

Value relevance of financial risk disclosures

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Abstract

Purpose – The objective of the present study is to examine the value relevance of accounting information presented by Brazilian banks.

Design/methodology/approach – The studied sample derived from Brazil's Stock Exchange, B3, under the banking segment, resulting in a group of 24 publicly listed companies, whose data ranged from 2017 to 2019. The study was conducted using the disclosure index, made with the intent of evaluating the disclosure adherence of a company to the reporting standard. In this case, Comitê de Pronunciamentos Contábeis (CPC) 40, financial instruments: recognition, evaluation and disclosure, Instrumentos Financeiros: Evidenciação, Brazil's interpretation of the International Financial Reporting Standards (IFRS) 7.

Findings – The results show that for the sample and period, the disclosure index cannot be used as an explanatory variable for the market evaluation of financial institutions.

Originality/value – While other studies have presented a similar approach to the value-relevance theme, the present work is original as it develops the methodology on financial institutions, and even more so on the financial institutions of a developing country.

Keywords Financial instruments, IFRS 7, Value relevance, Risk disclosure

Paper type Research paper

1. Introduction

Financial instruments have rapidly gained prominence as leading tools for hedging risks (Radoi and Olteanu, 2017). This perceived risk-proof strategy has led many companies to use derivatives as a financial instrument option and risk-mitigation device (Aretz and Bartram, 2010). The benefits of using financial instruments, such as derivatives, include the mitigation of revenue reduction risks by preventing the increase in the cost of producing goods or numerous expenses (Chang *et al.*, 2016). In addition to those possibilities, financial instruments may lead to a significant decrease in financial risk exposure, leading to a lower likelihood of financial distress (Bohn, 1990; Huang *et al.*, 2017). Nevertheless, financial instrument usage can result in something other than those benefits, leading to considerable losses in a short period when the strategy is poorly executed, timed, or both.



The results of the financial instrument used, whether profitable or not, are intrinsically connected with accounting and its disclosure function (Ohlson, 1995). Accounting is a method capable of providing information regarding financial instrument outcomes to those in the market. This creates responsibility, as perceived in the guilt deposited in accounting practices as one of the culprits of the subprime crisis, specifically, the suggested poorly developed role of accounting in the report of financial instruments used (Laux and Leuz, 2010). As the crisis reached its peak, both depositors and investors pushed for bank transparency, as they realized the lack of information about risk exposure. This was the result of financial institutions' deliberate use of accounting interpretation to keep said exposure away from financial reports (Ackermann, 2008).

This maneuver may be regarded as an example of the potential malicious use of accounting, showing firms deliberately using financial disclosure for their convenience by choosing which information is accessible to investors. This discretion also provides a clear example of how accounting plays a significant role as a risk disclosure tool. Although the recent obligatory adoption of the International Financial Reporting Standards (IFRS) is linked to consistent economic benefits (Neel, 2016), one may connect current standards to lessons learned from past misuses.

Based on the previous discussion, this study uses a value relevance approach to examine whether a higher financial instrument risk disclosure level is positively associated with higher valuations in an untried setting, the Brazilian banking industry. A modified version of the Disclosure Index developed by Thai and Birt (2019) is employed to assess the risk disclosure of financial instruments, along with hand-collected data from financial notes to identify banks' adherence to *Comitê de Pronunciamentos Contábeis* (CPC) 40 disclosure requirements (IFRS 7 equivalent), the current standard used by Brazilian banks for financial risk disclosure.

The intent to develop a study on financial institutions was twofold. First, as put by Elshandidy *et al.* (2018), the examples brought by accounting scandals and financial crises can lead to the assumption that financial institutions demand higher regulation to reduce the chances of failure. This assumption is based on the understanding that the use of potentially damaging economic tools may lead to grave damages because financial market failures are considerably more aggressive and long-lasting (Stiglitz, 1993). Second, we discuss the relevance of the sector to Brazil's economy, as the financial sectors comprise over 30% of the Ibovespa Index: Brazil's Stock Exchange, Brasil, Bolsa, Balcão, B3 and the main financial index (B3, 2020a). Both reasons also indicate the possible contributions of the present study, given the relevance of the sector and the seldom researched topic.

