Intangible Assets and Conservatism in the Brazilian Stock Market

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Abstract

Objective: This study's objective was to analyze the influence of the level of intangibility on accounting conservatism. Evidence was considered that the valuation of shares might influence discretionary accounting practices and that recorded intangible assets may improve the quality of information.

Method: 92 publicly traded Brazilian companies were analyzed between 2014 and 2019. The empirical models adopted were those of Basu (1997) and Ball and Shivakumar (2005). Two aspects of intangibility were considered: (i) the relationship between the shares' market value and book value; and (ii) accounted intangible assets. Data were processed using panel data regression.

Results: Intangibility based on market value showed a negative relationship with conservatism. On the other hand, intangibility based on book value showed a positive relationship. Additionally, companies with greater intangibility based on market value did not show the conservatism attribute. It was also found that companies with a higher proportion of recorded intangible assets showed more significant conservatism.

Contributions: This paper contributes to the academic milieu, regulatory agents, and investors, as it helps understand the influence of intangible assets on the quality of accounting information.

Keywords: intangible assets; intangibility; conservatism; profit quality.

1. Introduction

Intangible assets are key elements in the new economy. The reason is that they provide a competitive advantage, which is crucial in a highly competitive economic context. Hence, the competitiveness of firms in this environment becomes more dependent on strategic assets without physical substance, making up a considerable portion of some companies' investments.

For example, Haskel and Westlake (2018) mention the case of technology companies such as Microsoft, which has physical assets equivalent to approximately 1% of its market value. Another example is reported by Ewens, Peters, and Wang (2021), which shows the intangible elements' more significant participation in the prices of mergers and acquisitions in the American market, starting from 50% in the 1990s to more than 80% in 2015.

Haskel and Westlake (2018) argue that the main drivers of value have shifted from physical properties, machinery, and inventories to patents, brands, technological information, and human resources. The importance of these resources without physical substance has transformed the nature of capital, making economies and companies with high investments in intangible assets behave differently. This environment where market value can be predominantly based on intangible assets has radically changed capital markets.

This scenario has impacted the usefulness of financial information in equity markets. Researchers such as Brown, Lo, and Lys (1999) and Lev and Gu (2016) found a decrease in the statistical relationship between the firms' accounting information and market value, mainly from the 1980s onwards, showing that markets have assigned increasing importance to non-financial information. As new economic environments generate new informational demands, there is a need to study how the current era of assigning relevance to intangible assets impacts the quality of disclosed information. This need becomes evident given the market's difficulty pricing intangible assets (Eisfeldt & Papanikolaou, 2014).

As the prices of assets reflect not only past performance but also future prospects, and the market attributes high expectations to intangible-intensive companies (Griffin & Lemmon, 2002), the opportunity arises for these firms' managers to follow the requirements of accounting standards making discretionary choices, i.e., bias based on interests. When a company's equity is valued in such a way that most of its value is based on intangible assets that are difficult to control or monitor, discretionary practices that obscure the informational content of earnings may impair the quality of information. In this context, a wide range of studies, such as Healy (1985) and Burgstahler and Dichev (1997), has shown the existence of bias in accounting choices to match market expectations. For example, in Brazil, Martins, Paulo, and Monte (2016) obtained evidence along these lines, as they found that managers are more likely to manage earnings when they are close to reaching analysts' forecasts.

Regarding information attributes, studies address the relationship between earnings management and intangibility. For example, Machado and Machado (2021) showed higher levels of earnings management among companies with high intangibility based on market value. This finding suggests that the quality of information among intangible-intensive companies may be lower, considering biased accounting estimates aimed at meeting market benchmarks.

Other studies, such as Moura, Theiss, and Cunha (2014), Moura, Ziliotto, and Mazzioni (2016), Lopes, Peixoto, and Carvalho (2021) and Machado and Machado (2021) considered recorded intangible assets. These authors obtained evidence that the participation of these assets in balance sheets is negatively related to earnings management, arguing that higher scrutiny to recognize them contributes to the quality of information.

Considering the conservatism attribute, this study aims to verify the relationship between intangibility levels and the quality of accounting information. Conservative practices (or their lack thereof) are possibly used in a discretionary manner. According to Moreira, Colauto, and Amaral (2010), choosing between a conservative or bold method can reflect on stock prices differently depending on the news.

