVAR	0.0028	1.60
LEV	−0.1403	−2.45**
ADR	0.0104	0.56
BCGI	−0.1600	−3.59***
Mandatory IFRS Adopters	0.0667	3.14***
Post-Mandatory Adoption Period	0.0600	2.44**
Mandatory IFRS Adopters* × *Post-Mandatory Adoption Period	**−0.0741**	**−4.80*** **
Industry	Yes	
N. Obs.	424	
Adjusted R^2	0.15	
F Statistic	4.16***	

Note: r_{PEG} is the cost of equity capital of firm i in year t estimated by price earnings growth (PEG); SIZE is the natural logarithm of the total assets of firm i in year t; RETVAR is the standard deviation of the monthly stock returns for one year; LEV corresponds to the relation between total debt and total assets; BCGI is a corporate governance index based on Lopes and Walker (2012); ADR is a dummy variable assuming the value one if the company issues ADR; and the variable "mandatory IFRS adopters" is a dummy variable equal to one if a company does not adopt the IFRSs until 2010 and zero otherwise. It reveals the difference in the cost of equity capital between the two groups (mandatory versus voluntary adoption). The variable "post-mandatory adoption period" is a dummy variable equal to one if a firm year observation falls in 2010 or 2011 and zero otherwise. It shows the trend of an increase or decrease in the cost of equity capital. The variable "mandatory IFRS adopters × post mandatory adoption period" reveals the true impact of full or mandatory adoption on the cost of equity capital, controlling the temporal effect. Coefficients ***, **, and * are statistically significant at the 0.01, 0.05, and 0.10 level, respectively.

This timeliness is greater when considering the period of full adoption, because the variable ($EARN_{it}$-$EARN_{it-1}$) * *IFRS* is statistically significant, although at the 0.10 level, and has a higher coefficient than the variable ($EARN_{it}$-$EARN_{it-1}$). This result demonstrates that full IFRS accounting information is more timely, confirming the research hypothesis regarding timeliness.

5.6. Cost of equity capital analysis by the difference-in-differences model

The effect of the full adoption of the IFRSs on the cost of companies' equity capital can be observed in the following table (Table 7).

The variable of interest, "mandatory IFRS adopters × post-mandatory adoption period," is statistically significant and has a negative sign, suggesting a reduction in the cost of capital of around 7 basis points for firms in the full adoption period. This result allows the research hypothesis concerning the cost of equity capital to be accepted, consistent with Lee et al. (2010) and Li (2010).

5.7. Relationship between the cost of equity capital and earnings quality

To verify the relationship between earnings quality and the cost of equity capital in the full adoption of the IFRSs, the DAs estimated by the KS model are assumed as a proxy for quality.

The results in Table 8 confirm the positive relationship between earnings management (EM) and the cost of equity capital, indicating that the higher the level of DAs, a proxy for EM, the higher the cost of equity. In this sense, the effect of management practices on the cost of equity capital can be represented by coefficient α_1 (0.276).

The role of the IFRSs can be investigated through the interaction between $|AD_{KS}|$ and IFRS, which reveals the effect of discretionary accruals on the cost of equity capital during the full adoption period (2010 and 2011). The variables $|AD_{KS}|$ and $|AD_{KS}|$ * IFRS indicate a reduction in the effect of discretionary accruals on the cost of equity, since the sum of coefficients α_1 and α_2 ($0.276 + (-0.159) = 0.117$) is less than α_1 (0.276). Therefore, these results provide evidence that the increasing earnings quality in the full adoption period contributed to reducing the cost of equity capital. However, the estimated coefficient for the variable |ADKS| * IFRS has a p value of 0.1724.

6. Robustness checks

6.1. Difference-in-differences model to observe the cost of equity capital

According to Bertrand et al. (2004), the difference-in-differences (DD) approach can present the problem of serial correlation. To

Table 8
Estimates to assess the relationship between the cost of equity capital and earnings quality.

$$r_{PEG_{it}} = \alpha_0 + \alpha_1|AD_{KS\,it}| + \alpha_2|AD_{KS\,it}|*IFRS_{it} + \alpha_3 SIZE_{it} + \alpha_4 DEBT_{it} + \alpha_5 CF_{it} + \alpha_6 ADR_{it} + \alpha_7 \mathrm{BCGI}_{it} + \alpha_8 \mathrm{VOL}_{it} + \varepsilon_{it} \quad (10)$$