In addition, this study expands the literature on risk disclosure in the Brazilian market, specifically in the financial sector. Further, our work can be valuable to regulators, as it may provide insight into how the market perceives the principles stated by IFRS policy (Hao *et al.*, 2019). Additionally, value-relevant papers such as this also allow market participants to better comprehend how companies adhere to the regulations imposed upon them.

Our findings indicate that the Brazilian market does not appear to value financial instruments' risk disclosure information under a value-relevance lens, either positively or negatively.

This paper is divided into the following sections. Section 2 discusses the main theoretical cornerstones of the research, value-relevance methodology, risk disclosure literature, signaling and agency theories. Section 3 explains the hypotheses, and Section 4 presents the methodology employed. Section 5 introduces the results and data gathered, followed by section 6, where we discuss the disclosure model findings and lastly, section 7 concludes the paper with the final thoughts on the study.

2. Literature review and hypothesis development

2.1 *Value relevance literature*

Value relevance has been previously described as a method to study the informational content of accounting data as a tool capable of influencing investors' decision-making (Beaver, 1968), or even as a technique used to evaluate the usefulness of accounting practices, as explained by Ball and Brown (1968). Both descriptions, although not identical, allow the same concept of value relevance, as addressed by Amir (1993), be classified as a group of papers whose motivation, partial or not, is the standard-setting purpose (Holthausen and Watts, 2001).

Under the pretenses of value relevance, financial statements and accounting information must provide investors with decision-making data (Badu and Appiah, 2018). However, to evaluate how "useful" an accounting value may be, it must have a predicted association with equity market values, as this is the requirement to be declared relevant (Barth *et al.*, 2001). The concept of value relevance as a methodological approach is presented based on valuation theory, the goal being to estimate the informational value of accounting data for those who use it. The results function as a gauge of the impact of the action of standard setters (Francis and Schipper, 1999).

Recently, Barth *et al.* (2019) developed a literature review whose main finding was the lack of value relevance literature from 1962 to 2014, while also indicating a research gap in determining themes, such as intangible assets and innovative measurement methods. However, value relevance literature has, of late, included studies on the impacts of IFRS adoption on developing countries (Badu and Appiah, 2018), the adoption of integrated reporting (Baboukardos and Rimmel, 2016), the relationship between corporate governance and earnings management (Khalili and Mazraeh, 2016), intangible assets recognition (Kimouche and Rouabhi, 2016), derivatives and financial instruments use (Thai and Birt, 2019) and studies on debt holders (Givoly *et al.*, 2016). This broad range of studies allows for the development of the value relevance discussion while addressing one of the main arguments of criticism on value relevance: its dependence on equity investors (Barth *et al.*, 2001).

2.2 *Financial instruments risk disclosure*

Accounting disclosure is a research topic of ample academic discussion, with literature arguing about its virtues and problems (Hassan and Marston, 2019). This study avoids the debate on the limitations of some research methods. The foundations of the approach are the history of risk disclosure of financial instruments and the relevant state-of-the-art research on disclosure, aiming to develop a cohesive debate on the current regulation and research production.

The timeline of IFRS 7 – financial instruments: Disclosures started as a draft in July 2004, issued in August of the following year (Deloitte, 2012). Since its issuance in 2005, nine amendments were made to the text until its latest version in 2014; many of them due to the events in 2008, where both private and public sectors observed the need to improve areas that, from their perspective, were the priority, such as transparency and risk management (Ackermann, 2008).

These improvements resulted from the unregulated use of one of the many financial instruments and derivatives. Derivatives rely on the recognition of an asset derived from an underlying asset, leading to a product with less capital cost and higher economic value added when compared to the usual practice of money lending (Mah-Hui, 2008). Nonetheless, the events of 2008 led to three amendments throughout the year. The first is related to the classification of current and non-current derivatives (IFRS, 2008b). The following amendment, a response to the credit crisis, focused on the reclassification of financial assets, addressing the desire to reduce the

divergence between United States Generally Accepted Accounting Principles (US GAAP) and IFRS (IFRS, 2008a). The third and final amendment of the year required all entities to provide additional disclosure on all investments in debt instruments not already classified in the fair value category (IFRS, 2008c). All amendments, while not affecting our employed method, still provide us with a background understanding of how regulation has changed as an answer to reducing information asymmetry, following our theoretical framework.