Considering that the specific characteristics of firms can influence accounting conservatism (Watts, 2003) and that intangible assets have informational relevance for the market (Ewens et al., 2021; Loprevite, Rupo, & Ricca, 2019; Silva, Sousa, & Klann, 2017), these assets are expected to influence conservatism practices.

Given the inherent subjectivity of intangible resources and doubts about firms' ability to deliver consistent performance, caution when preparing financial reports can avoid damaging the quality of information. In this context, the following problem arises: does a company's intangibility level influence conservatism practices? Thus, this study analyzes the relationship between intangibility and accounting conservatism to answer this question.

This study is relevant because it fills a gap in research addressing Brazil's accounting information quality. No papers addressing the direct relationship between intangible assets and conservatism were found. Given the growing participation of companies with high intangibility, there is a need to study the informational environment of these companies.

Additionally, this study is expected to expand the literature, considering that Brazilian researchers seldom address the level of intangibility as a factor influencing the quality of accounting information (Moura et al., 2016). Moreover, the benefits of conservatism for the capital market are still unclear (Lara, Osma, & Penalva, 2014). Thus, this study is intended to fill these gaps and encourage discussions in the academic milieu and among regulatory agents and investors.

2. Theoretical Framework

2.1 Accounting conservatism

According to Kam (1990), assets and liabilities are frequently assessed in the context of uncertainties, and therefore, accounting can choose a conservative behavior. It is better to err in underestimating positive elements and overestimating negative items than passing an expectation that may not be fulfilled. This prudent conduct is about conservatism, which Basu (1997) defines as the requirement for more verification to recognize good news (gains) than bad news (losses). Ball and Shivakumar (2005) state that the biased recognition of bad news causes losses to affect profit more rapidly, as they are recognized more opportunely.

The asymmetric recognition of gains and losses intended to anticipate problems might be helpful in not misleading investors. Exercising caution when making estimates generates financial statements without optimism bias. This cautious behavior on the part of accountants can balance the optimistic tendency of managers to overestimate earnings, which can be more dangerous than their underestimation in terms of disclosure penalties (Kam, 1990; Hendriksen & Van Breda, 1999).

The literature has considered conservatism one of the proxies for accounting information quality (Watts, 2003; Ball & Shivakumar, 2005). Although regulatory bodies do not consider it on the list of quality characteristics because it is inconsistent with neutrality, it is an important attribute of quality, which contributes to information efficiency by mitigating problems such as information asymmetry and agency conflicts.

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The literature shows the pros and cons of conservatism. However, the positive aspect most frequently mentioned refers to the reduction of information asymmetry by disclosing conservative rather than opportunistic results (Watts, 2003; LaFond & Watts, 2008; Lara et al., 2014; Silva, Heinzen, Klann & Lemes, 2018); as it reduces managers' incentive to engage in earnings manipulation. Thus, it is an important corporate governance mechanism, especially when facing uncertainty.

The influence on contractual relationships can also be considered a positive aspect. Conservatism works to mitigate moral hazard effects associated with managers, to the detriment of contracting parties, due to imperfect information. It is intended to ensure minimum guarantees for fulfilling obligations and reducing the likelihood that resources are inappropriately distributed to a few agents (Watts, 2003).

LaFond and Watts (2008) note another positive aspect of conservatism, i.e., greater disclosure is expected. In this case, the explanatory notes are supposed to mention gains that had not been accounted for.

Regarding the negative aspects, comparisons are hindered due to a lack of standards and the possibility of generating biased numbers due to the negative bias. Additionally, its excessive use may lead to the disclosure of information, emitting false signals to users (Hendriksen & Breda, 1999).

When considering the pros and cons, Silva et al. (2018) argue that this attribute can improve the quality of accounting information, mitigating opportunistic practices that could generate artificially inflated results, which eventually might be more harmful to users than conservative information.

2.2 Intangibility

According to regulatory restrictions, it is not possible accounting all intangible assets. Hence, there is a need to consider the level of intangibility using two approaches: (i) the relationship between the shares' market value and book value; and (ii) intangible assets relative to total assets.

The first refers to internally generated intangible assets, which, although not accounted for, are valued by the market. These include corporate culture, advertising effects, and administrative quality (Ewens et al., 2021). This subjective evaluation can generate asymmetric information, as verified by Wu and Lai (2020). These authors showed a positive relationship between intangibility based on market value and informational asymmetry. It occurs due to errors in measuring intangible assets, as there is no universal standard for their valuation, and also due to the difficulty in monitoring.

