

Impact of IFRS 15 on the Quality of Accruals and Earnings Management of Brazilian Publicly Held Companies

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Abstract

Purpose – To verify the effects of the mandatory nature of the new rule on revenue recognition on the quality of accruals and earnings management in publicly held Brazilian companies listed on the B3.

Theoretical framework – By requiring greater judgment and discretion in assessing companies' performance obligations, IFRS 15 can provide greater scope for managerial influence on earnings quality.

Design/methodology/approach – A total of 305 Brazilian companies were used with annual data covering 2011 to 2021. As proxies for quality, the accruals quality model by Dechow and Dichev (2002) and the earnings management model by Pae (2005) were used. In addition, two models were estimated using quantile regressions to verify whether the new standard affects earnings quality.

Findings – After the adoption of the standard, there is evidence of a reduction in the quality of accruals of companies in the technology sector and an increase in earnings management in general, especially in the industrialized products sector. From the research, it is possible to verify that there is evidence that IFRS 15 did not bring improvements in earnings quality in Brazilian public companies.

Practical & social implications of research – Due to the failure to achieve the initial objectives expected by the implementation of IFRS 15 in Brazil, standard setters should monitor the evolution of the implications of the use of this standard, eventually seeking to improve it in the search to align the exercise of manager judgment to practices that improve the quality of accounting information.

Originality/value – This study provides evidence that a new accounting standard resulted in a reduction in the quality of reported earnings, contributing to the formulation of mechanisms to improve the application of the standard, especially in the most affected sectors.

Keywords: Revenues, earnings quality, earnings management, IFRS 15.

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I Introduction

The establishment of the new standard for the recognition and measurement of revenues (IFRS 15) may, by giving greater discretion over the steps contained in that standard, namely the moment of recognition or not of revenues, directly affect the quality of an entity's earnings, either because of the potential to show the aforementioned economic event with greater reliability or because of the possibility of greater earnings management. Given this scenario, this research aims to verify the effects of the new mandatory standard (IFRS 15) on revenue recognition and earnings quality in publicly traded Brazilian companies.

One of the objectives of the accounting standards internationalization process is to seek to reduce information asymmetry (Florou & Kosi, 2015), as well as increasing the comparability and transparency of reported information (Tsunogaya, 2016). Thus, as a result of this process of improving international standards, the International Accounting Standards Board (IASB) began to require, as of 2018, the adoption of International Financial Reporting Standard (IFRS) 15, which replaces a set of fragmented standards on revenues with a single guide applicable to all sectors (Huefner, 2016).

In Johnson's view (2018, p. 5), the abovementioned standard is relevant since revenues represent "[...] one of the most important measures used by investors in the current economy to assess a company's performance and prospects." This standard aims to correct weaknesses in several previous standards, by requiring more detailed information (Trabelsi, 2018).

The standard establishes a process to determine when it is possible to recognize revenue and measure its value (Cova, 2015). The fundamental principle of revenue recognition by this regulation is to better represent the transfer of goods and services at a value that best reflects the reality of the company (Aquino et al., 2019).

The benefits of adopting IFRS 15 include: the removal of inconsistencies from previous standards; a more robust structure; improved comparability across sectors; a reduction of complexity; a reduction in the volume of different interpretations; and providing more useful information (Oyedokun, 2016). On the other hand, the single model for the recognition and measurement of revenues will require greater judgment on the part of the preparers of financial statements, which may allow for the use of different practices, such as earnings management (EM from now on) (Johnson, 2018; Rutledge et al., 2016).

Therefore, the standard allows professionals to make choices and these judgments are closely related to the quality of the accounting information. According to Rutledge et al. (2016, p. 45), "[...] the moment of revenue recognition directly affects the predictive value of revenue values and earnings," which, if aligned with a transparent accounting standard, can improve the quality of the accounting information; otherwise, it can generate greater opportunities for EM, thus reducing the quality of the accounting information.

In general, the quality of accounting information can be understood as the usefulness of financial statements for information users (Ball & Shivakumar, 2005). For Perotti and Wagenhofer (2014), the quality of information is an important characteristic that embodies the idea that financial reports should be useful to different users when making decisions about resource allocation.

If earnings-related information is persistent and has predictive power, it is considered high-quality information. However, managers often reduce the quality of these earnings by deliberate manipulation due to the accounting system being permeated by judgments and estimates (Rutledge et al., 2016). Johnson (2018) states that, based on this new accounting standard, companies have discretionary power over their revenues, changing the amount to be recognized.

Studies that have analyzed the effects of IFRS 15 on earnings quality include that of Tutino et al. (2019) in a sample of Italian companies and the study by Morawska (2021) in Polish companies. Both studies find evidence that the standard allows for greater EM in both samples analyzed.

The present study advances by using a sample comprising companies in an emerging market (Brazil) with a more fragile regulatory environment than the European one. It also advances by adopting different models related to EM and earnings quality more comprehensively and segmenting the analysis by different sectors. Finally, a more comprehensive and contemporary sample is used compared to previous studies. Thus, it is understood that this study fills several gaps concerning the effects of the new revenue standard on earnings quality in publicly traded companies.

The earnings quality measures used in this research are the quality of accruals and earnings management based on discretionary accruals. In the study, we used metrics based on accruals to represent earnings quality.

The possible manipulations justify this decision in that adopting the new revenue standard allows managers to reduce the quality of information coming directly from the accounting statements. Thus, measures based on accruals may better reflect other metrics not directly influenced by management discretion. It is worth mentioning that the work does not aim to address the weaknesses of the standard but rather to empirically test whether the establishment of this new standard affects measures of earnings quality. Discussions about earnings focus on the expression “earnings quality” to represent the quality of accruals and earnings management.

The present study is relevant as it seeks to understand the effects of adopting a new accounting standard that affects an entire chain of calculated results, primarily revenues. According to standard setters, the new revenue standard removes inconsistencies and weaknesses from the previous ones, it presents a more robust structure, it improves comparability, and it provides more useful information to users (International Accounting Standards Board, 2014); that is, it is expected that with the adoption of this standard there will be an improvement in the quality of the information reported by entities. Thus, by taking into account that revenues can impact earnings quality through accruals, the study aims to contribute by helping to understand the behavior of managers regarding the implementation of IFRS 15, providing insights into its use and consequences for the various agents in the market. The Brazilian capital market differs from the studies previously analyzed due to its particularities.