Notably, while the methodology is rooted in Brazil's interpretation of IFRS 7 and CPC 40, the mentions in theory and research design are always in the former because of its main theoretical implications, while the latter presents itself only as a practical application to this research case.

2.2.1 Financial disclosure literature review. Some studies have examined the financial disclosure literature as a research objective (Elshandidy *et al.*, 2018; Khlif and Hussainey, 2014; Ryan, 1997). Thus, the present study addresses only the recent findings regarding the theme of this work. Past research suggests categorization under two main themes: "Incentives for reporting" and "Informativeness of risk reporting" as introduced by Elshandidy *et al.* (2018).

The first theme, incentives for reporting, comprises papers that focus on understanding the leading reasons for a company to provide risk information. This theme includes works such as those by Bufarwa *et al.* (2020), who focus on the impact of mechanisms employed by corporate governance in financial risk reporting. However, Al-Maghzom *et al.* (2016) studied demographic characteristics as determining factors for voluntary risk disclosure practices in the banking industry.

The second theme, informativeness of risk reporting, presents papers with the main concern of understanding reporting consequences. Research on this theme includes the one developed by Heinle and Smith (2017), where the impact of risk disclosure on pricing was studied to probe the Financial Accounting Standards Board's understanding of the influence of risk disclosure, archiving said goals by researching the variance of cash flows, and the disclosure of financial risk. On the same theme as measuring cash flow volatility, the work developed by Lobo *et al.* (2019) aims to measure the risk disclosure quality and its association with cash flow volatility, finding that higher risk disclosure is associated with lower future cash flow volatility. However, cash flow is not the only area where informativeness can be measured; for instance, Linsley *et al.* (2006) discuss the usefulness of the risk information reported, reporting the finding of a bias toward past information, rather than future information regarding risk; Nahar *et al.* (2016) investigate risk disclosure, cost of capital and company performance on a company that abides by voluntary disclosure, not mandated.

In addition to these previously mentioned works, Thai and Birt (2019) have had a significant impact on the work presented here due to the creation of the disclosure index, which was adapted and used here. The authors explored mineral and metal sector risk disclosure according to Australia's internal standard on financial instrument disclosure, the Australian Accounting Standards Board (AASB), 7. The authors introduce a disclosure index as the main contribution to this research, as it allows for the evaluation of both qualitative and quantitative information required by regulations disclosed in companies' financial statements. However, as both countries and markets are distinct, the index was contextually modified with CPC 40.

It is important to note that both types of research are part of the second theme of the informativeness of risk disclosure, given the measurement of the relevance of risk disclosure by the market. In addition, neither of the two themes is mutually exclusive, or one paper can focus on the research of both the incentives for reporting and the informativeness of said risk reporting (Elshandidy *et al.*, 2018), allowing for studies with a broader or more specific research focus.

3. Hypothesis development

Value relevance has a deep relationship with information, its disclosure and its resulting value to those who may use such information. Thus, as a valid research route, value relevance is based on the premise that the market is rooted in asymmetric information, leading those inside a company to have more information about its activity than those outside (Levy and Lazarovich-Porat, 1995). To better understand how value relevance studies the exchange of information between stakeholders and executives, the agent–principal problem becomes relevant. Additionally, agency and signaling theories can provide different perspectives on the agent–principal problem (Eisenhardt, 1989). Our theoretical framework explains how accounting information disclosure may be advantageous to investors and regulators.