Variables	Coefficients	t
C	0.066	0.487
|AD$_{KS}$|	**0.276**	**3.058*****
|AD$_{KS}$| * IFRS	**−0.159**	**−1.367**
ADR	0.013	0.826
BCGI	**−0.158**	**−2.983*****
VOL	−0.016	−1.134
SIZE	**0.019**	**2.663*****
CF	**−0.013**	**−3.701*****
DEBT	0.009	1.087
Industry	No	
N. Obs.	293	
Adjusted R^2	0.05	
F Statistic	3.030***	

Note: the coefficients were estimated according to the fixed-effect specification; r_{PEGit} is the cost of equity capital of firm *i* in year *t* estimated by price earnings growth (PEG); $|AD_{KS}|$ is the earnings management proxy of firm *i* in year *t*; IFRS is a dummy variable equal to one for observations in 2010 or 2011 and zero otherwise; *ADR* is a dummy variable assuming the value one if the company issues *ADR*; *BCGI* is a Brazilian corporate governance index; *VOL* is a dummy variable equal to one if the company adopted the IFRSs voluntarily, that is, before December 31, 2010; *SIZE* is the natural logarithm of the total assets of firm *i* in year *t*; *CF* is the net operating cash flow of firm *i* at the end of year *t*; and DEBT is the total debt divided by equity, both of firm *i* at the end of year *t*. Coefficients ***, **, and * are statistically significant at the 0.01, 0.05, and 0.10 level, respectively.

assess the problem, the transition period (2009 and 2010) can be deleted and then it can be verified that the estimates are consistent, including the interaction term "mandatory IFRS adopters × post-mandatory adoption period" (Table 9).

After excluding the years 2009 and 2010, the results show that the interaction term (−0.0515) is statistically significant. Therefore, the results remain robust after controlling for the serial correlation problem.

6.2. Estimates by the GMM system

In the context of econometric analysis, one of the problems observed in the literature is the presence of endogeneity (Larcker and Rusticus, 2010). Given the difficulty in identifying instrumental variables, the GMM system, which was developed by Arellano and Bover (1995) and Blundell and Bond (1998), can be used.

First of all, the method was applied to the earnings management (EM) model, which investigates the EM levels during the full adoption of the IFRSs. In unpublished results, the estimated coefficient for the IFRSs was negative and statistically significant, as expected, providing robustness to the previous results.

Table 9
Estimates generated for the cost of equity capital by the difference-in-differences model, excluding 2009 and 2010.

Variables	Coefficients	T
C	0.2591	1.67*
SIZE	−0.006	−0.09
RETVAR	0.0040	1.89*
LEV	−0.0719	−0.84
ADR	0.0285	1.52
BCGI	−0.2169	−4.53***
Mandatory IFRS Adopters	0.0465	2.18**
Post-Mandatory Adoption Period	0.0554	1.85*
Mandatory IFRS Adopters × Post-Mandatory Adoption Period	**−0.0515**	**−2.95*****
N. Obs.	332	
Adjusted R^2	0.04	
F Statistic	3.02***	

Note: r_{PEG} is the cost of equity capital of firm i in year t estimated by price earnings growth (PEG); SIZE is the natural logarithm of the total assets of firm i in year t; RETVAR is the standard deviation of the monthly stock returns for one year; LEV corresponds to the relation between total debt and total assets; BCGI is a corporate governance index based on Lopes and Walker (2012); ADR is a dummy variable equal to one if the company issues ADR; and the variable "mandatory IFRS adopters" is a dummy variable equal to one if a company does not adopt the IFRSs until 2010 and zero otherwise. It reveals the difference in the cost of equity capital between the two groups (mandatory versus voluntary adoption). The variable "post-mandatory adoption period" is a dummy variable equal to one if a firm year observation falls in 2010 or 2011 and zero otherwise. It shows the trend of an increase or decrease in the cost of equity capital. The variable "mandatory IFRS adopters × post-mandatory adoption period" reveals the true impact of full or mandatory adoption on the cost of equity capital, controlling the temporal effect. Coefficients ***, **, and * are statistically significant at the 0.01, 0.05, and 0.10 level, respectively.

Table 10
Estimates generated to assess the relationship between the cost of equity capital and earnings management: GMM system estimator.