The remaining are essentially acquired intangible assets. Because they are identifiable, they are accounted for in the assets. However, certain intangible assets, such as research and development, expenses with advertising, and employee training, are taken to the result of the period because they do not meet recognition criteria. These intangibles generate future benefits, although they are not activated.

The difference in the treatment of intangible assets impacts accounting in the subsequent periods. Banker, Huang, Natarajan, and Zhao (2019) note that the profits of companies with high expenses related to intangible assets that go to the result tend to be underestimated because these expenses reduce current profits but generate value in the future. In other words, what is recognized in the results, instead of assets, will generate a benefit in the future and will not have a related expense to be recognized. This value created in the future is not reflected in current balance sheets due to this accounting treatment. The authors add that if investors focus on the accounting rule and do not understand this effect, it may lead to the mispricing of shares. In this line of reasoning, Lev and Gu (2016) argue that what is conservative in the present may become bold in the future, as this practice generates effects in the coming periods. This is in line with Watts (2003), who highlights that one of the consequences of the asymmetrical recognition of losses and gains resulting from conservative practices is the persistent undervaluation of assets, which may lead to the overvaluation of future profits due to the underestimation of future expenses. That is, underestimating assets or overvaluing liabilities in the present may overestimate financial performance in the future.

Given the two intangibility approaches, one has to consider that the capital market assigns importance to information about these assets, considering that several studies have found the value relevance of these items in the United States (Ewens et al., 2021), Europe (Loprevite et al., 2019), and Brazil (Silva et al., 2017). Thus, intangible assets provide valuable information that impacts the firms' market value.

2.3 Research hypotheses

For Feltham and Ohlson (1995), the value of intangible assets results from the expectation that profits above the normal will be generated. Griffin and Lemmon (2002) state that the market attributes greater expectations to intangible-intensive companies. Hence, this feeling becomes an essential vector of the price of these companies' shares. The authors above reported evidence of overvalued companies with weak fundamentals in the present but with the potential for future growth.

Market expectations can motivate biased accounting decisions depending on the message one wants to convey. In this context, Wu and Lai (2020) argue that intangible-intensive companies are subject to discretionary accounting choices that encourage opportunism to make judgments according to specific interests.

Stock prices are also likely to influence accounting choices. According to Ball and Brown (1968), most of the information in earnings is already priced before disclosure. The reason is that stock prices reflect expected earnings as analysts release estimates. According to this reasoning, Brugni, Fávero, Flores, and Beiruth (2015) studied the relationship between stock prices and earnings and identified situations in which earnings impact prices, and vice-versa, prices impact earnings. The first situation occurs with the disclosure of good or bad information. The second denotes that price may precede earnings based on the released estimates of analysts. This finding makes room for biased accounting choices for a company to match analysts' forecasts. Additionally, there is evidence that the release of prior earnings impact stock prices, as analysts' forecasts influence the market more strongly than past performance analyses (Lev & Gu, 2016).

Anticipating prices while waiting for profits may motivate accounting practices that compromise information content. In this environment, Jensen's statement (2005) is valid as it suggests that the overvaluation of companies is a fertile ground to impair the quality of information. Machado and Machado (2021) corroborate this statement as they found more frequent earnings management in firms with high intangibility at market value.

Added to this context is the fact that conservatism, or its lack, may also be a means of manipulating accounting numbers, as managers have different incentives to report financial information on losses and gains (Healy, 1985; Ball & Shivakumar, 2005). This attribute may also be used with greater discretion among companies that need to meet expectations. Thus, an absence of conservatism is expected in intangible-intensive firms.

Additionally, the first hypothesis is based on research conducted in the Brazilian market that showed a negative relationship between conservatism and market value (Roychowdhury & Waths, 2007; Silva et al., 2018).

In this context, the first hypothesis is proposed:

H1: Intangibility based on the relationship between the shares' market value and book value is negatively related to conservatism.

The second hypothesis is based on the finding that intangible assets have informational relevance for the market (Ewens et al., 2021; Al-Ani, & Tawfic, 2021; Silva et al., 2017) and, for this reason, might also influence judgments when preparing financial statements.