Agency theory has established relevant premises, such as agency costs and increasingly discussed subjects such as moral hazard and adverse selection (Jensen and Meckling, 1976). However, to understand how value relevance may be introduced in this context, one needs to understand the concept of the principal–agent relationship. This relationship is between the agent, one hired or otherwise selected by the principal to execute, in their name, a service or a delegated power (Shapiro, 2005), in which shareholders can be understood as principals, while the chief executive officer of a determined company, can be seen as the agent (Panda and Leepsa, 2017).

While the principal–agent relationship may present a conceptual hierarchy of the company's shareholder relationship, signaling theory may expand on the feasibility of the maintenance of the previously mentioned relationship by focusing on how both parties may prove that they are meeting each other's expectations. In this regard, disclosure-based actions can be used as tools, providing deeper information sharing among market participants to allow the best execution of capital markets (Ho and Wong, 2001). By studying how this information is shared between market participants, signaling theory expands on the information asymmetry (Connelly *et al.*, 2011; Spence, 1973). This asymmetry is based on the understanding that those involved in the market have different levels of information, which can lead to moral hazard (Al-Sartawi and Reyad, 2018). Those who partake in the market are susceptible to shared risk: the result of their actions and those engaged in the same market (Holmstrom, 1979).

As a tool, disclosure may be understood as a regulator's response, the goal of which is to protect the stakeholders from possible malicious effects caused by information asymmetry (Bamber and McMeeking, 2016), allowing for better signaling of significant information exchange between market participants (Spence, 1973). When well-executed, the push for regulation and disclosure can lead to a decrease in information asymmetry between market participants, as proven by Dignah *et al.* (2017), while the lack of regulation and questionable accounting choices can lead to greater economic impairment (Laux, 2012).

One of the many resulting products of accounting and regulation is the IFRS, which are presented as guidelines for accounting interpretation of certain topics. Although international, in some cases, it requires some sort of country-centered adaptation, as is the case with Brazil's CPC. While IFRS adoption has been studied (Li *et al.*, 2017; Wieczynska, 2015), IFRS 7 has much to be discussed. Presented as a unification of many of the previous overlapping texts (Grosu and Chelba, 2019), it provides a new slate of text aimed at reducing information asymmetry for the financial instrument used. Brazil's interpretation of IFRS 7 and CPC 40 will be used in this study as a disclosure standard whose resulting information may impact investors' perceived value of a company, that is, information relevant to firm valuation.

Assuming the value-relevance approach to measure the value of accounting information based on its equity market impact and the nature of disclosure, the hypothesis has been developed to measure whether a company price is impacted positively or not by its risk disclosure level, leading to the following hypothesis:

H1. A company's share price is positively associated with its disclosure of financial instrument risk.

The hypothesis is the result of the premise laid out in value relevance literature: The disclosure of accounting information may impact a financial market participant's decision-making. As previously discussed, the reasoning behind this possible impact lies within the concept of information asymmetry. Practically, the hypothesis is a summary of how value relevant literature can be applied to our reality.

4. Research design

4.1 Sample and data

We chose one industry sector (Botosan, 1997), allowing us to maintain a constant disclosure policy (Adam-Muller and Erkens, 2020): banking companies. The sample was selected directly from B3's sector classification, companies listed under "finance sector of operation," specifically those in the sub-sector of "financial intermediaries" under the banking segment (B3, 2020b). This selection process resulted in the inclusion of 24 publicly traded companies in the study.

Regarding the timeframe, we designed the research to collect a better possible interval. We chose the most comprehensible span for the sample, three years, from 2017 to 2019. The period limitation was mainly because this period amounted to the largest possible span to maximize the number of listed companies. If we were to increase the timeframe, we would have a considerably smaller number of companies listed, severely unbalancing our data. Previous literature may use only one period to maintain regulatory stability (Brown *et al.*, 2018). However, we chose to use a larger timeframe to allow for more observations, thereby increasing the validity of the findings. This design is conducive to a longitudinal study, given the inherent introduction of time, instead of the cross-sectional model usually chosen by the existing literature (Badu and Appiah, 2018; Bowerman and Sharma, 2016; Kargin, 2013). Finally, for data collection, we manually collected information from each company's financial statements available on B3's website, allowing us to have reasonable comparability.