Variables	Coefficients	Z
$\|AD_{KS,GMM}\|$	0.177	0.84
$\mathbf{\|AD_{KS,GMM}\|}$ *** IFRS**	**−0.895**	**−2.80*****
ADR	0.186	2.78***
BCGI	−0.077	−0.70
VOL	0.077	1.49
SIZE	0.020	1.30
CF	−0.018	−1.05***
DEBT	0.008	0.43
N. Obs.	154	
Instruments	23	
m1	−1.61 (0.1074)	
m2	−0.61 (0.538)	
J of Hansen	14.12 (0.434)	
Difference Sargan	0.23 (0.630)	

Note: r_{PEG} is the cost of equity capital of firm i in year t estimated by price earnings growth (PEG); |ADKS| is the earnings management proxy for firm i in year t; IFRS is a dummy variable equal to one for observations in 2010 or 2011 and zero otherwise; ADR is a dummy variable assuming the value one if the company issues ADR; BCGI is a Brazilian corporate governance index; *VOL* is a dummy variable equal to one if the company adopted the IFRSs voluntarily, that is, before December 31, 2010; SIZE is the natural logarithm of the total assets of firm i in year t; CF is the net operating cash flow of firm i at the end of year t; and DEBT is the total debt divided by equity, both of firm i at the end of year t. Coefficients ***, **, and * are statistically significant at the 0.01, 0.05, and 0.10 level, respectively.

The GMM system was applied to Basu's (1997) timely recognition model, generating some unpublished results. According to the original model, characteristics of conservatism are observed in the earnings, since the sum of coefficients β_2 and β_3 (1.257 +1.430) is greater than β_2 (1,257). Adding the IFRS variable to the original model reveals incremental timeliness of loss recognition, because the coefficient of 1.748, given by the variable *IFRS* * *DR* * *RET*, is positive and statistically significant at the 0.01 level, confirming increased conservatism in the full adoption period.

In the value relevance model, the statistical significance of the *EARN* variable indicates that accounting information is value relevant in the Brazilian capital market context. The estimate for the interaction between the *IFRS* dummy and *EARN* presents statistical significance at the 0.01 level, exhibiting a higher coefficient than the *EARN* (1.135 > 0.278) variable.

After applying the GMM system to the timeliness model, the findings reveal that the accounting information is timely in the Brazilian capital market, especially with the full adoption of the IFRSs, which showed a higher coefficient (1.595 > 0.302).

Finally, the cost of equity capital and earnings quality model is estimated by the GMM system (Table 10).

The variable $|AD_{KS,GMM}|$ is not statistically significant, probably due to the reduced number of observations. However, the interaction between $|AD_{KS,GMM}|$ and IFRS reveals a reduction in the cost of equity capital because of an increase in earnings quality. This result is consistent with the scenario of increasing earnings quality, providing greater robustness to the tests.

6.3. Synthesis of results

The earnings quality models are restricted in the dimensions: earnings management, conservatism, value-relevance and timeliness. The results for the earnings management model reveal signs of lesser earnings management. It should be noted, however, that the coefficient for the IFRS variable is significant at 10%, indicating that the result is weak. This can be explained by the possible presence of earnings management incentives (Watts and Zimmerman, 1986), regardless of the adopted GAAP.

With regard to conservatism, the models indicate an increase in conditional conservatism. Knowing that conditional conservatism consists of a greater degree of verification to reflect good news in the financial statements, and that economic circumstances should be adequately reflected in the financial reports, the higher degree of conservatism observed is consistent with the adoption of IFRS in Brazil. This may be justified by the new rules that have had effects previously not observed in the balance sheets of Brazilian companies, for example, the impairment standard and the greater use of fair value as a measurement basis. According to Ball (2006), the use of fair value implies more timely accounting information, and the impairment test allows prompt recognition of losses in long-term assets. Therefore, it can be concluded that the changes provided by IFRS are consistent with more informative accounting figures (Fig. 1).

For the dimensions of earnings quality called value-relevance and timeliness, the results indicate greater relevance and timeliness of accounting information in the context of the capital market. This result indicates that IFRS implies more usefulness for information users, consistent with other international studies (Alali and Foote, 2012; Barth et al., 2008; Chalmers et al., 2011; Cormier et al., 2009; Devalle et al., 2010; Horton and Serafeim, 2009). In addition, these results are consistent with the qualitative characteristics of the IASB's Conceptual Framework for Financial Reporting.