Furthermore, the regulatory aspect is a determining factor. In this sense, Watts (2003) notes that regulation incentivizes companies to prepare conservative accounting statements. At the same time, Roychowdhury and Watts (2007) argue that assets tend to be undervalued if bad news is accounted for faster than good news. This undervaluation is more evident in intangible assets, as these are subject to more significant regulatory restrictions than physical assets. For example, Beuren, Theiss, and Sant'Ana (2013) found conservatism in the treatment of expenses with research and development. Most companies were resistant to capitalization due to uncertain future results. As conservatism is a rational means of dealing with uncertainties, as Kam (1990) noted, one opts for conservative behavior to amortize current expenses.

The relationship between accounted intangible assets and information quality was investigated by Moura et al. (2014), Moura et al. (2016), Lopes et al. (2021), and Machado and Machado (2021). These authors found that the greater the share of intangible assets in total assets, the less frequent earnings management is. Complementarily, Al-Ani, and Tawfic (2021) found a positive relationship between these assets and earnings quality in emerging countries. Such results suggest that, as these assets are limited by conservatism due to regulatory issues, the extensive verifications for recognition may restrict discretionary practices, contributing to the quality of financial information. Thus, the second hypothesis is proposed:

H2: Intangibility based on intangible assets accounted in the balance sheet is positively related to conservatism.

3. Method

3.1 Sample and data collection

Companies from the Índice Brasil Amplo, by B3 – Brasil Bolsa Balcão, were selected, comprising the shares of the 149 companies with the highest trading volume in July 2021, configuring a non-probabilistic sampling. The period concerned is 2014 to 2019. In addition, financial and insurance companies (14), those missing data or which did not have listed capital in the period (36), and companies with negative equity (7) were excluded. Hence, the final sample comprised 92 companies.

The information was extracted from the Economática® database, the companies' websites through which they communicate with investors, and the B3 listed companies directory.

3.2 Intangibility variables

Two proxies were used to capture the intangibility level. The first, called *INT1*, refers to the division between the market value of Shareholders' Equity and its book value, similar to the market-to-book ratio. As the indicator reflects a firm's potential to grow and the expectation of it generating funds (Griffin & Lemmon, 2002), it corresponds to the objective of this study, which is to capture market expectations reflected in stock prices. Its use as an intangibility index was pioneered by Lev (2001), Chen and Zhao (2006), and Kayo and Fama (2004), who claim that this indicator is based on the close relationship of intangible assets with the market value share exceeding the book value. This measure is widely used in studies intending to capture intangibility at market value, such as Machado and Famá (2011), Lev and Gu (2016), Sousa and Cunha (2020), and Machado and Machado (2021). The higher the result, the greater the participation of intangible assets in a company's value, denoting the characteristics of intangible-intensive or otherwise tangible-intensive companies. Due to fluctuations in share prices, the average annual index was used.

The *INT2* variable was used to reflect the intangible assets recorded in the balance sheet. It comes from the ratio between intangible assets and total assets. This variable was also used by Moura et al. (2014), Moura et al. (2016), Lopes et al. (2021), and Machado and Machado (2021), to verify the level of intangibility at book value.

3.3 Empirical models for conservatism

For more in-depth and rigorous verifications, two models of conservatism were used, those proposed by Basu (1997) and Ball and Shivakumar (2005). Both are conditional conservatism, also seen as profit conservatism. The first considers the stock price, seeking to identify whether there is a difference in the timing of the accounting result insofar as the return is positive or negative. The second considers accounting variables, allowing us to measure conservatism by reversing the results. Both were adapted by including intangibility variables.

3.3.1 Adaptation of Basu's model (1997)

This model is based on the regression of companies' profits, showing whether they respond more strongly to negative returns (bad news) than positive returns (good news), assuming that bad news captured by the market is derived from conservatism. The original model is given by:

$$Luc_{it} = \beta_0 + \beta_1 D_{it} + \beta_2 RE_{it} + \beta_3 D_{it} \times RE_{it} + \varepsilon_{it} \qquad \text{(Eq. 1)}$$

Where: *Luc* – earnings per share, *D* – dummy variable for returns, where 1 concerns negative returns and 0 positive returns, *RE* – stock returns, *DxRE* – the difference between the impact of positive and negative returns. All variables refer to company *i* in year *t*. To control for heteroscedasticity and the scale effect, the variables were deflated by the share price in *t-1*.

The β_3 coefficient corresponds to conservatism. When it is positive and significant, it shows timely recognition of negative returns. In other words, β_3 is positive when bad news (negative return) is reflected in earnings to a greater extent than good news (positive return). When it is negative and significant, it indicates no conservatism.