4.2 Measuring a financial risk disclosure

The reasoning and usage of a disclosure index are not novel (Elshandidy *et al.*, 2018), with Marston and Shrivs (1991) being one of the early uses of this method. The literature indicates that an index must be designed with the best possible fit to maximize desired information (Marshall and Weetman, 2007). The disclosure index employed in this research is the model of Thai and Birt (2019) because of its similar rationale, while also allowing for data from financial statements and granting a more in-depth analysis. The model measures a company's disclosure adherence regarding three types of financial instruments risk: credit risk, liquidity risk and market risk.

The weighted disclosure score of a firm is obtained using the following Equation (1):

$$DScore_i = \frac{1}{J} \sum_{j=1}^3 \frac{Score_{ij}}{\max (Score_{ij})} \quad (1)$$

Assuming i is a given firm, its score of j risk would be the result of the sum of the disclosure marks divided by the highest possible value, in this case, 25, resulting in the relative adherence of a company's financial statements to the base standard. As required by the methodology employed, we use the information disclosed in the annual financial statements, while the evaluation topics are provided by the CPC 40. It should be noted that the disclosure

index may be presented in two ways as robustness tests. The model in Equation (2) presents an unweighted disclosure score.

$$RawDScore_i = \frac{\sum_{j=1}^3 Score_{ij}}{\sum \max (Score_{ij})} \tag{2}$$

The third model, presented in Equation (3), captures the isolated score of the qualitative and quantitative dimensions of the disclosure index.

$$DScore_{Quant/Qual} = \frac{Quant / Qual Score_{ij}}{\max \left(\frac{Quant}{Qual Score} \right)} \tag{3}$$

All the models here presented will evaluate the disclosure of a company against an index made with CPC 40 as its underlying metric, said index is composed of 25 topics to be evaluated, ranging from credit risk to liquidity risk and market risk, the scoreboard of the index is presented in Table 1. As shown, each one of the CPC 40 points (33 (a), 33(b) and so on) represents one possible point to be measured additionally; the disclosure type indicates whether the point is either quantitative or qualitative; thus, for the 25 topics, results in 25 points, 5 for credit risk, 5 for liquidity risk and 15 for market risk and its subtypes.

As stated, the index introduced by Thai and Birt (2019) has been modified to fit our context, and we would like to clarify how and why we believe it is a valuable metric in our research case. First, the index presents itself as a method to quantify the adherence of information presented in the financial statements to regulation (in our case, CPC 40), which provides a clear contribution to value relevance, as it allows for a metric on how a company is adhering to a required disclosure policy, proving the concept useful in our case. Second, we performed minor adaptations on the index to allow its use in our context, with our adaptations regarding the substitution of some “evaluation topics” required in the original implementation to those queried by ours. That is, we changed some metrics required by AASB 7 to metrics required by Brazil’s interpretation, CPC 40, allowing the metric to maintain its intended concept and now allowing for a different regulation.

As one may see, each line in the “Disclosure Instruction” column represents a possible point. Therefore, the highest points are 25; yet, within those 25, there are three large groups, these being the types of risk: credit, liquidity and market; within each of these types, there are two sub topics: qualitative topics and quantitative topics. The score method chosen, as presented in Equation (1), is given by the total number of marks scored each year by each risk type, divided by the maximum possible and applicable score; thus, the method implies the weight of each risk type. However, in models 2 and 3, there is no weight applied to the risk type; for instance, in the former model, the score is given by the total number of marks divided by the maximum possible and applicable score, while the latter is obtained by the total qualitative or quantitative marks scored by year divided by the total possible quantitative or qualitative score. As previously stated, the work presented here focused on the DScore model, 1, with the Raw DScore, 2 and Quant/Quali market, 3, used as robustness tests.

To measure this index, we manually collected information from the financial statements of each company involved. That is, each of the 72 financial statements was read to gather information used in each topic of the index. The period selected reflects not only the time-consuming task of this search but also the fact that this is the further back one may go without unbalancing the dataset. Additionally, the low variability of the index within each company for the timeframe studied may present itself as a low marginal gain of information given the time of work demanded.

