

IFRS adoption and credit ratings: A comparative study in emerging and developed markets

Bruno Ferraz Ferreira¹

 <https://orcid.org/0000-0003-3930-2842>

Email: ferraz.bruno@outlook.com

Lucas A. B. de C. Barros²

 <https://orcid.org/0000-0002-9319-1306>

Email: lucasbarros@usp.br

Renê Coppe Pimentel²

 <https://orcid.org/0000-0002-8845-049X>

Email: renecp@usp.br

¹ Independent researcher not currently affiliated, São Paulo, SP, Brazil

² Universidade de São Paulo, Faculdade de Economia, Administração, Contabilidade e Atuária, Departamento de Contabilidade e Atuária, São Paulo, SP, Brazil

Received on 12/27/2022 – Desk acceptance on 01/31/2023 – 4th version approved on 12/05/2023

Editor-in-Chief: Andson Braga de Aguiar

Associate Editors: Márcia Martins Mendes De Luca and Eduardo da Silva Flores

ABSTRACT

The study examined the effects of mandatory International Financial Reporting Standards (IFRS) adoption on the quality of accounting information from three perspectives: the ability of accounting figures to explain credit ratings and their evolution after IFRS adoption; the difference in information gains from mandatory IFRS adoption between emerging and developed countries; and the identification of aspects of national governance capable of explaining these information gains. This article differs from the existing literature in three respects: it uses a more comprehensive and heterogeneous sample of emerging and developed countries; it uses the bootstrapping resampling method for a consistent analysis of the results; and it examines the heterogeneity of the effects of IFRS adoption as a function of country-level development and governance characteristics. The study reinforces the relevance of accounting information for analyzing companies' credit risk and makes new contributions to the literature on the heterogeneity of the effects of IFRS adoption. By using a multi-country sample, the article has potential implications for national and international accounting and finance literature, and is also useful for regulators and international portfolio managers. The analyses were based on the ratings and annual accounting data of 566 companies domiciled in 36 countries over the period from 2005 to 2017, using a bootstrapping resampling method. This article documented that mandatory IFRS adoption increased the ability of accounting data to explain the credit ratings assigned by rating agencies. Moreover, it was found that this relationship is, on average, more pronounced in emerging economies. The analysis also showed a positive relationship between the control of corruption and the information gain associated with IFRS adoption.

Keywords: international accounting, IFRS, credit market, ratings, governance.

Correspondence address

Lucas A. B. de C. Barros

Universidade de São Paulo, Faculdade de Economia, Administração, Contabilidade e Atuária, Departamento de Contabilidade e Atuária
Avenida Professor Luciano Gualberto, 908 – CEP: 05508-010
Butantã – São Paulo – SP – Brazil

This is a bilingual text. This article was originally written in Portuguese and published under the DOI <https://doi.org/10.1590/1808-057x20231843.pt>
This article stems from a master's thesis defended by the author Bruno Ferraz Ferreira, in 2019.



Adoção das IFRS e ratings de crédito: um estudo comparativo em mercados emergentes e desenvolvidos

RESUMO

O estudo investigou os efeitos da adoção mandatária das Normas Internacionais de Contabilidade (International Financial Reporting Standards [IFRS]) sobre a qualidade das informações contábeis sob três aspectos: a capacidade dos números contábeis explicarem os ratings de crédito e sua evolução após a adoção das IFRS; a diferença em termos de ganho informacional com a adoção mandatária das IFRS entre países emergentes e desenvolvidos; e a identificação de aspectos de governança nacional capazes de explicar os referidos ganhos informacionais. Este artigo se diferencia da literatura existente em três aspectos: utiliza amostra mais abrangente e heterogênea, composta por países emergentes e desenvolvidos; utiliza o método de reamostragem por bootstrapping para análise consistente dos resultados; e investiga a heterogeneidade dos efeitos da adoção das IFRS como função do nível de desenvolvimento e das características de governança no nível do país. O estudo reforça a relevância da informação contábil para a análise do risco de crédito das empresas e traz novas contribuições à literatura sobre a heterogeneidade dos efeitos da adoção das IFRS. Ao utilizar amostra de diversos países, este artigo tem potencial impacto na literatura contábil e financeira nacional e internacional, também se mostrando útil para reguladores e gestores de portfólios internacionais. As análises se basearam nos ratings e dados contábeis anuais de 566 empresas domiciliadas em 36 países, durante o período de 2005 a 2017, por meio de método de reamostragem por bootstrapping. Este artigo documenta que a adoção mandatária das IFRS aumentou a capacidade dos dados contábeis explicarem as classificações de crédito atribuídas pelas agências de classificação de risco (agências de rating [AR]). Ademais, evidencia que essa associação é, em média, mais acentuada em economias emergentes. E indica, ainda, relação positiva entre controle da corrupção (CC) e ganho informacional associado à adoção das IFRS.

Palavras-chave: contabilidade internacional, IFRS, mercado de crédito, ratings, governança.

1. INTRODUCTION

The literature provides several pieces of evidence that the adoption of the International Financial Reporting Standards (IFRS) is associated with an improvement in the quality of accounting information, suggesting that financial statements now more reliably reflect the economic situation of companies (Souza & Borba, 2022; Barth et al., 2008; Houque et al., 2014), increasing the degree of comparability between financial statements in different jurisdictions (Signorelli et al., 2022). However, the literature also indicates that the benefits of adopting IFRS may depend on the value judgments of accountants and the regulatory environment in which the standards are applied (Daske et al., 2008).

If, on the one hand, studies provide empirical evidence of the gains in comparability resulting from the use of IFRS (Brochet et al., 2013; Yip & Young, 2012), on the other hand, there are arguments (and evidence) against the use of a “one size fits all” accounting standard for different firms and jurisdictions (Cascino & Gassen, 2015). Therefore, it can be seen that there is still no well-established consensus in the literature on the effects of adopting international standards.

Much of the literature focuses on the effects of IFRS adoption on European Union (EU) member states or on the effects of the transition in a single jurisdiction (Florou & Kosi, 2015; Florou et al., 2017). However, the growing adoption of IFRS in the international arena makes it possible to assess its effects in economically and institutionally heterogeneous environments, especially after the 2008 financial crisis, which reinforced the relevance of studies on the credit market by showing its impact on the real economy (Gozzi et al., 2010) and on the role of rating agencies (RAs) in the financial market, their methods of assessing credit risk and the possible conflicts of interest arising from the business (Fracassi et al., 2016). However, there are few findings on the effects of accounting and changes in financial statement disclosure standards on the credit market (Ball et al., 2015).

Against this background, the aim of this article is to analyze the effects of mandatory IFRS adoption on the quality of accounting information relevant for the assessment of companies’ credit risk. Specifically, it analyzes the ability of accounting figures to explain

the credit risk categories assigned to companies by RAs, in the contexts of pre- and post-IFRS adoption in countries, with the aim of comparing the information gains in emerging and developed markets. The paper also analyzes the relationship between the results found and the quality of governance mechanisms at the country level.

Research on the effects of mandatory IFRS adoption is relevant for the following reasons:

1. Given the number of countries that have adopted IFRS, it can be considered successful in its global dissemination process;
2. The effects of adoption are relatively recent, as most countries have adopted the standards in the last two decades;
3. In addition to being a recent practice in several countries, the effects of IFRS are not homogeneous, as accounting standards are constantly evolving and are adopted in very different contexts.

Another relevant aspect is the weight of RAs and their ratings in emerging markets, since, according to Luo and Tung (2007), external perceptions that local institutions are fragile and non-transparent lead companies to seek verification of their credit quality from international entities. In this context, RAs meet the needs of these companies due to the global recognition and credibility of their assessments. Thus, IFRS would have a more profound impact on credit ratings in countries with weaker institutional quality, suggesting that IFRS increases confidence in financial statements (Tawiah & Gyapong, 2021). Therefore, research on credit ratings is potentially more important for emerging markets. In addition, Kraft et al. (2021) show that while mandatory IFRS adoption may have increased accounting quality and provided capital market benefits to equity investors, there is no clear evidence of similar benefits for debt investors. This conflicting result suggests the relevance of the issue and the need for further research.

With regard to comparing the effects of IFRS on different levels of economic development and the influence of corporate governance at the national level, few studies were found, which reinforces the importance of this study. This article differs from the

existing literature, especially the related study by Florou et al. (2017), in three respects:

1. The use of a more comprehensive and heterogeneous sample composed of emerging and developed countries;
2. The use of the bootstrapping resampling method to statistically test the differences between the explanatory power metrics (pseudo R-squared of ordered probit regressions with panel data) of pre- and post-IFRS rating prediction models in the population of interest, which suggests that the empirical results documented are not merely due to sampling variation (error), but rather an effective increase in the ability of accounting data to explain the credit ratings assigned by RAs; and
3. The unprecedented examination of the heterogeneity of the effects of IFRS adoption in the context of ratings analysis as a function of country-level development and governance characteristics.