The motivation behind the study is to achieve a better understanding of the effect of the revenue standard on earnings quality. Implementing this standard in the Brazilian environment is intended to improve the quality of information, with mechanisms aimed at the greater participation of various users. However, by attributing greater power of judgment to the preparer and the possibility of management influences, there are questions about the real impact of the standard on the quality of information and earnings. Thus, it is important to observe whether the norm serves as a tool that contributes to or mitigates the agency conflicts observed within an entity.

2 Literature review

2.1 Standardization and quality of accounting profit

The financial performance represented by earnings is considered an important input in decision-making (Latif et al., 2017). Therefore, to be useful, accounting earnings must provide relevant and reliable information for better decision-making (Dechow et al., 2010).

In search of better information quality, international standards aim for the report preparer to analyze the economic event in order to represent it with greater reliability, with a view to greater transparency and comparability between companies (Edeigba & Amenkhenan, 2017). According to Firth et al. (2017, p. 2), “[...] accounting policymakers and financial regulators expect IFRS standards [...] to increase transparency and comparability [...] and effectively contribute to the efficient functioning as well as the global integration of capital markets.”

If international standards are applied, accounting information will contribute to greater efficiency in the capital market. For Latif et al. (2017), profit represents an important variable in users’ decision-making process, measuring one of the forms of information quality in the standardization process.

Earnings quality as an aspect of financial reporting reliability is seen as an important feature, as it embodies “[...] the principle that financial reports should be useful to investors and other providers of capital in their decisions about resource allocation” (Perotti & Wagenhofer, 2014, p. 548).

When discussing the quality of accounting earnings, it is understood that low quality accounting reports are linked, among other factors, to manipulation of their information (Paulo, 2007). For García-Sánchez and García-Meca (2017), earnings quality refers to their stability and persistence, allowing for a more reliable estimate of a company’s future cash flows. For Cameran et al. (2014), earnings quality refers to lower EM, timely recognition of losses, and higher value relevance.

It is thus understood that there is not just one attribute that represents the quality of accounting earnings since it is not directly observable, and because of this, the literature on the subject has developed a variety of proxies that represent this aspect (Perotti & Wagenhofer, 2014).

Regardless of the proxy used to assess the quality of accounting information, reliability in the process of

recognition, measurement, and disclosure of organizational revenues is relevant as it affects a whole set of information, especially the economic result.

2.2 The new revenue recognition standard (IFRS 15)

The new standard for revenue recognition seeks to promote a more detailed analysis of contracts made with customers, and the various users of accounting information must understand the impacts that this new standard will have on various entities' operations (Oliveira et al., 2020).

As pointed out by Dani et al. (2017), in the old standard (IAS 18), the revenue generated by companies in the civil construction sector did not go through a detailed process and was recognized only at the time of completion of work or according to the evolution of the service, without making an individual distinction between goods and services contained in a contract. One of the main weaknesses of IAS 18 (or CPC 30 in Brazil) was the uncertainty about the recognition of revenue, that is, whether this should be at the time of sale or at the time of transfer of a particular asset that is the object of this revenue (Silva & Pierri, 2020).

IFRS 15, on the other hand, presents a more specific model for recognizing and measuring revenue in contracts with customers (Cova, 2015). According to Bauer and Centorrino (2017, p. 242), a fundamental principle of IFRS 15 is “[...] to recognize revenue to represent the transfer of promised goods or services to customers in an amount that reflects the amount to which the entity expects to be entitled in exchange for those goods or services.” The implementation of IFRS 15 allows the preparer of the financial statements greater judgment regarding the recognition of revenues. To this end, it established a five-step analysis process comprising:

[...] identifying the contract(s) with a customer; identifying performance obligations in the contract; determining the transaction price; allocating the transaction price to the contract's performance obligations; and recognizing revenue when (or as) the entity satisfies a performance obligation (Bauer & Centorrino, 2017, p. 242).

For Yeaton (2015), the main objective of this standard is to provide consistent principles for the process of recognition, measurement, and disclosure of revenue through greater detail and scope, which results in greater professional judgment about the recognition

and measurement of revenues. The greater professional judgment is also due to greater uncertainty in applying the standard.

According to Huefner (2016), managers responsible for revenue recognition decisions need to pay more attention to how their choices will be reflected in the entity's financial statements, while Johnson (2018) states that this recognition should go through a highly regulated process due to the discretionary power that companies have over their revenues.

This position by Johnson (2018) is ratified by Rutledge et al. (2016) and Bauer and Centorrino (2017). They believe that the new revenue recognition standard, requiring greater judgment in evaluating companies' performance obligations, provides greater space for a possible managerial influence on earnings quality.

Given this greater discretion arising from the increase in probabilistic expressions in the standard, Huefner (2016) reports several cases of fraud from revenue recognition, in which entities recognized revenue in advance as a way to increase their profits. Thus, as there is greater room for management judgment with the adoption of the new standard for revenue recognition, particularly in the measurement of performance obligations, the earnings quality may be harmed due to possible EM (Rutledge et al., 2016).

Although standard setters argue that the new standard improves the quality of information, authors such as Huefner (2016) and Rutledge et al. (2016) point out that this can negatively affect the earnings quality of entities.

Niyama et al. (2015, p. 76) comment that even if the statements were prepared aiming to offer better information to users, “[...] their elaboration and presentation by companies allow the adoption of procedures that reflect the management's judgment and, sometimes, may fall into the service of the particular interests of the administrator himself or the entity.”

Therefore, for Baldissera et al. (2019), adopting IFRS 15 will allow greater levels of discretion in revenue recognition, reflecting managers' accounting choices and allowing their judgments to serve their particular interests.

Thus, it appears that the subject is still controversial; however, based on the objectives for which IFRS 15 was proposed, the following research hypotheses are elaborated:

H₁: The adoption of the new standard on revenue recognition (IFRS 15) positively affects earnings quality by improving the quality of accruals.

H₂: The adoption of the new standard on revenue recognition (IFRS 15) positively affects earnings quality by reducing the level of earnings management.