				Value relevance of financial risk disclosures
Risk type	Disclosure type	CPC 40	Disclosure instruction	
Credit Risk	Qualitative	33 (a)	Exposure to risk and how it occurs	29
		33 (b)	Methods, policies, and process to mitigate risks and methods to measure said risk	
	Quantitative	38 (b)	Policy to sell or use assets used as collateral	
		36 (a)	Maximum exposure to credit risk at the end of the period, without collaterals	
Liquidity risk	Qualitative	36 (b)	Description and financial effects of securities held	
		33 (a)	Exposure to risk and how it occurs	
		33 (b)	Methods, policies, and process to mitigate risks and methods to measure said risk	
	Quantitative	39 (c)	Description of how the institution manages liquidity risk described in topics 39 (a) and (b)	
Qualitative		39 (a)	A Time-analysis of the non-derivatives liabilities	
	Quantitative	39 (b)	A Time-analysis of the derivatives liabilities	
Market Risk - Currency		Qualitative	33 (a)	Exposure to risk and how it occurs
	33 (b)		Methods, policies, and process to mitigate risks and methods to measure said risk	
	Quantitative	40 (b)	The methods and assumptions used in the sensibility analysis	
		40 (a)	A sensibility analysis for each market risk the company has exposure to in the period	
Market Risk - Interest	Qualitative	40 (c)	Changes in the methods or assumptions used from the last period, and the reason behind said changes	
		33 (a)	Exposure to risk and how it occurs	
		33 (b)	Methods, policies, and process to mitigate risks and methods to measure said risk	
	Quantitative	40 (b)	The methods and assumptions used in the sensibility analysis	
40 (a)		A sensibility analysis for each market risk the company has exposure to in the period		
40 (c)		Changes in the methods or assumptions used from the last period, and the reason behind said changes		
Market Risk - Others	Qualitative	33 (a)	Exposure to risk and how it occurs	
		33 (b)	Methods, policies, and process to mitigate risks and methods to measure said risk	
	Quantitative	40 (b)	The methods and assumptions used in the sensibility analysis	
		40 (a)	A sensibility analysis for each market risk the company has exposure to in the period	
		40 (c)	Changes in the methods or assumptions used from the last period, and the reason behind said changes	

Table 1.
Disclosure index

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Disclosure index

4.3 Value relevance model

As previously stated, the value relevance methodology is based on the resulting impact after the standard-setter's action (Francis and Schipper, 1999). This can lead to the assumption that to measure such an impact, an econometric model is needed. To that end, Ohlson (1995) presented a model with reasonable reliability. However, to use the disclosure index of Thai and Birt (2019), a modified model with a different set of variables was chosen, with another modification to reduce the possibility of endogeneity. The resulting model is shown in Equation (4).

$$Price_{ij} = \beta_0 + \beta_1 DScore_{it} + \beta_2 BV_{it} + Lev + Profit + DAH + \epsilon_{it} \quad (4)$$

In this model:

Where in this model:

- (1) *Price_i* represents the stock price of firm *i* in a given period (year).
- (2) *DScore* is the previously introduced disclosure index score of company *i*, which is expected to be positive and significant.
- (3) *BV* is the book value of company *i* deflated by outstanding shares and is expected to be positive and significant, as used by [Barth and Clinch \(1998\)](#) and [Thai and Birt \(2019\)](#).
- (4) *Lev* is the company *i* leverage ratio and is the result of debt divided by equity. An indicator used in the study by [Ahmed and Courtis \(1999\)](#) is expected to be significant and positive based on the literature and theory.
- (5) *Profit* is the company's *i* profitability and the result of the net profit divided by equity. An indicator is expected to be significant and positive, as in the study made by [Ahmed and Courtis \(1999\)](#).
- (6) *DAH* is a dummy variable that represents the presence or not of hedge accounting in the firm's financial statements, expected to be positive and significant as presented by [Potin et al. \(2016\)](#).