The results suggest that the explanatory power of accounting information for firms' credit ratings increased after the mandatory adoption of IFRS in both developed and emerging countries. However, this information gain was significantly larger in emerging market countries. Furthermore, after isolating the time-invariant characteristics (fixed effects) of the countries, the analysis reveals that the gain in relevance of accounting information associated with mandatory IFRS adoption was more pronounced in the more advanced countries according to the "control of corruption" indicator. In contrast, no evidence of such moderation was found using the other country-level governance indicators provided by the World Bank. Taken together, the evidence from this research suggests that IFRS adoption can provide information gains for the analysis of corporate credit risk, but in a heterogeneous manner and depending on the governance characteristics and level of development of the adopting countries.

In addition to this introduction, Section 2 presents the literature of interest and the development of the research hypotheses. Section 3 presents the research design and operational procedures. Section 4 presents the results of the analysis. Finally, Section 5 presents the conclusions and concluding remarks.

2. LITERATURE OF INTEREST AND HYPOTHESES

An extensive body of literature investigates the determinants of credit ratings assigned to firms. Most

of the studies that have developed models to predict the ratings assigned by agencies have achieved good results

using indices derived from accounting figures (Bhat et al., 2014; Chan et al., 2013; Florou et al., 2017; Wu & Zhang, 2014). In particular, two recent studies presented empirical evidence that the use of IFRS as a standard for preparing financial statements improves the ability of accounting figures to explain company ratings (Tawiah & Gyapong, 2021; Florou et al., 2017) and increases their sensitivity to variations in the main indices used to assess credit risk (Wu & Zhang, 2014).

Certain accounting standards and principles established by IFRS can influence the ability of accounting figures to assess the credit risk of companies (Moody's, 2004; S&P, 2004; Bhat et al., 2014). Thus, accounting information is directly responsible for the objective factors in the assessment of credit risk perceived by creditors and RAs, such as debt levels, debt composition and specialization, and financial constraints (Eça & Albanez, 2022; Granzotto et al., 2023), while another part is due to subjective factors that are not fully reflected in the financial data, mainly because they involve expectations about the company's performance, the future economic scenario, and the prospects of the sector in which it operates, among other aspects (Fracassi et al., 2016).

In this sense, Chan et al. (2013) found evidence of an improvement in ratings after the mandatory adoption of international standards. However, the causal effect is not directly related to the quality of accounting information, but rather to the increased credibility of companies that choose to prepare their financial statements based on IFRS. On the other hand, Florou et al. (2017) suggest that such standards may not be that relevant, since agencies, as service providers, have access to private information relevant for assessing credit risk, and the new information presented in the financial statements would already have been incorporated by the RAs. Kraft, Landsman and Shan (2021), in turn, argue that while mandatory IFRS adoption may have increased accounting quality and provided capital market benefits to equity investors, the authors find no clear evidence of similar benefits for debt investors. This conflicting evidence highlights the relevance of the issue and the need for further research.

Therefore, there is no consensus on the effects of mandatory IFRS adoption on the relevance of accounting information for assessing credit risk. In this sense, Bhat et al. (2014) analyze the explanatory power of accounting indicators relevant to credit risk and include country-level variables in the models, but do not document significant differences between the pre- and post-adoption periods. The interactions with the institutional aspects included in the analysis were also not relevant.

Wu and Zhang (2014) analyze the change in the sensitivity of ratings to a credit risk factor composed of three accounting indicators and variables from the countries in the sample and document that voluntary IFRS adoption increases the sensitivity of ratings to this credit risk factor, especially for economies with strong legal enforcement, demonstrating the ability of the relationship between institutional characteristics and IFRS to influence the relevance of accounting information for assessing credit risk.

Similarly, Florou et al. (2017) compare the relevance of accounting information for credit risk under local GAAP (Generally Accepted Accounting Principles) and IFRS in a sample of 202 firms from 17 countries and document an improvement in the explanatory power of accounting information after the adoption of international standards, but do not use formal hypothesis testing to account for sampling error in this comparison. In addition, the study documented a more pronounced improvement in model performance after mandatory IFRS adoption for speculative grade ratings.

Florou et al. (2017) suggest that the greater relevance of IFRS for assessing credit risk would be related to the improvement in the comparability of information across firms, resulting from the reduction in the use of different rules for measuring and recognizing assets and liabilities across countries. For example, for credit ratings, the convergence of rules would result in reduced measurement errors at the country level, since with IFRS adoption, accounting figures are now calculated based on what is determined by a single regulator. Consequently, convergence would increase comparability between companies in different jurisdictions and facilitate the process of assessing credit risk, which benefits from comparisons between companies. These arguments are important given the empirical evidence on the ability of IFRS to improve the quality and comparability of accounting information (Souza & Borba, 2022; Barth et al., 2008; Yip & Young, 2012). Based on these arguments and the available evidence on the relationship between IFRS and credit ratings, the first research hypothesis suggests that:

H₁: mandatory IFRS adoption has improved the ability of accounting figures to explain the credit ratings assigned by RAs.

However, it cannot be ruled out that IFRS, while providing new information and more comparable figures, offers limited benefits in some countries, not only because of the relationship between accounting standards and regulatory and institutional aspects but also because the

principle-based approach prevails over the normative approach in international standards, which increases the degree of subjectivity of the accounting rules. As a result, there is more room for interpretation by regulators and local accountants, which would explain the existence of different accounting practices even among countries that fully apply IFRS (Nobes, 2011).

Therefore, the gains in quality and comparability of accounting information may not be constant across countries, as they are conditioned by regulatory and institutional factors (Houqe et al., 2014), such as the level of legal enforcement (Daske et al., 2008), legal origin (Wu & Zhang, 2014) and the degree of capital market development (Roychowdhury et al., 2019). In addition, the benefits of adopting international standards also depend on the local GAAP previously used, particularly with respect to the level of disclosure of information relevant to credit risk analysis.

In addition, empirical evidence shows that accounting figures are more relevant in explaining ratings when the company's credit risk is higher (Tawiah & Gyapong, 2021; Florou et al., 2017; Givoly et al., 2017). In this sense, studies show that, compared to developed economies, emerging economies have higher levels of risk, less developed capital markets, weaker legal enforcement and corporate governance mechanisms, and a greater concentration of company ownership (Tawiah & Gyapong, 2021; Claessens & Yurtoglu, 2013). These factors contribute to greater information asymmetry between managers and investors in these economies, which can result in accounting figures that do not reliably reflect the real economic situation of companies.

In line with this idea, companies in emerging markets have a higher credit risk than those in developed countries, which is directly related to the higher risk of the economic environment in which they operate. Therefore, based on the premise that the effect of mandatory IFRS adoption on accounting information may vary across countries, and that the credit ratings of emerging market companies may be better explained by accounting figures because they are more risky, it is predicted that, after the mandatory adoption of international standards, the performance gain of accounting figures in explaining ratings will be, on average, more pronounced in emerging markets than in developed ones. To the best of our knowledge, there is no evidence in the available literature to support this hypothesis, which reinforces the importance of the

results obtained in testing it. Thus, the second research hypothesis examines whether:

H₂: the improvement in the ability of accounting figures to explain credit ratings brought about by mandatory IFRS adoption is, on average, more pronounced for emerging market companies than for developed market companies.

Even though, on average, the emerging markets group does not show significantly greater information gains than the developed countries group, the arguments support the hypothesis that aspects of governance at the national level can influence the effects of IFRS adoption, regardless of the level of development of the countries. Thus, this study also seeks to provide evidence on which of these aspects are most relevant in explaining the different effects of international standards on the explanatory power of accounting figures in relation to credit ratings.

Previous literature addresses certain characteristics of countries that may influence the effects of IFRS adoption. Daske et al. (2008) document that the positive effects of international standards on reducing the cost of capital and increasing the value of firms' shares depend on the incentives for transparency and the level of legal enforcement in the jurisdictions where they are adopted. In addition, Bhat et al. (2014) point out that companies' incentives to report quality information depend on the regulatory and institutional aspects of their environment. Thus, environments where the relevance of companies' accounting information is low due to low market demand (for example, where private companies predominate) would also tend to have low legal enforcement. In addition, the subjectivity of IFRS, due to its principle-based rather than normative approach, makes the institutional environment even more important in ensuring that the standards are properly interpreted by local regulators and accountants.