3 Methodological procedures

3.1 Sample definition and data collection

Publicly held Brazilian companies listed on the B3 were selected as an initial sample to verify whether the obligation to comply with the new revenue accounting standard affects the quality of accounting earnings through the quality of accruals and earnings management. Table 1 presents the sample definition of the study:

The sample comprises 305 companies. Four hundred and three companies were excluded due to the lack of essential information for the models (assets and revenue). Another 26 companies were excluded because they belong to the financial sector, due to the particularities that make them incomparable with the others.

It is noteworthy that due to the particularities of the models used, related to lags, for the proxy obtained in the model of Dechow and Dichev (2002), the periods from 2011 to 2020 were used, while for the Pae model (2005), the periods from 2012 to 2021 were used, both totaling 3050 observations analyzed.

3.2 Dechow and Dichev's (2002) accruals quality model

Dechow and Dichev's (2002) model focuses on accruals generated through working capital, considering that cash flow realizations related to working capital usually occur within one year. Thus, through this approach, we

have a proxy that comprises the quality of corporate earnings that is based on the observation that an entity's earnings are equivalent to cash flows plus accruals, and the cash flow for a period can be categorized into three groups: CF_t^{t-1} = payments of amounts accumulated in t_{-1} (net); CF_t^t = current cash flows (net); and CF_t^{t+1} = deferred cash flows for t_{+1} (net).

To obtain the accruals, the variation in working capital (ΔWC) from year t_{-1} to t must be calculated, which is done as follows (Equation 1):

$$\Delta WC = \Delta AR + \Delta ST - \Delta AP - \Delta TP - \Delta OT \quad (1)$$

where: ΔWC = change in working capital from year t_{-1} to year t ; ΔAR = change in accounts receivable from year t_{-1} to year t ; ΔST = change in inventories from year t_{-1} to year t ; ΔTP = change in taxes payable from year t_{-1} to year t ; and ΔOT = change in other liquid assets from t_{-1} to t .

The measurement of accruals by Dechow and Dichev (2002) comprises the change in working capital, regressed with the three operating cash flow proxies, in periods t_{-1} (CFO_t^{t-1}), t (CFO_t^t), and t_{+1} (CFO_t^{t+1}), as shown in Equation 2:

$$\Delta WC_t = \alpha + \beta_1 CFO_{t-1} + \beta_2 CFO_t + \beta_3 CFO_{t+1} + \varepsilon_t \quad (2)$$

The regression residuals (ε_t) reflect the accruals that are not related to cash flow realizations, and the standard deviation of these residuals comprises a measure of the quality of the accruals, in which a higher standard deviation represents lower quality (Dechow & Dichev, 2002). Therefore, it is understood that the higher the residuals obtained in the regression, the lower the earnings quality is.

3.3 Pae's earnings management model (2005)

As a way of comparing (validating) the results of the analysis carried out using the accruals quality variable (Dechow & Dichev, 2002), discretionary accruals were used as a proxy for earnings management, measured according to Pae (2005). Pae's (2005) model is widely used by national studies, such as those of Alcoforado et al. (2019), Paulo and Mota (2019), and Silva and Lucena (2020), who used the model in a contemporary sample.

We chose to use the Pae (2005) model because it presents an advance in relation to other earnings management models based on Jones and Modified Jones. The main differential of this model is, according to Paulo (2007),

Table 1
Criteria for sample selection

Total companies between 2010 and 2021	734
(-)Companies without information on total assets	(340)
(-)Companies without information on net revenue	(63)
(-)Companies belonging to the financial sector	(26)
(=)Final number of companies in the sample	305

Note. Source: Research data.

the inclusion of variables related to operating cash flow and the natural reversal of accruals from previous periods.

To obtain it, initially, the total accruals must be measured (Equation 3), and then the parameters α , β_1 , β_2 , γ_1 , γ_2 , and γ_3 and discretionary accruals (DA) must be estimated according to Equation 4:

$$TA_t = ((\Delta CA_t - \Delta Cash_t) - (\Delta CL_t - \Delta STD_t) - Dep_t) / A_{t-1} \quad (3)$$

$$TA_t = \alpha \left(\frac{1}{A_{t-1}} \right) + \beta_1 (\Delta R_t) + \beta_2 (PPE_t) + \gamma_1 (CFO_t) + \gamma_2 (CFO_{t-1}) + \gamma_3 (TA_{t-1}) + \varepsilon_t \quad (4)$$

where: TA_t = total accruals in period t , weighted by total assets at the end of period t_{-1} ; ΔCA_t = change in current assets in period t ; ΔCL_t = change in current liabilities period t ; $\Delta Cash_t$ = change in cash and cash equivalents in period t ; ΔSTD_t = change in debt (loans and financing) of current liabilities in period t ; Dep_t = depreciation and amortization expense in period t ; ΔR_t = change in net revenues from period t_{-1} to period t , weighted by total assets at the end of period t_{-1} ; PPE_t = permanent asset account balances at the end of period t , weighted by total assets at the end of period t_{-1} ; CFO_t = operating cash flow at the end of period t ; CFO_{t-1} = operating cash flow at the end of period $t-1$; TA_{t-1} = total accruals in period t_{-1} ; A_{t-1} = total assets at the end of period t_{-1} ; and ε_t = regression error (residuals) representing the discretionary part of the accruals.

3.4 Definition of the econometric model

Econometric models were estimated using quantile regression to understand whether adopting IFRS 15 improved earnings quality (through the quality of accruals and earnings management). According to Koehler and Bassett (1978) and Montresor and Vezzani (2015),

because it is a semi-parametric technique, this method is beneficial because it is less sensitive to the presence of outliers and the occurrence of non-normal data, as well as the presence of data heterogeneity.

As pointed out by Duarte et al. (2017), using quantile regression corrects both problems related to the presence of outliers and the problem of a lack of normality in the distribution of errors, and it can reduce problems arising from heteroscedasticity, both observed in the previous results of this research. Also, quantile regression allows for the analysis of more detailed results, which cannot be captured through OLS estimation (Duarte et al., 2017).