We employ four control variables, and their expected association is as follows: first, we add book value, which is expected to be positive and significant, as larger companies are more prone to better disclosure practices ([Barth and Clinch, 1998](#)). Second, we expect leverage to be significant and positive ([Ahmed and Courtis, 1999](#)), as companies with higher debt-to-equity ratios may use accounting disclosure to reduce information asymmetry and consequently the risks to their investors and lenders. Third, profitability is expected to be significant and positive, as it motivates management to provide more information through disclosure, reducing information asymmetry to investors and providing them with confidence that may lead to higher management compensation ([Singhvi and Desai, 1971](#)). Finally, we anticipate the presence of hedging accounting to be positive and significant, as entities adhering to higher accounting disclosures regarding hedges reduce information asymmetry by investors, reducing the risks involved ([Potin et al., 2016](#)).

Financial statement data used was collected manually from Brazil's Stock Exchange, B3, while the price data were collected with Thomson Reuters's Refinitiv Eikon financial information system.

5. Data analysis

Following the previously stated methodology, once we gathered data, we conducted treatment for outliers ([Nyitrai and Virág, 2019](#)), and certain variables were winsorized on both tails by 5% following the literature ([Ghosh and Vogt, 2012](#)). Two model components were submitted to the outlier treatment: Price (P), and Book Value (BV), becoming PW and BVW, respectively. Summaries of the data before and after the data treatment are presented in [Table 2](#) to provide a better understanding of the reasoning.

The high mean DScore, 76.9%, indicates high adherence of companies to the disclosure index; that is, companies disclose a large amount of information about their relationships with financial instruments. As previously stated, high adherence to regulations may indicate market expectations in the banking sector.

[Table 3](#) presents the descriptive statistics of the disclosure score, providing an overview indicating high adherence to the score, albeit with a considerable standard deviation. The context of the data allows for an understanding of how highly adherent banks are to CPC 40

Table 2.
Summary

Variable	Obs	Mean	Std. dev	Min	Max
Price	72	17.30892	26.77492	0	151.6531
Price (Winsorized)	72	13.42194	12.60893	0	35.65208
BV	72	9.95982	17.83527	0.0009507	103.6806
BV (Winsorized)	72	7.581197	10.53064	0.0052805	29.67233
DScore	72	0.7690586	0.2798247	0	1
Lev	72	7.555947	4.477277	0.0076048	17.60062
Profit	72	0.0849414	0.1871725	-0.8594283	0.3199844
DAH	72	0.6388889	0.4836934	0	1

Table 3.
Descriptive statistics -
DScore

Variable	Obs	Mean	Std. dev	Min	Max
Credit Risk	72	68%	34%	0	1
Liquidity Risk	72	81%	28%	0	1
Market Risk C	72	86%	31%	0	1
Market Risk I	72	87%	31%	0	1
Market Risk O	72	72%	39%	0	1

requirements, indicating how this may explain why the market does not value the disclosure of financial instruments, as shown in our results.

Table 4 contains the correlation matrix, indicating the absence of a dangerously high correlation between the variables, that is, multicollinearity. Nevertheless, as the correlation matrix indicates an inverse correlation between PriceW and DScore, we are empirically unable to explain why, yet we can provide possible explanations by theory, as explained later.

We performed an auto-correlation test, which indicated the presence of first-order autocorrelation, leading to a robust specification.

6. DScore model results

Given the reasonably low number of observations in the focal sector, we choose to increase the observation period to increase the sample size (Wooldridge, 2016). A decision was made to use a longitudinal data panel, that is, to provide observations for the same variables in different periods (Kennedy, 2008).

During data collection, we were able to verify that the companies were stable during the period chosen; that is, they had not changed, and the basis of the data was balanced for each company. Thus, the data were deemed ready to be studied following Park's (2011)

Table 4.
Correlation matrix

	PriceW	BVW	EPS	DScore	Lev	Profit	DAH
PriceW	1						
BVW	0.2746	1					
DScore	-0.1302	0.0384	-0.0144	1			
Lev	0.0052	0.0049	0.0283	0.4875	1		
Profit	0.25	0.1754	0.4129	0.0054	-0.0716	1	
DAH	0.1762	0.2275	-0.1508	0.3724	0.1648	0.223	1

recommendations. Along with the previously discussed auto-correlation test, heteroskedasticity was handled with the same robust model specification as previously explained. The unit-root test was also performed, with the results for variables indicating the stationarity of the panels.