Therefore, assuming that external governance mechanisms (EGMs) at the country level can affect the quality of accounting information, it is expected that they will also affect the ability of accounting figures to explain the credit ratings assigned by RAs, since weak mechanisms would translate into greater freedom to engage in earnings management, opportunistic accounting choices and a lower level of convergence to IFRS, among other aspects. These arguments justify the third research hypothesis:

H₃: the improvement in the ability of accounting figures to explain credit ratings brought about by mandatory IFRS adoption is more pronounced in countries with better EGMs.

3. RESEARCH METHODOLOGY

3.1 Sample Composition and Description

The main criteria for the selection of the countries of domicile of the companies were the full and mandatory adoption of IFRS, the identification of the year in which this occurred, as well as the existence of a credit rating assigned to the company in the country. The definition of the collection period was determined according to the full and mandatory adoption of IFRS. The first adopters of IFRS were the EU member states in 2005, while the last adopter was Malaysia in 2013. As adoption took place at different times, the data collection period for each country varies according to the year in which mandatory IFRS adoption took place.

The initial sample consisted of the credit ratings of 4,674 non-financial companies in 104 countries. The information, both financial and ratings, was collected from Bloomberg systems.

Following a similar procedure to Florou et al. (2017), credit ratings and financial data were collected from annual statements prepared based on local GAAP from five years before and five years after the full and mandatory transition to IFRS (up to ten annual observations were collected for each company between 2000 and 2017). Thus, the period analyzed for each

company varies depending on its country of domicile. For the statistical models, this reduces the noise caused by temporal factors that may operate in certain periods, as the possible effects of mandatory IFRS adoption are not analyzed in just one period, but in several different periods simultaneously.

A procedure similar to that of Wu and Zhang (2014) was adopted to collect the accounting data needed to calculate a set of three fundamental credit risk indicators: (i) return on assets; (ii) degree of leverage; and (iii) interest coverage capacity. In addition, (iv) capital intensity; and (v) firm size were also taken into account.

Companies for which the required financial data were not available for the periods before and after mandatory IFRS adoption were removed from the sample. Also removed were companies that did not provide information on the accounting standard used to prepare their statements (local GAAP or IFRS), as well as those that did not present ratings for both periods, did not adopt international standards, or did so voluntarily.

After applying these selection criteria, the sample used to test the hypotheses consisted of 563 firms domiciled in 36 countries, totaling 4,647 firm-year observations. Table 1 describes the effect of each sample composition criterion on the final number of companies and observations.

Table 1
Sample selection criteria applied to the original data

Description	Firms	Firm-years
Non-financial companies with a credit rating from Moody's, S&P Global Ratings or Fitch between 2000 and 2017 in countries that mandatorily adopted IFRS.	4,674	36,464
Observations outside the five-year period before and after mandatory IFRS adoption in the country of domicile.	(2,231)	(20,096)
Firms with missing data for any of the periods or no information on the accounting standard used to prepare the financial statements.	(1,610)	(9,711)
Firms that have not adopted IFRS or have done so voluntarily.	(270)	(2,010)
Total number of observations in the final sample.	563	4,647

Source: Prepared by the authors.

The information used to obtain the credit ratings was provided by one of the three RAs with the greatest market share in the international market: Moody's, S&P, and Fitch. Taking into account the ratings of the three largest RAs reduces the agency selection bias and increases the robustness of the results, since a larger number of countries are included in the sample (Lima et al., 2018). In the case of firms rated by more than one RA, the assignment procedure was carried out in two steps. In the first, the average rating assigned to the company by

each RA was calculated, taking into account the entire sample period. In the second step, only the annual ratings of the most conservative RA, i.e. the one with the lowest average rating, were assigned to the company. In any case, the ratings used in the sample were the last ones assigned to the companies in each year.

To ensure the comparability of ratings across countries, credit ratings of long-term debt issuers were collected on a global scale and in foreign currency. According to the RAs, credit ratings on a global scale are internationally

comparable, which is convenient for this work since the sample includes several countries in different economic conditions (see, for example, Fitch Ratings, 2020).

Following the procedure carried out by Florou et al. (2017), Wu and Zhang (2014), and in other related works, the credit ratings were grouped into broader classifications and converted from literal categories, from AAA to C, to numerical ones, from 8 to 1. (i.e., AAA = 8; AA = 7; A = 6; BBB = 5; BB = 4; B = 3; CCC = 2; CC/C = 1). In addition, although Moody's rating scale is presented differently, the scales of the three agencies were converted to a general scale. It is assumed that the RA analysis method is sufficiently comparable to carry out this procedure without affecting the results obtained. Furthermore, previous studies have used ratings from different agencies and obtained similar results (Lima et al., 2018; Florou et al., 2017; Wu & Zhang, 2014).

Table 2
Sample composition by country in terms of period and quantity

Country	Development Level (MSCI)	Mandatory IFRS Adoption	Sample Interval	Firms-Years	%	Pre-IFRS	Post-IFRS
Argentina	E	2012	2007 – 2016	122	2.6%	58	64
Australia	D	2005	2000 – 2009	324	6.9%	147	177
Austria	D	2005	2000 – 2009	7	0.1%	2	5
Belgium	D	2005	2000 – 2009	18	0.4%	8	10
Belgium	E	2010	2005 – 2014	340	7.3%	146	194
Chile	D	2011	2006 – 2015	729	15.6%	321	408
Chile	E	2009	2004 – 2013	201	4.3%	95	106
Czech Republic	E	2005	2000 – 2009	9	0.2%	4	5
Denmark	D	2005	2000 – 2009	21	0.4%	7	14
Finland	D	2005	2000 – 2009	69	1.5%	32	37
France	D	2005	2000 – 2009	368	7.9%	156	212
Germany	D	2005	2000 – 2009	182	3.9%	76	106
Greece	E	2005	2000 – 2009	20	0.4%	10	10
Hong Kong	D	2005	2000 – 2009	119	2.5%	46	73
Ireland	D	2005	2000 – 2009	14	0.3%	6	8
Israel	D	2008	2003 – 2012	26	0.6%	11	15
Italy	D	2005	2000 – 2009	102	2.2%	41	61
Luxembourg	D	2005	2000 – 2009	40	0.9%	15	25
Malaysia	E	2013	2008 – 2017	64	1.4%	30	34
Mexico	E	2012	2007 – 2016	182	3.9%	90	92
Netherlands	D	2005	2000 – 2009	144	3.1%	69	75
New Zealand	D	2005	2000 – 2009	38	0.8%	18	20
New Zealand	D	2007	2002 – 2011	86	1.8%	37	49
Peru	E	2012	2007 – 2016	9	0.2%	4	5
Philippines	E	2006	2001 – 2010	39	0.8%	17	22
Poland	E	2005	2000 – 2009	21	0.4%	7	14
Portugal	D	2005	2000 – 2009	36	0.8%	16	20
Russia	E	2012	2007 – 2016	133	2.8%	63	70
Singapore	D	2009	2004 – 2013	64	1.4%	29	35

Table 2

Cont.

Country	Development Level (MSCI)	Mandatory IFRS Adoption	Sample Interval	Firms-Years	%	Pre-IFRS	Post-IFRS
South Africa	E	2005	2000 – 2009	40	0.9%	15	25
South Korea	E	2011	2006 – 2015	173	3.7%	74	99
Spain	D	2005	2000 – 2009	117	2.5%	58	59
Sweden	D	2005	2000 – 2009	146	3.1%	65	81
Taiwan	E	2012	2007 – 2016	97	2.1%	47	50
Turkey	E	2005	2000 – 2009	47	1.0%	22	25
United Kingdom	D	2005	2000 – 2009	500	10.7%	236	264
Developed	D	-	-	3,150	67.8%	1,396	1,754
Emerging	E	-	-	1,497	32.2%	682	815
All	-	-	-	4,647	100.0%	2,078	2,569

Note: Level of development assigned according to MSCI categories, with "E" for emerging economies and "D" for developed ones. For simplicity, frontier economies are classified as emerging. Years of mandatory IFRS adoption provided by the IFRS Foundation. Credit ratings provided by Bloomberg. For Moody's, ratings from the senior unsecured (investment grade) and corporate family ratings (speculative grade) categories were sampled, and for S&P and Fitch, long-term foreign currency ratings were sampled. For all agencies, ratings on a global scale were collected.

Source: Prepared by the authors.

Table 3 shows the descriptive statistics of the annual samples of credit ratings for the pre- and post-IFRS adoption periods and for developed and emerging countries. As expected, the average rating of emerging

market companies is lower than that of developed market companies for both the period before and the period after the adoption of international standards.