Therefore, in the present research, the abovementioned estimation method is beneficial not only because of the presence of the characteristics indicated but also because it allows analyses of the trend and variations over time (before and after IFRS 15) of the increase or decrease in the quality of accounting information between companies and sectors, jointly considering the characteristics mentioned here.

The period analyzed comprises annual information between 2011 and 2021, where the years between 2011 to 2017 comprise the pre-mandatory period for the new revenue standard, and the years 2018 to 2021 represent the post-mandatory period.

The study sought to understand such variations in the sectors identified as the most affected by the inclusion of the new accounting standard for revenue recognition, according to research carried out by KPMG Auditores Independentes (2016) and Pricewaterhouse Coopers Brasil Ltda (2017), as well as by Huefner (2016), Gordon et al. (2017), and Johnson (2018). According to the abovementioned studies, the sectors indicated in Table 2 are more sensitive in revenue recognition depending

Table 2
Sectors most impacted by IFRS 15

Sectors	Stage				
	1	2	3	4	5
Fund managers			X		
Civil construction and real estate development	X	X	X		X
Custom manufacturers					X
Licensors (health, pharmaceuticals, and franchisors)	X	X			X
Software and technology		X		X	X
Telecommunications		X		X	

Source: KPMG Auditores Independentes (2016), Pricewaterhouse Coopers Brasil Ltda (2017), Huefner (2016), Gordon et al. (2017), and Johnson (2018).



on the stage analyzed, that is: Step 1 – identification of the contract with a customer; Step 2 – identification of performance obligations in the contract; Step 3 – determining the transaction price; Step 4 – allocation of the transaction price to contract performance obligations; and Step 5 – recognition of revenue when (or as) the entity satisfies a performance obligation (IASB, 2014).

Two models were used that analyze the impact of the new accounting standard on the quality of the entities' earnings. The dependent variable Quality of Accruals (QA) (Dechow & Dichev, 2002) was tested using these two models as follows:

$$|QA|_{it} = \alpha + \beta_1 IFRS15_{it} + \beta_2 SZ_{it} + \beta_3 ROA_{it} + \beta_4 IND_{it} + \beta_5 CFO_{it} + \beta_6 CG_{it} + \beta_7 REC_{it} + \varepsilon_{it} \quad (6)$$

$$|QA|_{it} = \alpha + \beta_1 IFRS15_{it} + \beta_2 CCRE_{it} + \beta_3 IPM_{it} + \beta_4 LIC_{it} + \beta_5 TEC_{it} + \beta_6 TELEC_{it} + \beta_7 IFRS15 * CCRE_{it} + \beta_8 IFRS15 * IPM_{it} + \beta_9 IFRS15 * LIC_{it} + \beta_{10} IFRS15 * TEC_{it} + \beta_{11} IFRS15 * TELEC_{it} + \beta_{12} SZ_{it} + \beta_{13} ROA_{it} + \beta_{14} IND_{it} + \beta_{15} CFO_{it} + \beta_{16} GC_{it} + \beta_{17} REC_{it} + \varepsilon_{it} \quad (7)$$

where: $|QA|_{it}$ = modulus of total accruals of company i in period t , according to the model of Dechow and Dichev (2002); $IFRS15_{it}$ = a dummy that assumes the value 1 for the periods after the adoption of the new accounting standard and 0 otherwise; SZ_{it} , ROA_{it} , IND_{it} , CFO_{it} , CG_{it} , and REC_{it} = the control variables represented by the size, return on assets, indebtedness, operating cash flow, corporate governance, and periods of recession, of company i in period t ; $CCRE_{it}$, IPM_{it} , LIC_{it} , TEC_{it} , and $TELEC_{it}$ = the dummy variables of the following sectors: civil construction and real estate development (CCRE), industrialized products and manufacturing (IPM), licensers – health (LIC), technology (TEC), and telecommunications (TELEC). The dummy variable assumes 1 for companies in the respective sector and 0 otherwise.

Finally, $IFRS15 * CCRE_{it}$, $IFRS15 * IPM_{it}$, $IFRS15 * LIC_{it}$, $IFRS15 * TEC_{it}$, and $IFRS15 * TELEC_{it}$ represent dummy variables that take 1 for companies in the individual sector for periods after the adoption of IFRS 15 and 0 otherwise; and ε_{it} = residuals of the regression of firm i in period t .

The first model (Equation 6) seeks to analyze whether there is higher earnings quality after adopting the IFRS 15 standard. For this purpose, a dummy variable was defined in which it receives the value 0 for periods before the adoption of the revenue standard and the value 1 for the periods after the adoption of the standard.

The second model (Equation 7) includes variables by sector, individualized and interactive, to identify which sectors are most influenced by the adoption of the new standard. The variables of interest were obtained by the interaction (multiplication) of the dummy of each specific sector (see Table 3) with the dummy IFRS15, which captures the effect of the period after adoption of the new standard. Therefore, each sector dummy variable only receives 1 for its respective sector in periods starting after 2018, for periods when the new revenue standard became mandatory.

The second analysis regarding earnings quality also uses a dummy variable to capture the effects of IFRS 15 and sectoral variables. However, the earnings quality was represented through discretionary accruals, representing an entity's level of EM. The discretionary accruals were obtained using the EM model of Pae (2005), representing the dependent variable of the model described in Equations 8 and 9:

$$|EM|_{it} = \alpha + \beta_1 IFRS15_{it} + \beta_2 SZ_{it} + \beta_3 ROA_{it} + \beta_4 IND_{it} + \beta_5 CFO_{it} + \beta_6 CG_{it} + \beta_7 REC_{it} + \varepsilon_{it} \quad (8)$$

$$|EM|_{it} = \alpha + \beta_1 IFRS15_{it} + \beta_2 CCRE_{it} + \beta_3 IPM_{it} + \beta_4 LIC_{it} + \beta_5 TEC_{it} + \beta_6 TELEC_{it} + \beta_7 IFRS15 * CCRE_{it} + \beta_8 IFRS15 * IPM_{it} + \beta_9 IFRS15 * LIC_{it} + \beta_{10} IFRS15 * TEC_{it} + \beta_{11} IFRS15 * TELEC_{it} + \beta_{12} SZ_{it} + \beta_{13} ROA_{it} + \beta_{14} IND_{it} + \beta_{15} CFO_{it} + \beta_{16} GC_{it} + \beta_{17} REC_{it} + \varepsilon_{it} \quad (9)$$