In this sense, IFRSs have contributed to a better quality of accounting information in the capital market, allowing investors to

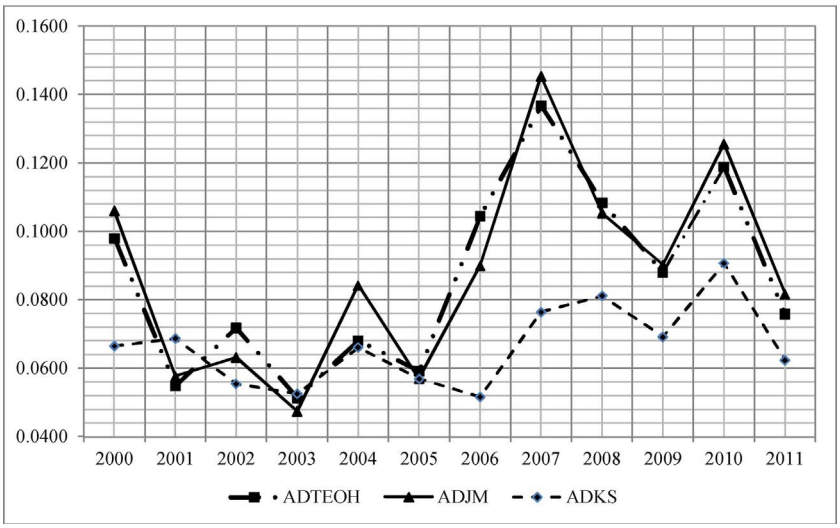

Fig. 1. Discretionary accruals estimated by the TEOH, JM, and KS models.
Note: ADTEOH are the discretionary accruals estimated using the model based on Teoh et al. (1998); ADJM are the discretionary accruals estimated using the model by Dechow et al. (1995); and ADKS are the discretionary accruals estimated using the model by Kang and Sivaramakrishnan (1995). The abscise axis shows the years, and the ordinate axis displays the discretionary accruals estimated by the earnings management models.

make a more appropriate assessment of the risks involved, given the lower level of information asymmetry. As a result, the investor may require a lower premium on investment opportunities, reducing transaction costs, which in turn contributes to a more efficient allocation of resources in the capital market. The results for the cost of equity are consistent with this expectation, as it suggests a reduction in the cost of capital of around seven basis points for firms in the full adoption period. Therefore, these evidences are favorable to the acceptance of the research hypotheses and corroborate many international studies that show the benefits in the adoption of the IFRS.

7. Conclusions

The objective of this study was to investigate the earnings quality and the cost of equity capital of Brazilian companies following the full adoption of the IFRSs.

The empirical evidence for the dimensions of earnings quality, earnings management, conservatism, value relevance and timeliness indicates acceptance of the hypothesis of an increase in earnings quality after full adoption of the IFRSs. In this sense, this set of results suggests an accounting model that indeed provides information for the capital market. Moreover, although Brazil is classified as a code law country, providing low protection for investors (La Porta et al., 1998), the benefits of full adoption of the IFRSs are observed in the case of Brazil.

With regard to the cost of equity capital, the models suggest a reduction after full adoption of the IFRSs, allowing the acceptance of the research hypothesis concerning the cost of equity capital. Considering that the IFRSs provide a higher level of disclosure for companies, this result is consistent with studies that find a negative relationship between the cost of equity capital and disclosure, such as Lopes and De Alencar (2010). There are many examples of the higher level of disclosure of IFRSs due to some transactions that were not previously accounted for or not accounted for appropriately, such as: i) share-based payment, ii) impairment testing, iii) financial leasing, iv) accounting of depreciation according to the consumption pattern of asset benefits, v) non-current assets held for sale, discontinued operations, and so on.

In this context, the IFRS financial statements can be informative, since taking into consideration economic events that were not previously accounted for may lead to the accounting numbers approaching the companies' true financial positions. Such information becomes value relevant for investors who are interested in evaluating companies.