Table 3

Descriptive statistics for the sample of credit ratings

Panel A: Pre-IFRS ratings						
	N	Mean	SD	P25	Median	P75
Emerging	682	4.42	1.06	4	5	5
Developed	1,396	5.24	1.00	5	5	6
All	2,078	4.97	1.09	4	5	6
Panel B: Post-IFRS ratings						
	N	Mean	SD	P25	Median	P75
Emerging	815	4.44	1.09	4	5	5
Developed	1,754	5.10	0.98	5	5	6
All	2,569	4.89	1.06	4	5	6

Note: This table presents the descriptive statistics of the sample credit ratings in the pre- and post-IFRS periods, separated between emerging market and developed market firms. Following Florou et al. (2017) and Wu and Zhang (2014), the overall rating scales were numerically converted as follows: AAA = 8; AA = 7; A = 6; BBB = 5; BB = 4; B = 3; CCC = 2; CC/C = 1.

Source: Prepared by the authors.

The data distributed among the rating classifications for the sub-samples show that the distribution of ratings for emerging countries is negatively asymmetric with respect to that for developed countries, i.e. emerging countries have a greater number of speculative grade companies (rating below BBB), which is considered by the RAs to be evidence of the higher average credit risk of these economies.

3.2 Empirical Model and Description of Variables

Hypotheses H₁ and H₂ refer to the increased ability of accounting data to explain credit ratings after mandatory IFRS adoption, and whether this effect has been greater in emerging countries compared to developed countries. Similar to the method used by Florou et al. (2017), the

hypotheses are assessed by comparing the explanatory power (pseudo R-squared) of ordered probit regression models with panel data. In addition, to assess whether the difference in model performance is significant, the process is repeated several times with new samples randomly drawn from the original data (bootstrapping). This allows a two-tailed t-test to be performed for the difference between the pseudo R-squared means of the simulated samples.

The tests of hypotheses H_1 and H_2 use ordered panel data probit models, which are appropriate for cases where the dependent variable is discrete, with multiple categories and a natural order, such as credit ratings.

$$Rating_{it} = \beta_0 + \beta_1 ROA_{it} + \beta_2 LEV_{it} + \beta_3 COV_{it} + \beta_4 CI_{it} + \beta_5 SIZE_{it} + u_{it}$$

1

where,

$Rating_{it}$ = credit rating of company i in period t ;

ROA_{it} = return on assets, calculated as $EBITDA_{it} / TotalAssets_{it}$, $EBITDA$ being the earnings before interest, taxes, depreciation, and amortisation;

LEV_{it} = financial leverage, calculated as $TotalDebt_{it} / TotalAssets_{it}$;

COV_{it} = interest coverage, calculated as $EBITDA_{it} / FinancialExpenses_{it}$;

CI_{it} = capital intensity, calculated as $FixedAssets_{it} / TotalAssets_{it}$; and

$SIZE_{it}$ = company size, calculated as $\ln(TotalAssets_{it})$ where u is the error term of the model. Since the analysis is based on the overall performance of accounting indicators as factors explaining credit ratings, the inclusion of control variables or fixed effects would have undesirable effects on the performance measures of the models, as it would make it difficult to attribute explanatory power only to the independent variables of interest, in this case the accounting indicators. Therefore, other variables should not be included in the models. In addition, to mitigate the effect of outliers, winsorization was applied to the 1st and 99th percentiles for all indicators.

Since probit-type models are always estimated using the maximum likelihood method, McFadden's (1974) pseudo R-squared is used as a measure of the explanatory power of the model, and the differences between the pseudo R-squared before and after mandatory IFRS adoption are the object of the study, rather than the values themselves.

Specifically, to evaluate hypothesis H_1 , a comparison is made of the pseudo R-squared values estimated based on two different samples: (i) one consisting only of credit ratings and accounting indicators calculated for the periods prior to mandatory IFRS adoption in the

Therefore, the dependent variable in all the models testing hypotheses H_1 and H_2 is the credit rating of company i in each period t ($Rating_{it}$), which can vary from 1 to 8 according to the conversion scale (AAA = 8; AA = 7; A = 6; BBB = 5; BB = 4; B = 3; CCC = 2; CC/C = 1). The set of independent variables in the models consists of five accounting indicators related to credit risk: (i) return on assets (ROA_{it}); (ii) financial leverage (LEV_{it}); (iii) interest coverage (COV_{it}); (iv) capital intensity (CI_{it}); and (v) firm size ($SIZE_{it}$). The indicators were chosen based on the work of Lima et al. (2018), Florou et al. (2017), and Wu and Zhang (2014). Thus, Equation 1 assumes the following notation:

countries; and (ii) the other consisting only of ratings and indicators measured in the periods after adoption.

The test of hypothesis H_2 follows the same evaluation criteria, but in addition to dividing the sample into pre- and post-adoption periods, it is further divided into two other groups: (i) companies domiciled in emerging economies; and (ii) companies domiciled in developed economies, according to the MSCI classifications. In this way, it is possible to compare the differences in the explanatory power of accounting information with respect to ratings in four scenarios: (i) pre-IFRS emerging economies, (ii) post-IFRS emerging economies, (iii) pre-IFRS developed economies, and (iv) post-IFRS developed economies.

However, simply checking the difference between the average pseudo R-squared values of the models in each sample, as done by Florou et al. (2017), is not sufficient to ensure that the differences found are statistically significant. For this purpose, the bootstrapping method is used in a way that is unprecedented in the literature, in which the original data used in the models are resampled multiple times at random and with repetition (Ohtani, 2000).

Thus, for each new sample obtained through this process, a new pseudo R-squared is calculated until enough statistics are obtained to construct a sampling distribution. The data are re-sampled at two different levels: (i) the firm level; and (ii) the observation level. Also, hypothesis tests are performed at both levels.

Specifically, the bootstrapping resampling method consists of creating pseudo-random samples from the original data. Based on the sampling distribution of the test statistic, it is possible to construct confidence intervals and perform hypothesis tests on the pseudo R-squared differences (Ohtani, 2000). In this sense, hypotheses H_1

and H_2 can be evaluated using the t-test for differences between sample means.

Hypothesis H_3 is related to the search for explanations for the different gains observed across countries in terms of the ability of accounting data to explain credit ratings after mandatory IFRS adoption, and suggests that this condition is related to the quality of the EGMs of the jurisdictions where adoption takes place.

Similar to the method used by Wu and Zhang (2014) and Lima et al. (2018), the test of hypothesis H_3 is based on the analysis of the regression coefficients of the interactions between the EGMs and IFRS, which constitute an interactive relationship. For this purpose, regressions are estimated where the dependent variable is the pseudo R-squared calculated in the periods before and after mandatory IFRS adoption in each country.

First, following a procedure similar to that used to test hypotheses H_1 and H_2 , the original sample of ratings and accounting data from the firms is grouped by country of domicile, forming sub-samples for each country. Each sub-sample is, in turn, grouped into observations from the years before and after mandatory IFRS adoption so that each country has a sub-sample for each period. The next step is to estimate McFadden's (1974) pseudo R-squared for each sub-sample using ordered probit models. This gives values that represent the overall quality of the models for the pre- and post-adoption periods in each country.

An ordinary least squares (OLS) model with panel data is used to test hypothesis H_3 . In this model, the dependent variable ($R2_{jt}$) is composed of the pseudo R-squared values for each country j in each period t obtained from the previous procedure. The set of independent variables is represented by the countries' Worldwide Governance Indicators (WGI) calculated annually by the World Bank: (i) voice and accountability (VA_{jt}), which includes aspects ranging from freedom of expression to trust in

government finances; (ii) political stability and levels of violence/terrorism (PV_{jt}), which refers to the presence of political instability and violence as a result of the same aspect; (iii) government effectiveness (GE_{jt}), which is measured by the quality of the country's public institutions, which includes levels of bureaucracy, commitment to government policies and the quality of services provided to the population; (iv) regulatory quality (RQ_{jt}), which refers to the ability of government institutions to implement measures that promote the development of the private sector in their country, such as tariff and tax policies, levels of protectionism, measures to control prices and monopolies and also practices that promote financial liberalism; (v) rule of law (RL_{jt}), which refers to agents' confidence in the law and legal institutions, as well as certainty regarding the enforcement of contracts and property rights; and (vi) control of corruption (CC_{jt}), which is related to the rule of law and concerns the tendency of the government to exercise its power for individual gain, i.e. to favor private interests.

The empirical model (Equation 2) uses the means of each indicator in the years before and after IFRS adoption. In this way, the data panel of the model shows longitudinal variation over only two periods.