Table 3
Results of descriptive statistics of dependent and control variables

Variable	MN	MDN	SD	CV
QA	0.0590	0.0388	0.0552	0.9353
EM	0.0629	0.0432	0.0569	0.9056
SZ	6.4735	6.5493	0.8125	0.1255
ROA	0.0186	0.0289	0.0681	3.6551
IND	0.7365	0.6468	0.2762	0.3750
CFO	4.9195	5.4477	1.6704	0.3395

|QA| = Dechow and Dichev's (2002) Accruals Quality Modulus; |EM| = Pae's (2005) Earnings Management Modulus; SZ = Size; ROA = Return on Assets; IND = Indebtedness; CFO = Operating Cash Flow; MN = Mean; MDN = Median; SD – Standard Deviation; CV = Coefficient of Variation. Note. Source: Search Results.

where: $|EM|_{it}$ = modulus of discretionary accruals of company i in period t , obtained by the model of Pae (2005).

It is noteworthy that the modulus of the QA and EM variables were used due to their interpretation being the highest, the worst. The residues obtained in Equations 2 and 4 have negative and positive variations, and when using the modulus, they start to present only positive variations. Thus, with the use of the modulus, the intention is to capture only the distance of the residue from 0, regardless of the direction, which means that the further away from 0 the residue is, the lower the QA and the greater the EM. The application of the modulus of the dependent variables is in line with the research objective, which is to aim to analyze the reflection of the standard on earnings quality, regardless of whether this application increases or reduces earnings.

Finally, control variables were included, namely size (SZ = log of total assets), return on assets (ROA = net income/total assets), indebtedness (IND = (current liabilities + non-current liabilities)/total assets), operating cash flow (CFO), corporate governance (CG), and economic recession (REC), because, despite not being the object of study, the dependent variables can be influenced by them (Ball & Shivakumar, 2005; Cameran et al., 2014; Frankel et al., 2002; Paulo & Mota, 2019).

It is worth mentioning that in the models represented in Equations 6 and 8, the dummy variable IFRS15 may be capturing other effects that occurred between 2017 and 2018, including economic factors and changes in other standards, such as IFRS 9 and later IFRS 16. Thus, this analysis is more conservative due to this limitation of the variable. However, this limitation tends to be mitigated by the analysis carried out in the sectors identified as most affected by the standard, according to Equations 7 and 9.

4 Presentation and analysis of results

4.1 Descriptive statistics data

Tables 3, 4, and 5 present the descriptive statistics of the study variables to better understand the data set.

Initially, it is observed that the QA and EM variables have similar dispersions (SD and CV). Concerning the other variables, except for ROA, the dispersion observed by the coefficient of variation of the dependent variables is greater.

Table 4
Results of dummy variables by number of observations and companies

Variable	Dummy (0)	Dummy (1)	Total
IFRS15	1830	1220	3050
	-305	-305	-305
CCRE	2840	210	3050
	-284	-21	-305
IPM	1860	1190	3050
	-186	-119	-305
LIC	2960	90	3050
	-296	-9	-305
TEC	3010	40	3050
	-301	-4	-305
TELEC	3020	30	3050
	-302	-3	-305
IFRS15*CCRE	2966	84	3050
	-284	-21	-305
IFRS15*IPM	2573	477	3050
	-186	-119	-305
IFRS15*LIC	3014	36	3050
	-296	-9	-305
IFRS15*TEC	3034	16	3050
	-301	-4	-305
IFRS15*TELEC	3038	12	3050
	-302	-3	-305
CG	1620	1430	3050
	-162	-143	-305
REC	2135	915	3050
	-305	-305	-305

Note. The values in bold and constants outside the parentheses refer to the number of observations, and the values inside the parentheses refer to the number of companies, belonging to each type of dummy, whether 0 or 1. Source: Research results.

It is observed that the dependent and control variables have relatively high dispersion, particularly the ROA variable, which has a high coefficient of variation compared to the other variables. These results demonstrate the sample's heterogeneity and support the use of quantile regression, given the high data dispersion.

Next, to analyze the behavior of the dummy variables, the following table provides information for the independent variables relating to the new standard for revenue recognition, both for the global variable and the specific variables by sector.

According to the results of the dummy variables, there are some sectors with a higher number of observations and companies than others. It is noteworthy that for the IFRS15 variable, the same number of companies is repeated for the pre- and post-period, as the companies

Table 5
Results for medians and standard deviation of dependent variables

Quantile	PRE-IFRS 15				POST-IFRS 15			
	QA	SD	EM	SD	QA	SD	EM	SD
25	0.0161		0.0176		0.0169		0.0194	
50	0.0385	0.0555	0.0404	0.0549	0.0395	0.0543	0.0460	0.0595
75	0.0845		0.0823		0.0851		0.1009	

Note. |QA| = Dechow and Dichev's (2002) Accruals Quality Modulus; |EM| = Pae's (2005) Earnings Management Modulus; SD = Standard Deviation. Source: Research results.

are repeated throughout the sample period, and the same companies constant from 2011 to 2017 are repeated in 2018 to 2021; only the number of observations changes. The same occurs for the REC variable, considering it is a temporal dummy with the same number of companies. As for the sectoral variables, the quantity changes because it refers to companies belonging or not to each sector.

It is observed that the sector with the highest number of observations is IPM, followed by CCRE. The sectors with the lowest number of observations are LIC, TEC, and TELEC. It is worth mentioning that a large number of observations for dummy 0 in relation to dummy 1 are due to: (a) the number of years before mandatory IFRS 15 being higher; and (b) the existence of particularities of the Brazilian environment, which has few companies in specific segments, such as those listed in this study.

Finally, when performing quantile analyses, it is necessary to observe the behavior of interactions between variables for smaller groups of samples with similar characteristics concerning their quantiles. The following table presents such analyses:

Notably, both the QA variable and the EM variable denote low earnings quality; the higher the value obtained by each variable, the worse the earnings quality tends to be.