The original model was adapted by including intangibility variables to test the hypotheses. This procedure is commonly adopted in studies addressing conservatism according to the variables of interest one wishes to study, as shown in Demonier, Almeida, and Bortolon (2015). Intangibles at market value (*INT1*) were included in equation 2, and intangibles at book value (*INT2*) in equation 3:

$$Luc_{it} = \beta_0 + \beta_1 D_{it} + \beta_2 RE_{it} + \beta_3 D_{it} \times RE_{it} + \beta_4 INT1_{it} + \beta_5 INT1_{it} \times D_{it}$$
$$+ \beta_6 INT1_{it} \times RE_{it} + \beta_7 INT1_{it} \times D_{it} \times RE_{it} + \varepsilon_{it} \qquad \text{(Eq. 2)}$$

$$Luc_{it} = \beta_0 + \beta_1 D_{it} + \beta_2 RE_{it} + \beta_3 D_{it} \times RE_{it} + \beta_4 INT2_{it} + \beta_5 INT2_{it} \times D_{it}$$
$$+ \beta_6 INT2_{it} \times RE_{it} + \beta_7 INT2_{it} \times D_{it} \times RE_{it} + \varepsilon_{it} \qquad \text{(Eq. 3)}$$

The regressions' results will be analyzed by controlling the variables included in the model and their interactions with the original variables. To test hypothesis 1, it is expected that β_7 of equation 2 is positive and significant, confirming that there is no conservatism in intangible-intensive companies.

For hypothesis 2, β_7 in equation 3 is expected to be negative and significant, confirming conservatism practices in companies with a greater intangible assets to total assets ratio. Additionally, one can analyze the original coefficients after controlling for additional variables in both regressions.

3.3.2 Adaptation of Ball and Shivakumar's model (2005)

Ball and Shivakumar's (2005) model measures the recognition asymmetry between gains and losses. Conservatism is assessed according to the occurrence of reversing accounting results, allowing the identification of the profit's transitory components. The lower frequency of timely loss recognition is associated with a lower quality of financial statements. The original model consists of the following equation:

$$\Delta NI_{it} = \beta_0 + \beta_1 D\Delta NI_{it-1} + \beta_2 \Delta NI_{it-1} + \beta_3 D\Delta NI_{it-1} \times \Delta NI_{it-1} + \varepsilon_t \qquad \text{(Eq. 4)}$$

Where: ΔNI_{it} – the variation in accounting net income of company i from year *t-1* to year t; $D\Delta NI_{it-1}$ – dummy variable for negative variation in the net income of company *i* from year *t-2* to year *t-1*, assuming *1* if $\Delta NI_{it-1}<0$, and 0 otherwise; ΔNI_{it-1} – the variation in net income of company i from year *t-2* to year *t-1*.

Conservatism is reflected in β_2 and β_3. Parameter β_2 indicates whether there is a reversal of positive results. Positive variations tend to become a persistent component of profit, tending to non-reversal, given the higher requirements for recognizing good news. Thus, a β_2 positive denotes conservatism. On the other hand, timely recognition of gains implies a negative β_2, denoting no conservatism.

Coefficient β_3 indicates the existence of reversal of negative results. If it is negative and significant, it indicates timely recognition of losses, denoting conservatism. As there is no need for strong verification to recognize expenses, this means that negative results can be reversed in later periods. Thus, negative variations can be transitory components of profit.

Verifying the opportune recognition of losses as transitory dimensions of the result is also possible by adding $\beta_2 + \beta_3$. There is conservatism when the sum is negative.

Next, the model was adapted by including intangibility variables – respectively, market value (*INT1*) and book value (*INT2*) – in equations 5 and 6:

$$
\begin{aligned}
\Delta NI_{it} = \beta_0 + \beta_1 D\Delta NI_{it-1} + \beta_2 \Delta NI_{it-1} + \beta_3 D\Delta NI_{it-1} \times \Delta NI_{it-1} + \\
\beta_4 INT1_{it} + \beta_5 INT1_{it} \times D\Delta NI_{it-1} + \beta_6 INT1_{it} \times \Delta NI_{it-1} + \\
\beta_7 INT1_{it} \times D\Delta NI_{it-1} \times \Delta NI_{it-1} + \varepsilon_{it}
\end{aligned}
\tag{Eq. 5}
$$