In order to assess whether there is a relationship between the EGMs and IFRS adoption, interaction terms between the indicators and a binary variable representing the period before ($IFRS_{jt} = 0$) and after ($IFRS_{jt} = 1$) the adoption of international standards are included in the model. Country fixed effects are also included in the model in the form of a set of binary variables representing the countries in the sample to isolate any time-invariant characteristics at the national level that may influence the dependent variable, including stable differences in the level of corporate credit risk and financial market development. Equation 2 is described as follows:

$$\begin{aligned}
 R2_{jt} = & \beta_0 + \beta_1 VA_{jt} + \beta_2 PV_{jt} + \beta_3 GE_{jt} + \beta_4 RQ_{jt} + \beta_5 RL_{jt} + \beta_6 CC_{jt} \\
 & + \beta_7 (VA_{jt} \times IFRS_{jt}) + \beta_8 (PV_{jt} \times IFRS_{jt}) + \beta_9 (GE_{jt} \times IFRS_{jt}) \\
 & + \beta_{10} (RQ_{jt} \times IFRS_{jt}) + \beta_{11} (RL_{jt} \times IFRS_{jt}) + \beta_{12} (CC_{jt} \times IFRS_{jt}) \\
 & + \beta_{13} IFRS_{jt} + \text{Fixed Effects (Country)} + \varepsilon_{jt}
 \end{aligned}$$

2

where,

$R2_{jt}$ = pseudo R-squared in country j and period t , estimated based on Eq. 1;

$IFRS_{jt}$ = variable indicating mandatory IFRS adoption in country j ;

VA_{jt} = indicator of voice and accountability;

PV_{jt} = indicator of political stability and levels of violence;

GE_{jt} = indicator of government effectiveness;

RQ_{jt} = indicator of regulatory quality;

RL_{jt} = indicator of the quality of the rule of law;

CC_{jt} = indicator of the control of corruption.

During the course of this research, the WGI indicators were updated annually, were available for around 200 countries, and presented data from 1996 to 2017. The

scale is presented in two ways. In the first, the scores given to countries range from -2.5 to 2.5, with -2.5 being the worst quality and 2.5 being the best possible assessment. The second is in the form of percentiles, which are merely derived from converting the previous scale for the purposes of ranking countries.

The governance indicators used in Equation 2 are highly correlated (correlations are not reported to save space), so an overall governance indicator was created

from the simple average of the individual indicators. This aggregate indicator, called WGI_{jt} , represents the overall quality of the countries' governance mechanisms. By using this aggregate indicator, potential problems in interpreting the regression coefficients of the specific indicators related to multicollinearity are eliminated. However, with this approach, the model no longer directly identifies the six aspects of governance on which it focuses. Equation 3 is presented as follows:

$$R2_{jt} = \beta_0 + \beta_1 WGI_{jt} + \beta_2 (WGI_{jt} \times IFRS_{jt}) + \beta_{13} IFRS_{jt} + \text{Fixed Effects (Country)} + \varepsilon_{jt}$$

3

4. RESULTS

4.1 Mandatory IFRS Adoption and Credit Ratings

Panel A of Table 4 shows the average pseudo R-squared values calculated based on the ordered panel data probit models estimated in each sub-period (pre- and post-IFRS), as well as the difference between the results. At first glance, the explanatory power of the model estimated in the post-IFRS periods (0.128) exceeds that of the pre-IFRS periods (0.081) by 0.047, which represents an increase of approximately 58% in the ability of accounting data to explain credit ratings after the mandatory adoption of international standards.

Although they showed a greater difference, the results obtained are consistent with those of Florou et al. (2017), who documented a growth of 0.025 between the periods. Since the variables included in the models are similar, the difference between the studies is mainly due to the samples used.

However, an analysis based solely on the difference in the explanatory power of the models does not provide adequate support for evaluating hypothesis H₁. For this reason, 1,000 pseudo-random samples were taken from the original sample using the bootstrapping resampling method described above. This process was carried out both at the level of individual observations (firms and years) and at the level of firms alone.

Table 4
Evolution of explanatory power between pre- and post-IFRS periods

Panel A: Pseudo R-squared values estimated with original data

Sample	Pre-IFRS (A)	Post-IFRS (B)	(B) – (A)
Original	0.081	0.128	0.047

Panel B: Pseudo R-squared values estimated with simulated data

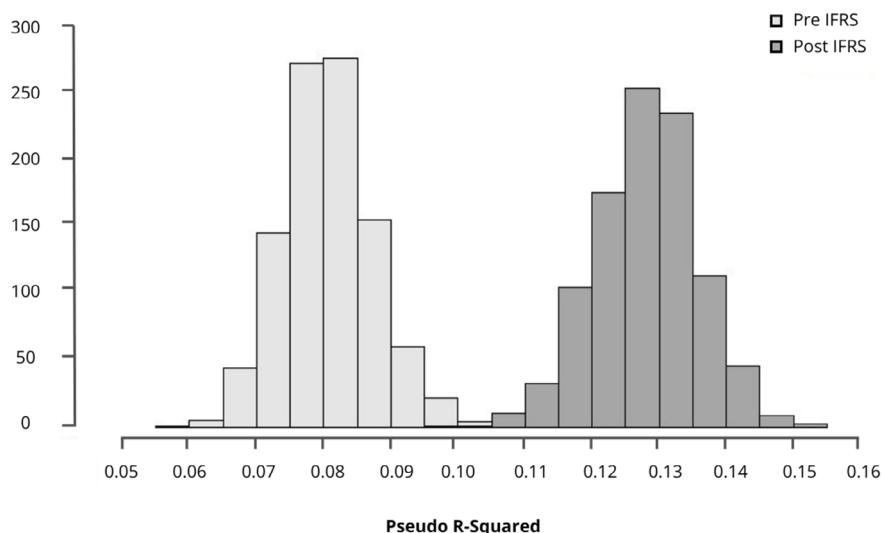
Sample	Pre-IFRS (N = 1000)			Post-IFRS (N = 1000)			(B) – (A)	P-value
	P05	Mean (A)	P95	P05	Mean (B)	P95		
Firm and year simulation	0.070	0.081	0.093	0.115	0.128	0.141	0.047	< 0.001
Firm simulation	0.061	0.083	0.105	0.105	0.130	0.155	0.049	< 0.001

Note: This table shows the gains in explanatory power with IFRS adoption, measured by the pseudo R-squared obtained after estimating the ordered probit models represented by Equation 1 ($Rating_{it} = \beta_0 + \beta_1 ROA_{it} + \beta_2 LEV_{it} + \beta_3 COV_{it} + \beta_4 CI_{it} + \beta_5 SIZE_{it} + u_{it}$) in the pre- and post-adoption periods based on three analyses: (i) with the original data (Panel A); (ii) with 1,000 bootstrap resamples for firms and years (Panel B); and (iii) with 1,000 bootstrap resamples for firms only (Panel B).

Source: Prepared by the authors.

Therefore, 1,000 pseudo R-squared values were estimated from the simulated samples for both the pre- and post-IFRS adoption periods. The results of testing hypothesis H₁ using

simulated data at both levels are shown in Panel B of Table 4, and the pseudo R-squared histograms for each simulated period for firms and years are shown in Figure 1.

**Figure 1** Histograms of pseudo R-squared for the pre- and post-IFRS periods

Source: Prepared by the authors.

Consistent with the results obtained with the original data, the difference between the sample mean of the simulations of firms and years is 0.047, 0.081 for the period before and 0.128 for the period after IFRS adoption. To complement the observed results, when simulations were performed only at the firm level, the difference of 0.049 between the sample means of the periods is similar to that of the other models, which reinforces the evidence obtained. The results of the two-tailed t-tests for differences between the sample means show that there was a significant increase in the ability of accounting data to explain the ratings assigned by the RAs after IFRS adoption for both types of simulation performed. Therefore, the null hypothesis of no change in this sense is rejected at conventional significance levels.

4.2 Developed and Emerging Economies and the Relationship between IFRS Adoption and Credit Ratings

Panel A of Table 5 shows the pseudo R-squared values obtained from the models estimated with original data for each period for companies in emerging and developed countries, as well as the differences between the results. It can be seen that in the case of companies in developed countries, the explanatory power of the accounting data with respect to ratings increased by 0.030 after IFRS adoption. For emerging market companies, the models showed an increase of 0.064, which is approximately 113% higher than for developed market companies.

Table 5
Evolution of explanatory power between periods and levels of development

Panel A: Pseudo R-squared values estimated with original data								
Sample	Pre-IFRS (A)		Post-IFRS (B)		(B) – (A)			
Developed (1)	0.088		0.118		0.030			
Emerging (2)	0.136		0.200		0.064			
(2) – (1)	0.048		0.082		0.034			
Panel B: Pseudo R-squared values estimated with simulated data for firms and years								
Sample	Pre-IFRS (N = 1000)		Post-IFRS (N = 1000)		P-value (95%)			
	P05	Mean (A)	P95	P05	Mean (B)	P95	(B) – (A)	P-value (95%)
Developed (1)	0.073	0.088	0.104	0.103	0.119	0.135	0.031	< 0.001
Emerging (2)	0.113	0.136	0.158	0.176	0.200	0.226	0.064	< 0.001
(2) – (1)	0.040	0.048	0.054	0.073	0.081	0.091	0.033	< 0.001

Table 5

Cont.