Note that there is a slight increase in QA in all quantiles, from the pre-IFRS 15 adoption to post-adoption period, which denotes a reduction in earnings quality, especially in the higher quantiles, where the reduction is accentuated in the post-IFRS 15 adoption period. The standard deviation of this variable was stable between the pre- and post-IFRS 15 periods.

When performing a test of difference of means for the QA variable, between the pre- and post-IFRS 15 period, a p-value = 0.8964 (that is, p-value > 0.05) was obtained, which denotes the non-rejection of the null hypothesis that the difference of means is equal to zero.

Therefore, for QA there is no significant change from the pre- to post-IFRS 15 periods.

The results relating to EM provide evidence of a small increase in the levels of this variable; that is, they corroborate the results of the first analysis, given the reduction in earnings quality with an increase in the levels of EM. Also, concerning the standard deviation, there is a slight increase in the dispersion from the pre- to post-IFRS 15 periods, which denotes an increase in risk.

Additionally, when carrying out the difference of means test for the EM variable, between the pre- and post-IFRS 15 periods, a p-value = 0.0001 (that is, p-value < 0.05) was obtained, which denotes the rejection of the null hypothesis that the difference of means is equal to zero. Therefore, it is observed that there is a significant difference in the means of EM between the periods analyzed, which denotes evidence of the influence of the abovementioned standard on earnings quality.

To better understand the data analyzed, the following section presents an analysis of model estimations using quantile regressions to test the research hypotheses.

4.2 Tests of quantile regression models

The results are arranged in three quantiles (0.25, 0.50, and 0.75), both for Model 1 (QA) and Model 2 (EM).

Wald tests were performed for all regressions to identify whether the estimated coefficients differed between the models for the three quantiles. The null hypothesis indicates that the impact of the variables analyzed is the same for all quantiles; thus, estimation using a single model is adequate. The results for the 12 estimated regressions indicate that the null hypothesis is rejected (p-value < 0.05); that is, the estimation using the quantiles shown here is robust. Table 6 provides the results regarding the dependent variable QA.

The results reported in Table 6 appear equivalent in all quantiles (in significance and sense), except for some

Table 6
Results of quantile regressions - Model 1

Variables/ Quantiles	Dependent Variable: QA – Dechow and Dichev (2002)					
	0.25	0.5	0.75	0.25	0.5	0.75
Constant	0.009126 (0.1245)	0.040724 (0.0001)***	0.102411 (0.0000)***	0.006851 (0.2543)	0.025726 (0.0189)**	0.094725 (0.0000)***
IFRS15	0.000387 (0.7600)	0.000653 (0.7534)	-0.002786 (0.4382)	0.001720 (0.2923)	0.000907 (0.7181)	-0.008005 (0.1241)
CCRE				0.014769 (0.0019)***	0.027738 (0.0000)***	0.027473 (0.0088)***
IPM				0.004843 (0.0013)***	0.007734 (0.0025)**	0.001067 (0.8294)
LIC				0.004875 (0.1301)	6.72E-05 (0.9887)	-0.006130 (0.5371)
TEC				0.010350 (0.0318)**	0.021402 (0.1057)	0.046210 (0.2493)
TELEC				-0.003521 (0.3309)	-0.009991 (0.0570)*	-0.020135 (0.0073)***
IFRS15*CCRE				0.007493 (0.6762)	0.019372 (0.1291)	0.014480 (0.3392)
IFRS15*IPM				-0.002526 (0.3619)	-0.003863 (0.3930)	0.003005 (0.6915)
IFRS15*LIC				-0.004700 (0.4156)	-0.003287 (0.6582)	-0.012003 (0.3480)
IFRS15*TEC				0.010397 (0.3982)	0.089486 (0.0001)***	0.065649 (0.1087)
IFRS15*TELEC				0.001378 (0.8518)	0.009397 (0.3574)	0.007978 (0.4131)
SZ	-0.000219 (0.8427)	-0.003829 (0.0616)*	-0.009743 (0.0037)***	-0.000439 (0.7077)	-0.003267 (0.1055)	-0.010754 (0.0034)***
ROA	0.005524 (0.7075)	0.028785 (0.1928)	0.055527 (0.0678)*	0.001720 (0.9070)	0.029880 (0.1805)	0.049042 (0.0907)*
IND	0.021249 (0.0000)***	0.051120 (0.0000)***	0.097320 (0.0000)***	0.021527 (0.0000)***	0.053798 (0.0000)***	0.100723 (0.0000)
CFO	-0.001226 (0.0878)*	-0.002848 (0.0352)**	-0.005905 (0.0010)***	-0.000846 (0.2641)	-0.001438 (0.2234)	-0.003495 (0.0895)*
CG	0.001924 (0.1333)	0.005430 (0.0072)***	0.009466 (0.0206)**	0.000199 (0.8848)	0.001481 (0.4752)	0.004502 (0.2872)
REC	-0.001359 (0.3090)	0.000229 (0.9185)	-0.002846 (0.4441)	-0.001670 (0.2182)	-0.000113 (0.9575)	-0.001424 (0.7044)
Note No.	3050	3050	3050	3050	3050	3050
Wald-Test	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LR Test	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VIF	1,021 - 2,792	1,021 - 2,792	1,021 - 2,792	1,021 - 2,792	1,021 - 2,792	1,021 - 2,792
Pseudo R ²	0.0169	0.0382	0.1006	0.0248	0.0553	0.1162

Note. This table reports the results relating to two models, one with a test only for the effect of the adoption of IFRS 15 and another for the sectors most influenced by the standard, for three quantiles, resulting in six different models. CCRE = civil construction and real estate development; IPM = industrialized products and manufacturing; LIC = health; TEC = technology; TELEC = telecommunications. The sectoral variables of interest interact with IFRS15 multiplicatively (IFRS15*). The values outside the parentheses represent the regression coefficients, the values inside the parentheses represent the p-value, and ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively. Source: Research results.

variables that present significance only in some quantiles. None of the significant variables shows sign inversion, which denotes that the variables behave linearly between the analyzed quantiles.