The contribution of this paper is the investigation of the IFRS adoption in Brazil, which happened in two stages, in contrast to most countries, which have adopted the IFRSs in one step. The two-step adoption could have influenced the application and interpretation of the international standards by professionals, due mainly to the long preparation and study of the impact on local accounting. These may have reduced some of the difficulties associated with IFRS adoption (Larson and Street, 2004; Tokar, 2005; Neidermeyer et al., 2012), for example the new professional behavior regarding the change from a rules-based system (BR GAAPs) to one based on principles (IFRSs). In addition, the adoption of the IFRSs occurred in an unfavorable scenario to increase the quality of accounting information due to the characteristics of the Brazilian market, for example the institutional environment with weak corporate governance practices that do not ensure shareholders' rights.

Finally, the results for earnings quality and the cost of equity capital in this study support the proponents of IFRS statements regarding the economic consequences of adopting such standards and corroborate several empirical pieces of evidence. Furthermore, attention should be paid to the current chairman of the IASB, Hans Hoogervorst, who advocates an increase in the transparency of

Table A1
Companies in the sample and their respective initial IFRS adoption dates.

Adoption	Company	Sector	Initial Adoption Period
MAN	AES TIETE	Electric Energy	2010
MAN	ALL AMER LAT	Transport Services	2010
MAN	AMIL	Others	2010
MAN	ANHANGUERA	Others	2010
MAN	B2W VAREJO	Trade	2010
MAN	BR BROKERS	Others	2010
MAN	BRADESPAR	Others	2010
MAN	BRASIL TELEC	Telecommunication	2010
MAN	BRASKEM	Chemistry	2010
MAN	BRF FOODS	Food and Beverages	2010
MAN	BROOKFIELD	Construction	2010
MAN	CCR SA	Transport Services	2010
MAN	CEMIG	Electric Energy	2010
MAN	CESP	Electric Energy	2010
MAN	CIA HERING	Textile	2010
MAN	CONFAB	Iron and Steel	2010
MAN	COPEL	Electric Energy	2010
MAN	COSAN	Food and Beverages	2010
MAN	CPFL ENERGIA	Electric Energy	2010
MAN	CYRELA REALT	Construction	2010
MAN	DASA	Others	2010
MAN	DURATEX	Others	2010
MAN	ECODIESEL	Others	2010
MAN	ECORODOVIAS	Transport Services	2010
MAN	ELETROBRAS	Electric Energy	2010
MAN	ELETROPAULO	Electric Energy	2010
MAN	EMBRAER	Vehicles and parts	2010
MAN	ENERGIAS BR	Electric Energy	2010
MAN	EVEN	Construction	2010
MAN	GAFISA	Construction	2010
MAN	HYPERMARCAS	Others	2010
MAN	IOCHP MAXION	Vehicles and Parts	2010
MAN	ITAUSA	Others	2010
MAN	KLABIN S/A	Paper and Pulp	2010
MAN	LIGHT S/A	Electric Energy	2010
MAN	LLX LOG	Others	2010
MAN	LOCALIZA	Others	2010
MAN	LOJAS AMERIC	Others	2010
MAN	MARFRIG	Food and Beverages	2010
MAN	MMX MINER	Mining	2010
MAN	MPX ENERGIA	Electric Energy	2010
MAN	MRV	Construction	2010
MAN	MULTIPLAN	Others	2010
MAN	ODONTOPREV	Others	2010
MAN	OGX PETROLEO	Oil and Gas	2010
MAN	P.ACUCAR CBD	Trade	2010
MAN	PARANAPANEMA	Iron and Steel	2010
MAN	PDG REALT	Construction	2010
MAN	POSITIVO INF	Electro Electronics	2010
MAN	RANDON PART	Vehicles and Parts	2010
MAN	REDECARD	Software and Data	2010
MAN	ROSSI RESID	Construction	2010
MAN	SABESP	Others	2010
MAN	SID NACIONAL	Iron and Steel	2010
MAN	SUZANO PAPEL	Paper and Pulp	2010
MAN	TELEMAR	Telecommunication	2010
MAN	TELEMAR N L	Telecommunication	2010
MAN	TIM PART S/A	Telecommunication	2010
MAN	TRACTEBEL	Electric Energy	2010
MAN	TRAN PAULIST	Electric Energy	2010
MAN	ULTRAPAR	Chemistry	2010
MAN	VALEFERT	Chemistry	2010
MAN	Vivo	Telecommunication	2010
MAN	WEG	Industrial Machinery	2010
VOL	AMBEV	Food and Beverages	2008
VOL	BR MALLS PAR	Others	2009
VOL	CIELO	Software and Data	2009
VOL	COMGÁS	Oil and Gas	1st Q 2010