Sample	Panel C: Pseudo R-squared values estimated with simulated data for firms							
	Pre-IFRS (N = 1000)			Post-IFRS (N = 1000)			(B) – (A)	P-value (95 %)
	P05	Mean (A)	P95	P05	Mean (B)	P95		
Developed (1)	0.067	0.093	0.123	0.093	0.123	0.154	0.030	< 0.001
Emerging (2)	0.101	0.139	0.184	0.160	0.205	0.260	0.066	< 0.001
(2) – (1)	0.035	0.046	0.061	0.067	0.082	0.105	0.036	< 0.001

Note: This table shows the gains in explanatory power with IFRS adoption, measured by the pseudo R-squared obtained after estimating the ordered probit models represented by Equation 1 ($Rating_{it} = \beta_0 + \beta_1 ROA_{it} + \beta_2 LEV_{it} + \beta_3 COV_{it} + \beta_4 CI_{it} + \beta_5 SIZE_{it} + u_{it}$) in the pre- and post-adoption periods and for emerging and developed countries, based on three analyses: (i) with the original data (Panel A); (ii) with 1,000 bootstrapping resamples for firms and years (Panel B); and (iii) with 1,000 bootstrapping resamples for firms only (Panel C).

Source: Prepared by the authors.

Similar to the procedure used to test hypothesis H_1 , the company data for each year were re-sampled by bootstrapping to create 1,000 new pseudo-random samples for each of the four original sub-samples. The results of this procedure, reported in Panel B of Table 5, show that there was an average increase in the explanatory power of accounting data of 0.031 for firms in developed countries and 0.062 for firms in emerging countries, which represents a 107% higher estimate for the second group relative to the first after mandatory IFRS adoption. This difference is consistent with the results obtained for the original data.

When the years are held constant and random samples are simulated only at the firm level, the average pseudo R-squared estimates do not differ much from the previous method, as reported in Panel C of Table 5, estimating an average 120% higher increase for firms in emerging countries (0.066) compared to others in developed countries (0.030).

In addition, the p-values of the two-tailed t-tests for differences in means presented in Table 5 indicate statistically significant gains in the explanatory power of accounting data in relation to credit ratings, not only between the periods before and after mandatory IFRS adoption, but also between companies in developed and emerging countries that started using international accounting standards. The null hypothesis that there is no difference between the effects of IFRS in the context analyzed is therefore rejected.

These results are consistent with those reported by Florou et al. (2017) regarding the variation in the ability of accounting data to explain ratings after mandatory IFRS adoption for speculative grade and investment grade companies. The authors found a 104% higher gain in the first group compared to the second (0.049 against

0.100), a result that is similar to the differences found in this study (Table 5) when comparing companies from emerging and developed countries. One of the factors that may contribute to this similarity is the fact that emerging countries have a greater number of speculative grade companies.

4.3 External Governance Mechanisms and the Relationship between IFRS Adoption and Credit Ratings

Table 6 shows the results obtained from estimating Equation 2 and the variance inflation factors (VIF) for each independent variable. As expected, the governance indicators are highly correlated, with high VIF values. There is no consensus in the literature on what values would indicate excessive collinearity among the regressors. For example, O'Brien (2007) shows that even a VIF value above 40 does not in itself imply problems with statistical inference or the need for intervention. However, researchers often use rules of thumb that suggest problems when the highest VIF associated with an independent variable exceeds 10 or 30 (Chatterjee & Hadi, 2012). Table 6 shows VIF values well above these benchmarks, warranting further analysis.

One strategy adopted to deal with the excessive collinearity in the model was the implementation of principal component analysis (PCA), the results of which are shown in Figure 2 and indicate that principal components 1 and 2 explain 88.8% of the total variation in the set of governance indicators. Considering these principal components, Figure 3 shows that two of the indicators capture a large part of the variance in the data: (i) rule of law (RL); and (ii) level of control of corruption (CC). Based on this analysis, a new model was estimated

without the other governance indicators, as shown in Equation 4. The results of this estimation are shown in

Table 7. It can be seen that the VIF values reported in Table 7 are all less than 10.

$$R2_{jt} = \beta_0 + \beta_1 RL_{jt} + \beta_2 CC_{jt} + \beta_3 (RL_{jt} \times IFRS_{jt}) + \beta_4 (CC_{jt} \times IFRS_{jt}) + \beta_5 IFRS_{jt} + \text{Fixed Effects}(Country) + \varepsilon_{jt}$$

4

When analyzing the coefficients of the interactions between the governance indicators and the variable indicating IFRS adoption, it can be seen that only for the indicator of the level of control of corruption (CC) did the coefficient of the interaction prove to be significant at conventional levels, both in Table 6 and Table 7. Moreover, the sign of the coefficient is in line with what was expected.

In order to limit possible biases in the calculation of the pseudo R-squared at the country level, the (nine) countries with few firms with available data (less than 26 observations in the sample period) were excluded in both regressions. The conclusions remain unchanged when all the countries in the sample are used in the empirical analysis and also when the country dummies are excluded.

Table 6
Estimates corresponding to Equation 2 – WGI components

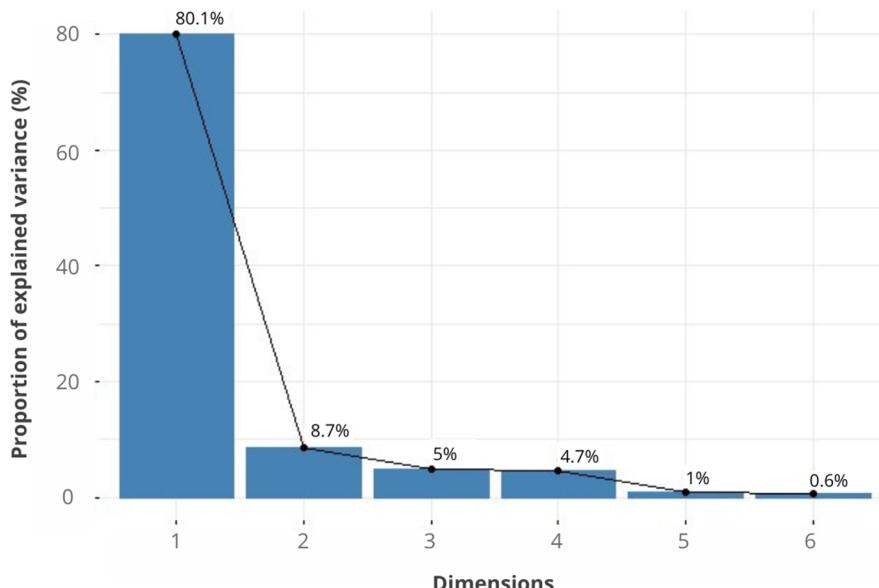
Independent Variables		Dependent Variable	Pseudo R ²	VIF
Voice and accountability	VA		-0.010 (0.010)	5.21
Political stability and levels of violence	PV		0.007 (0.001)	6.36
Government effectiveness	GE		0.004 (0.004)	27.94
Regulatory quality	RQ		-0.004 (0.009)	22.17
Rule of law	RL		0.003 (0.007)	4.00
Control of corruption	CC		0.001 (0.008)	43.62
Adoption of IFRS	IFRS		0.044*** (0.001)	8.87
	VA x IFRS		0.001 (0.001)	9.90
	PV x IFRS		0.001 (0.002)	7.16
	GE x IFRS		0.005 (0.002)	73.69
	RQ x IFRS		0.003 (0.003)	44.76
	RL x IFRS		0.001 (0.001)	7.14
	CC x IFRS		0.008* (0.003)	73.70
	Intercept		0.091*** (0.010)	
Fixed effects (country)		Yes		
Observations		54		
R ²		0.997		
Adjusted R ²		0.988		
F statistic		118***		
Degrees of freedom		14		