The results indicate no evidence that the IFRS15 variable is associated with the low quality of the companies' accruals, thus not initially supporting H_1 of the research. However, when performing the sectorial analysis, the following pieces of evidence are found: the sectors of civil construction (CCRE), industrialized products (IPM), and technology (TEC) showed a positive relationship with low earnings quality, which was statically significant in at least one of the quantiles. This result means that these sectors already presented lower earnings quality, through their accruals, regardless of the adoption of IFRS 15; the telecommunications sector (TELEC) presented a negative and significant relationship with earnings quality in two quantiles (0.50 and 0.75), which indicates that this specific sector already had better earnings quality. Finally, for the licensors sector (LIC), there is no evidence of a change in accruals quality, given the lack of statistical significance in any of the quantiles.

However, when analyzing the interaction of sectoral variables with the change in the standard, it is observed that in the period after the adoption of IFRS 15, the CCRE, IPM, and TELEC sectors lost significance, which denotes the possible effects of that standard on the quality of accruals in these sectors, identified as the most affected by the change in accounting standards. Only the technology sector (TEC) showed an increase in significance in one of the quantiles (0.50), which shows that the standard did not positively affect the earnings quality in this specific segment, which showed a positive and significant relationship at 1% with low quality accruals after the adoption of IFRS 15.

The control variables remain consistent across the quantiles in terms of their signs and, for the most part, significance, as some variables have significance only in one or two quantiles. It is also possible to note that concerning the R^2 of the models, the explanatory power is substantially better in the third quantile (0.75), since in both analyses the R^2 value in this quantile was substantially higher than in the others.

Next, the findings in Table 7 provide results for another earnings quality proxy, this time using discretionary accruals to represent the companies' EM level.

In the first regression, it is observed that the variable of interest of the research (IFRS15), which represents

the periods after the adoption of the revenue standard, denotes a positive and significant relationship with the discretionary accruals variable in the quartiles analyzed, except the first quantile (0.25). This result represents preliminary evidence that companies generally started to present higher EM in the periods after the adoption of IFRS 15, thus initially rejecting H_2 of the research. It is noteworthy that this finding is general, considering the limitation of the variable, which may be capturing effects other than that of the standard.

Additionally, when analyzing the sectors identified as the most affected by the new standard, there is also the presence of statistical significance for almost all sectors, both positively and negatively, at least in one of the quantiles, thus also initially rejecting H_2 of the research.

As in the previous results (Table 6), the civil construction and real estate development (CCRE) and technology (TEC) sectors showed a positive and significant relationship with EM; that is, they present a higher level of EM, regardless of the adoption of the new standard. On the other hand, the licensors (LIC) and telecommunications (TELEC) sectors started to show a negative relationship with EM, which shows that these segments use the discretion of accounting statements to manage earnings. Finally, the industrialized products sector (IPM) did not show a significant relationship in this analysis.

However, when specifically analyzing the effect of the standard on these segments, it is observed that the CCRE, LIC, TEC, and TELEC sectors lost significance after the adoption of IFRS 15, which indicates that this accounting standard may have mitigated the possibility of earnings management, thus positively influencing the quality of profits in these sectors. However, in the industrialized products sector, the norm was affected negatively, as it started to present a positive and significant relationship at 5% in one of the quantiles (0.25), which provides preliminary evidence of lower EM, with the norm negatively influencing earnings quality in this particular sector.

The analysis of the control variables is similar to the results in Table 6; that is, size (SZ) and operating cash flow (CFO) are negatively related to EM, and indebtedness (IND) and corporate governance (CG) are positively associated with EM. Additionally, the recession period (REC) had a negative relationship with the companies' EM.

Thus, there is evidence that adopting IFRS 15 reduced the earnings quality through decreased QA

Table 7
Results of quantile regressions - Model 2

Variables/ Quantiles	Dependent Variable: <i>Discretionary Accruals</i> (EM) – Pae (2005)					
	0.25	0.5	0.75	0.25	0.5	0.75
Constant	0.029940 (0.0001)***	0.080173 (0.0000)***	0.150844 (0.0000)***	0.025138 (0.0019)***	0.077251 (0.0000)***	0.158724 (0.0000)***
IFRS15	0.001971 (0.1560)	0.008203 (0.0001)***	0.013031 (0.0006)***	-0.000566 (0.7321)	0.003748 (0.1922)	0.014057 (0.0116)**
CCRE				0.009444 (0.0426)**	0.027239 (0.0219)**	0.049448 (0.0117)**
IPM				0.001991 (0.2674)	0.000298 (0.9153)	-0.000845 (0.8592)
LIC				0.010323 (0.0544)*	0.010567 (0.0665)*	0.002487 (0.8244)
TEC				0.020403 (0.0173)**	0.027685 (0.0023)***	0.015532 (0.2139)
TELEC				0.043291 (0.0001)***	0.051699 (0.0000)***	0.040632 (0.0000)***
IFRS15*CCRE				0.013146 (0.1223)	-0.000846 (0.9502)	-0.039994 (0.0881)*
IFRS15*IPM				0.006571 (0.0282)**	0.007036 (0.1064)	0.003541 (0.6700)
IFRS15*LIC				-0.008349 (0.3147)	-0.004158 (0.7522)	-0.005772 (0.7062)
IFRS15*TEC				-0.007936 (0.5006)	-0.006281 (0.8314)	-0.011630 (0.5473)
IFRS15*TELEC				-0.009933 (0.5711)	-0.016683 (0.1987)	-0.013277 (0.3503)
SZ	-0.003798 (0.0057)	-0.008601 (0.0011)***	-0.012629 (0.0000)***	-0.003026 (0.0397)**	-0.009696 (0.0001)***	-0.015250 (0.0000)***
ROA	0.008867 (0.5898)	0.007932 (0.7695)	0.033772 (0.3783)	0.006700 (0.6828)	-0.004810 (0.8530)	0.021447 (0.5828)
IND	0.017699 (0.0000)***	0.042686 (0.0000)***	0.069135 (0.0000)***	0.015447 (0.0002)***	0.041936 (0.0000)***	0.068215 (0.0000)***
CFO	-0.000272 (0.7365)	-0.003352 (0.0643)*	-0.007813 (0.0009)***	-8.26E-05 (0.9236)	-0.001491 (0.3976)	-0.006648 (0.0034)***
CG	0.003975 (0.0075)***	0.008184 (0.0002)***	0.011508 (0.0040)***	0.001265 (0.4184)	0.007050 (0.0033)***	0.011652 (0.0079)***
REC	-0.002363 (0.1104)	-0.001273 (0.5858)	-0.007426 (0.0429)**	-0.002468 (0.0943)*	-0.001383 (0.5529)	-0.005818 (0.1119)
Note No.	3050	3050	3050	3050	3050	3050
Wald-Test	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Teste LR	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VIF	1,021 - 2,792	1,021 - 2,792	1,021 - 2,792	1,021 - 2,792	1,021 - 2,792	1,021 - 2,792
Pseudo R ²	0.0121	0.0419	0.0935	0.0233	0.0538	0.1050