After the previously explained outlier treatment, the model was first pooled, followed by the fixed and random specifications. To evaluate the best choice between a fixed or random effects model, the Hausman test was performed to test whether the errors were correlated with the regressors (Greene, 2000), with the null hypothesis being that they are not.

The test resulted in a recommendation for the Random Effects model, which we then tested between a simple ordinary least square (OLS) regression through the Breusch-Pagan Lagrange multiplier test, whose null hypothesis is that the variances across entities are zero (Greene and McKenzie, 2012). This resulted in the rejection of the null hypothesis.

The test indicated that the random effects model was appropriate. The resulting model and its values are presented in Table 5.

The main topic of the research, the disclosure index, was not statistically significant, contradicting Thai and Birt's (2019) findings. The lack of statistical significance at the 5% level for the coefficient in this case, albeit not what was expected, still serves under the value relevance methodology by showing the market capability of valuing (or not in this particular case) said disclosure in the manner presented.

Contrary to the first use of the disclosure index (Thai and Birt, 2019), we can verify that the financial risk disclosure of Brazilian banks is not relevant to the market, and the reasons for this difference may be numerous. While it was for the Metals and Minerals industry in the Australian context for Thai and Birt (2019), we believe the reason behind this may be changes in the market, industry, or both. However, we argue that the difference may be more related to the industry, as banking is more exposed to financial instrument risk and subject to a higher level of regulatory concern. This leads the market to "expect" a high level of disclosure, thus not valuing it as much as other factors. We understand that the small number of observations may be the reason for the lack of statistical significance and the possible reduced power of the tests.

As we conducted the research on an entirely different context and industry than that done by Thai and Birt (2019), we are only able to compare the results of the index in each case, expanding on how adherent the companies were to the enforced regulation, but we are unable to generalize or compare the findings, as they are too distinct.

7. Conclusions

This study aimed to understand the value relevance of financial instrument risk disclosure within the Brazilian banking context. We conducted the research via 24 listed banks over three years, resulting in panel data with 72 observations. We manually collected data from

Table 5.
DScore model - random
effects (robust)

PriceW	Coef.	Std. err	z	P _t —z—	95% Conf. interval
BVW	0.1938758	0.193362	1.00	0.316	−0.1851068 → 0.5728585
DScore	−10.8689	13.16998	−0.83	0.409	−36.68159 → 14.94378
Lev	−0.0660132	0.5259648	−0.13	0.900	−1.096885 → 0.9648589
Profit	−0.6781348	5.742706	−0.12	0.906	−11.93363 → 10.57736
DAH	3.688793	4.556493	0.81	0.418	−5.241769 → 12.61935
cons	18.51062	7.731754	2.39	0.017	3.35666 → 33.66458

each company's financial statements for each year studied to construct a disclosure index following Thai and Birt (2019), although it was modified to use Brazil's standard.

As value relevance indicates that accounting information leads to decision-making, our research aimed to provide evidence regarding the relevance of financial instrument risk information to investors' interest in Brazilian banking. Our findings, despite the previous literature (Thai and Birt, 2019), indicate that the disclosure of financial instrument risk by a company is not valued by the market. Regardless of these unexpected findings, our research may still be seen as contributive to value relevant literature, by providing insight into how the market may (or may not) value information (Campbell *et al.*, 2014; Miihkinen, 2013).

Additionally, it provides both market and standard setters with a greater understanding of how the market may perceive accounting information. Our preferred explanation for these findings may be related to the industry, as banking is more exposed to financial instrument risk and is subject to a high level of regulatory scrutiny. We believe that this leads the market to "expect" a high level of disclosure, reducing its relevance when compared to other factors. This question may be presented as a possible research topic for further discussion.

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