Table 6

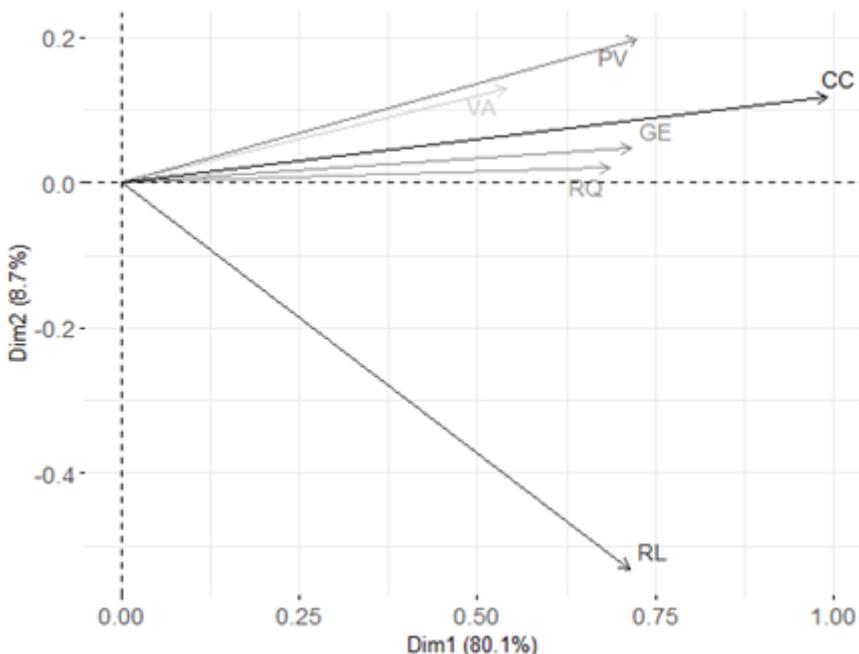
Cont.

Note: This table shows the values of the regression coefficients estimated by the ordinary least squares method according to Eq. 2, as well as the variance inflation factors (VIFs) for each independent variable. The standard error, robust to heteroskedasticity and autocorrelation and clustered by country, is shown in parentheses. Panel data were used with two periods defined by mandatory IFRS adoption. The sample consists of 54 observations corresponding to the periods before (27) and after (27) IFRS adoption in each country. The dependent variable is the pseudo R-squared for each country and period obtained from Eq. 1. The variables of interest are the interactions between the country governance indicators (VA, PV, GE, RQ, RL and CC) provided by the World Bank for each period and the binary variable of IFRS adoption. A set of country dummies (fixed effects) was added. The symbols “*”, “**” and “***” indicate statistical significance at the 5%, 1% and 0.1% levels, respectively.

Source: Prepared by the authors.

**Figure 2** Percentage of variance explained by principal components

Source: Prepared by the authors.

**Figure 3** Main variables in principal components 1 and 2

Source: Prepared by the authors.

Table 7
Estimates corresponding to Equation 4 – RL and CC indicators

Independent Variables		Dependent Variable	Pseudo R ²	VIF
Rule of law	RL		0.003 (0.006)	3.88
Control of corruption	CC		0.002 (0.005)	3.89
Adoption of IFRS	IFRS		0.047*** (0.001)	2.54
	RL x IFRS		0.001 (0.001)	6.60
	CC x IFRS		0.003*** (0.001)	6.16
	Intercept		0.088*** (0.004)	
Fixed effects (country)			Yes	
Observations			54	
R ²			0.996	
Adjusted R ²			0.991	
F statistic			182.2***	
Degrees of freedom			22	

Note: This table shows the values of the regression coefficients estimated by the ordinary least squares method according to Eq. 2, as well as the variance inflation factors (VIFs) for each independent variable. The standard error, robust to heteroskedasticity and autocorrelation and clustered by country, is shown in parentheses. Panel data were used with two periods defined by mandatory IFRS adoption. The sample consists of 54 observations corresponding to the periods before (27) and after (27) IFRS adoption in each country. The dependent variable is the pseudo R-squared for each country and period obtained from Eq. 1. The variables of interest are the interactions between the selected governance indicators of the countries (LR and CC) provided by the World Bank for each period and the binary variable of IFRS adoption. A set of country dummies (fixed effects) was added. The symbols **, *** and **** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively.

Source: Prepared by the authors.

No previous research was found that examined the moderating effect of the WGI indicators on the relationship between IFRS adoption and the credit relevance of accounting information. The results of the empirical analysis suggest that only the control of corruption (CC) quality indicator positively moderates the association between IFRS adoption and the pseudo R-squared. Therefore, this association tends to be greater in countries with more advanced CC, holding other indicators constant.

Another strategy to mitigate the possible bias caused by the high correlation between specific governance

indicators is to use a single aggregate WGI indicator, which is the average of the individual indicators. The results of estimating Equation 3 are presented in Table 8 and show that the estimated coefficients of WGI and its interaction with IFRS are not significant at conventional levels. This result, together with those reported in Tables 6 and 7, can be interpreted as an indication that the aggregate WGI measure of governance quality at the national level is not particularly relevant in explaining the phenomenon of interest, as well as its components, with the exception of the control of corruption indicator.

Table 8

Estimates corresponding to Equation 3 – aggregate WGI

Independent Variable	Dependent Variable	Pseudo R ²	VIF
National governance indicator	WGI	0.002 (0.008)	1.99
Adoption of IFRS	IFRS	0.047*** (0.001)	2.69
	WGI x IFRS	0.001 (0.001)	3.64
	Intercept	0.088*** (0.003)	
Fixed effects (country)		Yes	
Observations		54	
R ²		0.994	
Adjusted R ²		0.987	
F statistic		135.8***	
Degrees of freedom		24	

Note: This table shows the values of the regression coefficients estimated by the ordinary least squares method according to Eq. 3, as well as the variance inflation factors (VIFs) for each independent variable. The standard error, robust to heteroskedasticity and autocorrelation and clustered by country, is shown in parentheses. Panel data was used with two periods defined by mandatory IFRS adoption. The sample consists of 54 observations corresponding to the periods before (27) and after (27) IFRS adoption in each country. The dependent variable is the pseudo R-squared for each country and period obtained from Eq. 1. The variable of interest is the interaction between the aggregate WGI indicator, computed from the simple average of the specific indicators provided by the World Bank for each period, and the binary variable of IFRS adoption. A set of country dummies (fixed effects) was added.

The symbols **, *** and **** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively.

Source: Prepared by the authors.

It is important to note that the R-squared values in tables 6, 7, and 8 are very high and attract attention. The explanation for this phenomenon is the fact that the value of the dependent variable (pseudo R-squared) is higher in the post-IFRS period than in the pre-IFRS period for all (without exception) countries in the sample used to estimate the respective regressions. In other words, the IFRS adoption indicator variable largely explains the observed variation in the dependent variable. When this single variable is removed from the regression, the R-squared drops dramatically, even when all the country dummies are included. When the country dummies are also removed, leaving only the national governance

indicators, the R-squared drops to values closer to zero. For example, in the case of the model with all governance indicators (as reported in Table 6), removing only "IFRS" (and its interactions, of course) reduces the R-squared by more than 50%, to 0.43. When the country dummies are also removed, leaving only the six governance indicators, the R-squared of the regression drops to 0.02, indicating that the variation in these indicators explains little of the variation in the dependent variable. Similar results to those in the tables above were obtained from alternative specifications not reported for reasons of space, such as by estimating equations 2 and 3 using the natural logarithm of the pseudo R-squared variable as the dependent variable.

5. CONCLUDING REMARKS

The purpose of this study was to analyze the effects of mandatory IFRS adoption on the relevance of accounting information for the assessment of companies' credit risk. To this end, three aspects were analyzed: (i) the ability of accounting numbers to explain the credit ratings assigned by the main RAs; (ii) the differences in terms

of information gains between emerging and developed countries; and (iii) the identification of aspects of national governance capable of moderating the relationship that is the focus of this research.

Unlike previous research, this study: (i) used a larger and more heterogeneous sample of countries, covering

both developed and emerging countries; (ii) used the bootstrapping resampling method, which allows for the formal testing of hypotheses about the variation in the pseudo R-squared; and (iii) used all of the WGI governance indicators to test the hypothesis that the quality of governance at the country level has a moderating effect on the relationship between IFRS adoption and the explanatory power of accounting information on credit ratings.

Based on the pseudo R-squared of ordered probit-type models with panel data, evidence was found that the selected accounting indicators have, on average, greater explanatory power for credit ratings after mandatory IFRS adoption, supporting the idea that international standards have increased the relevance of accounting information in the context of credit risk assessment.

The results also suggest that the ability of accounting data to explain the credit ratings of firms in emerging countries showed significantly larger gains after mandatory IFRS adoption compared to the results observed for developed countries. This evidence suggests that the benefits of adopting international standards for the relevance of accounting information in credit analysis are not uniform across economies and that aspects related to credit risk at the national level and economic development may be important.

Finally, the empirical analysis suggests that most of the WGIs provided by the World Bank are not relevant as moderating variables in the relationship between IFRS adoption and the pseudo R-squared after isolating country fixed effects. The exception is the control of corruption (CC) indicator, which suggests that in the more advanced countries in this aspect of governance, the gain in relevance of accounting information tended to be more pronounced in the period following IFRS adoption, even when the other WGIs are held constant.