Note. This table reports the results relating to two models, one with a test only for the effect of the adoption of IFRS 15 and another for the sectors most influenced by the standard, for three quantiles, resulting in six different models. CCRE = civil construction and real estate development; IPM = industrialized products and manufacturing; LIC = health; TEC = technology; TELEC = telecommunications. The sectoral variables of interest interact with IFRS15 multiplicatively (IFRS15*). The values outside the parentheses represent the regression coefficients, the values inside the parentheses represent the p-value, and ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively. Source: Research results.

in the technology sector (TEC) and greater EM in the industrialized products sector (IPM). According to Watts and Zimmerman (1986) and Subramanyam (1996), this type of behavior may reflect opportunistic use of the discretion of the accounting standard.

4.3 Discussion of results

According to Huefner (2016), the results corroborate the idea that the sectors most affected by adopting the new revenue recognition standard are industrial products and technology sectors that provide aggregate goods and services with standardized prices.

Regarding the sector of industrialized product manufacturing companies (IPM), according to Oncioiu and Tănase (2016, p. 39), the accounting of the revenues of these companies can be impacted due to the particularities of allocation of the transaction price to performance obligations, variable considerations, uncertainties in the measurement of revenues, and guarantees. The issue regarding when control of an item is transferred according to the new model for revenue recognition is sensitive (Pricewaterhouse Coopers Brasil Ltda, 2017, p. 16) and, therefore, subject to greater EM, which was evidenced in Model 2, especially for companies located in the 0.25 quantile.

As for the technology sector, according to Pricewaterhouse Coopers Brasil Ltda (2017, p. 17), this sector offers “[...] often several products or services to its customers as part of a single agreement [...]” which makes the moment of application of the five steps complex. In addition, as they enter into complex licensing agreements, when determining whether the established license is an obligation, a relevant judgment must be made by professionals in these technology companies (Pricewaterhouse Coopers Brasil Ltda, 2017). In short, there is high discretion in applying IFRS 15, whose result, according to the data of this research, is lower quality information (QA) in one of the quantiles (0.50).

Negative relationships between sectors and earnings quality measures were not observed in any of the sectoral analyses after implementation of the standard. It was observed that some sectors lost significance, but this finding does not indicate that the sector started to present better earnings quality, but rather evidences possible effects of the norm on earnings quality.

In general, the results presented rejected the research hypotheses, given that after the IFRS 15 standard

became mandatory, some companies in the technology sector showed a lower level of accruals quality and, in the industrialized products sector, a higher level of earnings management. Therefore, the results indicate that, instead of encouraging an increase in earnings quality, IFRS 15 adoption allows for a reduction in informational quality and greater earnings management for companies belonging to specific sectors.

The results are in line with those of Healy and Wahlen (1999) and Niyama et al. (2015), who claim that accounting standards that allow managers to exercise greater judgment about what should be reported in their statements can create opportunities for them to manage earnings through the use of accounting methods that do not reflect the economic events of the company. This probably occurred due to what Aquino et al. (2019) emphasize is the fundamental principle of the recognition of revenues, which is to represent the effective transfer of goods or services, leaving room for interpretations that suggest greater discretion. That was shown in this study by the increase in earnings management and decrease in earnings quality.

Therefore, the findings allow us to conclude that even though standards issued by the IASB are intended to provide better information to users, they may allow for the use of procedures that reflect the opportunistic judgment of managers, with negative effects on earnings quality in some sectors (Baldissera et al., 2019; Niyama et al., 2015).

5 Final considerations

This study estimated two models of earnings quality in a panel using quantile regressions, namely the Quality of Accruals model by Dechow and Dichev (2002) and the Earnings Management model by Pae (2005), to verify whether the mandatory nature of the new rule on revenue recognition in contracts with customers affected the earnings quality of Brazilian companies.

In the first model, a dummy variable was tested for the periods after the new standard on revenue recognition (IFRS 15) became mandatory. In the second model, five multiplicative dummies were tested for companies belonging to sectors identified as the most “influenced” by the standard: civil construction, industrialized products and manufacturing, licensors – health, technology, and telecommunications.

The result related to earnings quality did not present a positive and significant relationship between

low quality accruals and the periods of validity of the new accounting standard. That is, after IFRS 15 became mandatory in Brazil, there were no effects on the quality of accruals, thus rejecting H_1 of the research. In the sectoral analysis, some evidence indicates that the technology sector started to report lower quality accruals.

The results for the EM model showed a positive and significant relationship with the implementation of IFRS 15, in general and specifically for the industrialized products sector, thus rejecting H_2 of the research. These results agree with Cameran et al. (2014), who pointed out that adopting IFRS standards would increase earnings management.

Therefore, the results provide evidence that the inclusion of the new accounting standard on revenue recognition, measurement, and disclosure can reduce the quality of accruals (rejecting H_1) and increase the level of earnings management (rejecting H_2), which, generally speaking, may imply a reduction in the earnings quality reported by companies.

Although the IASB's fundamental objective is to provide quality standards for the best decision-making of users, it is inferred from this research that standards based on principles that attribute greater power of judgment to managers negatively impact the quality of accounting information. More specifically, it appears that the IFRS 15 standard increased the level of discretion compared to previous standards on revenue recognition, providing managers with choices that negatively impacted the quality of reports.

The results of this research must be observed considering the limitations inherent to the variables used (QA and EM), the period, and the companies that comprise the sample. For future research, it is suggested that studies be carried out on the impact of the new revenue standard on the sectors that had a significant relationship with earnings quality.

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