(continued on next page)

Table A1 *(continued)*

Adoption	Company	Sector	Initial Adoption Period
VOL	COPASA	Others	2009
VOL	ESTACIO SA	Others	1st Q 2010
VOL	FIBRIA	Paper and Pulp	1st Q 2010
VOL	GERDAU	Iron and Steel	2008
VOL	GERDAU MET	Iron and Steel	3rd Q 2007
VOL	GOL	Transport Services	2008
VOL	GRENDENE SA	Textile	1st Q 2010
VOL	INDÚSTRIAS ROMI S.A.	Industrial Machinery	1st Q 2010
VOL	JBS	Food and Beverages	1st Q 2010
VOL	LOJAS RENNER	Trade	1st Q 2010
VOL	LUPATECH S/A	Iron and Steel	2009
VOL	MARCOPOLO	Vehicles and Parts	1st Q 2010
VOL	MARISOL SA	Textile	1st Q 2010
VOL	NATURA	Trade	2009
VOL	NET S.A.	Others	2009
VOL	PETROBRAS	Oil and Gas	1st Q 2010
VOL	SOUZA CRUZ	Others	2008
VOL	TAM S/A	Transport Services	2009
VOL	TEGMA SA	Transport Services	1st Q 2010
VOL	TELESP	Telecommunication	1st Q 2010
VOL	TEREOS S/A	Food and Beverages	2nd Q 2010
VOL	TOTVS	Software and Data	1st Q 2010
VOL	USIMINAS	Iron and Steel	2009
VOL	VALE	Mining	1st Q 2010
VOL	VULCABRAS SA	Textiles	2nd Q 2010

Note: This table displays the final sample. The companies that disclosed their financial statements with full IFRSs before December 31, 2010 were considered in the anticipated or voluntary adoption group (VOL), in line with CVM deliberation 603 for 2009; the initial adoption period was defined after consulting the CVM website. CVM is the Brazilian Securities and Exchange Commissio.

financial statements (International Financial Reporting Standards—IFRS, 2011), and David Tweedie, ex-chairman, who justifies the reduction of the capital cost (Tweedie, 2006).

One of the limitations is the use of non-probabilistic sampling methods, making it impossible to generalize the results of the sample to the population. Moreover, the omitted variables, the variables' measurement errors, and the sample selection bias imply endogeneity problems. Nevertheless, the application of the systemic GMM (generalized method of moments), a more robust method, can reduce the incidence of these problems, as its use does not depend on the availability of exogenous instruments for the regressors.

Also regarding the limitations, the literature indicates that the models used to observe the qualitative characteristics of accounting information have restrictions. However, new correction methods and approaches were applied considering the development of the research area, for example the use of instrumental variables in the KS model. The full adoption period is limited to the years 2010 and 2011. Thus, it is suggested to extend the period of the IFRS adoption to continue the research. Next, there is the estimation model of the cost of equity capital based on the price earnings growth (PEG), which depends on the earnings per share estimates of analysts. However, the number of companies followed by analysts, available on the Thomson Reuters I/B/E/S system, is low relative to other markets, implying limited estimates.

On the other hand, the model to estimate the cost of equity capital (PEG) has some premises; for example, it is assumed that the abnormal growth expected in the earnings provides an unbiased estimate of this growth for the next periods. Therefore, there is a risk that the estimate does not represent companies' cost of equity capital adequately. Finally, to measure the effect of the full IFRS adoption, a dummy equal to one for observations in 2010 or 2011 and zero otherwise was used. However, it is known that the IFRS adoption may have been conducted differently among the companies in the sample. However, the limitations mentioned do not invalidate the findings of this paper, because they are consistent with the international evidence.

It is suggested that future research could analyse the level of asymmetric information using, for example, spreads or PINs to complement the analysis of the cost of equity capital. In addition, an investigation of the effects of the IFRS adoption on the cost of bank loans is recommended along with an examination of the cross-sectional variation in the adoption effect, such as the corporate governance factor and cross-listing status. Other proxies for earnings quality can be used, for example income smoothing and benchmark targeting. On the same line, other measures of the cost of equity capital that are available in the literature can also be applied, contributing to increasing the robustness of the tests.

Appendix A

See Table A1.

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