As with most research in accounting and finance, the results of this study are conditioned by the measurement and estimation choices made. Despite the search for the most common and efficient practices in the literature, the results could be different if samples and methods other than those used here were used, thus limiting the conclusions to the research conducted, which is a limitation of the study. However, this research can be extended in various ways, for example by including other indicators of credit risk, such as corporate debt credit spreads and credit default swap (CDS) market values (Lima et al., 2018). It is also possible to explore other indicators of economic development and institutional quality, as well as new moderating variables such as the distance between each country's local GAAP and IFRS.

REFERENCES

Ball, R., Li, X., & Shivakumar, L. (2015). Contractibility and transparency of financial statement information prepared under IFRS: Evidence from debt contracts around IFRS adoption. *Journal of Accounting Research*, 53(5), 915-963. <https://doi.org/10.1111/1475-679X.12095>

Barth, M. E., Landsman, W. R., & Lang, M. H. (2008). International accounting standards and accounting quality. *Journal of Accounting Research*, 46(3), 467-498. <https://doi.org/10.1111/j.1475-679X.2008.00287.x>

Bhat, G., Callen, J. L., & Segal, D. (2014). Credit risk and IFRS: The case of credit default swaps. *Journal of Accounting, Auditing & Finance*, 29(2), 129-162. <https://doi.org/10.1177/0148558X14521205>

Brochet, F., Jagolinzer, A. D., & Riedl, E. J. (2013). Mandatory IFRS adoption and financial statement comparability. *Contemporary Accounting Research*, 30(4), 1373-1400. <https://doi.org/10.1111/1911-3846.12002>

Cascino, S., & Gassen, J. (2015). What drives the comparability effect of mandatory IFRS adoption? *Review of Accounting Studies*, 20(1), 242-282. <https://doi.org/10.1007/s11142-014-9296-5>

Chan, A. L.-C., Hsu, A. W., & Lee, E. (2013). Does mandatory IFRS adoption affect the credit ratings of foreign firms cross-listed in the U.S.? *Accounting Horizons*, 27(3), 491-510. <https://doi.org/10.2308/acch-50483>

Chatterjee, S., & Hadi, A. S. (2012). *Regression analysis by example*. John Wiley & Sons.

Claessens, S., & Yurtoglu, B. B. (2013). Corporate governance in emerging markets: A survey. *Emerging Markets Review*, 15, 1-33. <https://doi.org/10.1016/j.ememar.2012.03.002>

Daske, H., Hail, L., Leuz, C., & Verdi, R. (2008). Mandatory IFRS reporting around the world: Early Evidence on the economic consequences. *Journal of Accounting Research*, 46(5), 1085-1142. <https://doi.org/10.1111/j.1475-679X.2008.00306.x>

Ecá, J. P. A., & Albanez, T. (2022). A heterogeneidade da estrutura de dívida reduz o custo de capital? *Revista Contabilidade & Finanças*, 33(90), e1428. <https://doi.org/10.1590/1808-057x20211428.en>

Fitch Ratings. (2020, December 22). *National Scale Rating Criteria*. <https://www.fitchratings.com/research/corporate-finance/national-scale-rating-criteria-22-12-2020>

Florou, A., & Kosi, U. (2015). Does mandatory IFRS adoption facilitate debt financing? *Review of Accounting Studies*, 20, 1407-1456. <https://doi.org/10.1007/s11142-015-9325-z>

Florou, A., Kosi, U., & Pope, P. F. (2017). Are international accounting standards more credit relevant than domestic standards? *Accounting and Business Research*, 47(1), 1-29. <https://doi.org/10.1080/00014788.2016.1224968>

Fracassi, C., Petry, S., & Tate, G. (2016). Does rating analyst subjectivity affect corporate debt pricing? *Journal of Financial*

Economics, 120(3), 514-538. <https://doi.org/10.1016/j.jfineco.2016.02.006>

Givoly, D., Katz, S., & Hayn, C. (2017). The changing relevance of accounting information to debt holders over time. *Review of Accounting Studies*, 22, 64-108. <https://doi.org/10.1007/s11142-016-9374-y>

Gozzi, J. C., Levine, R., & Schmukler, S. L. (2010). Patterns of international capital raisings. *Journal of International Economics*, 80(1), 45-57. <https://doi.org/10.1016/j.inteco.2009.05.007>

Granzotto, A., Sonza, I. B., Nakamura, W. T., & Mendes, J. S. (2023). A relação entre o nível de especialização da dívida e a restrição financeira de empresas brasileiras no decorrer do tempo. *Revista Contabilidade & Finanças*, 34(92), e1701. <https://doi.org/10.1590/1808-057x20221701.en>

Houque, M. N., Easton, S., & Van Zijl, T. (2014). Does mandatory IFRS adoption improve information quality in low investor protection countries? *Journal of International Accounting, Auditing and Taxation*, 23(2), 87-97. <https://doi.org/10.1016/j.intacaudtax.2014.06.002>

Kraft, P., Landsman, W. R., & Shan, Z. (2021). Effect of mandatory IFRS adoption on accounting-based prediction models for CDS spreads. *European Accounting Review*, 30(2), 223-250. <https://doi.org/10.1080/09638180.2020.1760116>

Lima, V. S., Lima, G. A. S. F., & Gotti, G. (2018). Effects of the adoption of IFRS on the credit market: evidence from Brazil. *The International Journal of Accounting*, 53(2), 77-101. <https://doi.org/10.1016/j.intacc.2018.04.001>

Luo, Y., & Tung, R. L. (2007). International expansion of emerging market enterprises: A springboard perspective. *Journal of International Business Studies*, 38(4), 481-498. <https://doi.org/10.1057/palgrave.jibs.8400275>

McFadden, D. (1974). Conditional logit analysis of qualitative choice behavior. In P. Zarembka (Ed.), *Frontiers in econometrics* (pp. 105-142). Academic Press.

Moody's. (2004, October). *The impact of International Financial Reporting Standards (IFRS, formerly known as IAS) on the credit ratings of European corporates*. <https://www.treasurers.org/node/3389>

Nobes, C. (2011). IFRS practices and the persistence of accounting system classification. *Abacus*, 47(3), 267-283. <https://doi.org/10.1111/j.1467-6281.2011.00341.x>

O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality & quantity*, 41, 673-690. <https://doi.org/10.1007/s11135-006-9018-6>

Ohtani, K. (2000). Bootstrapping R2 and adjusted R2 in regression analysis. *Economic Modelling*, 17(4), 473-483. [https://doi.org/10.1016/S0264-9993\(99\)00034-6](https://doi.org/10.1016/S0264-9993(99)00034-6)

Roychowdhury, S., Shroff, N., & Verdi, R. S. (2019). The effects of financial reporting and disclosure on corporate investment: A review. *Journal of Accounting and Economics*, 68(2-3), 101246. <https://doi.org/10.1016/j.jacceco.2019.101246>

Signorelli, T., Campani, C. H., & Neves, C. (2022). Abordagem direta para avaliar o ajuste de risco de acordo com a IFRS 17. *Revista Contabilidade & Finanças*, 33(90), e1646. <https://doi.org/10.1590/1808-057x20221646.en>

Souza, J. A. S. D., & Borba, J. A. (2022). Readability as a measure of textual complexity: Determinants and evidence in Brazilian companies. *Revista Contabilidade & Finanças*, 33(88), 112-129. <https://doi.org/10.1590/1808-057x202114180>

Standard & Poor's. (2005). Transition without tears: A five-point plan for IFRS disclosure from Standard & Poor's ratings services. *Journal of Derivatives Accounting*, 2(1), 111-134.

Tawiah, V., & Gyapong, E. (2021). International financial reporting standards, domestic debt finance and institutional quality: Evidence from developing countries. *International Journal of Finance & Economics*, 28(3), 2915-2936. <https://doi.org/10.1002/ijfe.2575>

Wu, J. S., & Zhang, I. X. (2014). The adoption of internationally recognized accounting standards: Implications for the credit markets. *Journal of Accounting, Auditing & Finance*, 29(2), 95-128. <https://doi.org/10.1177/0148558X14524420>

Yip, R. W. Y., & Young, D. (2012). Does mandatory IFRS adoption improve information comparability? *The Accounting Review*, 87(5), 1767-1789. <https://doi.org/10.2308/accr-50192>

FUNDING

This study was financed in part by the Coordination for the Improvement of Higher Education Personnel (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – Brasil – Capes) – Finance Code 001, with support from PROEX/AUXPE nº 23038.011259/2021-97.