$$
\begin{aligned}
\Delta NI_{it} = \beta_0 + \beta_1 D\Delta NI_{it-1} + \beta_2 \Delta NI_{it-1} + \beta_3 D\Delta NI_{it-1} \times \Delta NI_{it-1} + \\
\beta_4 INT2_{it} + \beta_5 INT2_{it} \times D\Delta NI_{it-1} + \beta_6 INT2_{it} \times \Delta NI_{it-1} + \\
\beta_7 INT2_{it} \times D\Delta NI_{it-1} \times \Delta NI_{it-1} + \varepsilon_{it}
\end{aligned}
\tag{Eq. 6}
$$

In equations 5 and 6, coefficient β_7 reflects the relationship between conservatism and the variable of interest, denoting conservatism when it is negative. To test hypothesis 1, it is expected that β_2 and β_3 of equation 5 are negative and positive, respectively, or the sum of both be positive. Furthermore, β_7 is expected to be positive. Therefore, both cases will indicate no conservatism.

Regarding hypothesis 2, β_2 and β_3 of equation 6 are expected to be positive and negative, or the sum is supposed to be negative. Furthermore, β_7 is expected to be negative. In these cases, there will be evidence of conservative accounting practices.

Note that only statistically significant regression estimates were used to confirm or reject the hypotheses.

4. Results

4.1 Descriptive Statistics

As the intangibility indices show high fluctuations, we cut out outliers corresponding to 5% of the total observations distributed at the lower and upper ends. Such a practice is helpful for the results to be independent of extreme values. Considering the total number of companies in the sample (n = 92) and the six-year time series, 524 observations were obtained. Table 1 presents the results of descriptive statistics for the intangibility indices:

Table 1

Descriptive Statistics for the Intangibility Indexes

Panel A	Intangibility at Market Value – *INT1*						
	2014	**2015**	**2016**	**2017**	**2018**	**2019**	**6 years**
Mean	1.90	1.70	1.81	2.11	2.23	2.20	1.98
Standard deviation	1.79	1.67	1.74	2.06	1.88	1.64	1.81
Coefficient of variation	0.94	0.98	0.96	0.98	0.84	0.74	0.91
Minimum	0.22	0.21	0.24	0.20	0.23	0.30	0.20
Maximum	8.03	8.18	7.46	8.72	8.64	8.19	8.72
Panel B	Intangibility at Book Value – *INT2*						
	2014	**2015**	**2016**	**2017**	**2018**	**2019**	**6 years**
Mean	0.18	0.18	0.18	0.16	0.16	0.15	0.17
Standard deviation	0.21	0.20	0.20	0.18	0.18	0.16	0.19
Coefficient of variation	1.17	1.08	1.13	1.12	1.09	1.05	1.11
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	0.86	0.85	0.85	0.85	0.68	0.70	0.86

Source: developed by the authors.

The intangibility at market value (*INT1*) mean was 1.98 in the study period. It means the companies' equity market value was approximately twice the book value. Hence, the market is willing to disburse a premium above the book value due to a perception of potential elements that generate value and which are not accounted for.

The high standard deviation indicates that the results oscillate considerably in a distribution that reaches extreme points far from the mean. The high coefficient of variation corroborates this finding, denoting high volatility considering its result was higher than 1 in all the years. Volatility may result from stock price changes, reflecting market expectations adjustments. Additionally, we need to emphasize the low homogeneity between the companies included in the sample.

Note that intangibility decreased during times of financial crisis, in 2015 and 2016, with subsequent recovery. The fact that this indicator is linked to the shares' market value means that its dynamics follow the volatility of the capital market. As the economic situation influences investors' decisions and provides essential bases for valuation, a decrease in the intangibility level may be seen in periods of crisis, corroborating Lev's (2001) and Wu and Lai's (2020) studies.

Another important finding is that the mean of 1.98 for the Brazilian market is far from the mean of 6 that Lev (2001) found for the American market. A potential explanation lies in Brown, Martinsson, and Petersen's (2013) statement that developed financial markets favor intangible assets. Thus, it is expected that, in these markets, intangible assets are priced higher, as the indicator found was higher than in Brazil.

Regarding intangibility at book value represented by the *INT2* variable, an average of 17% of the companies' total assets was composed of intangible assets. There is also high oscillation, as shown by the standard deviation and coefficient of variation. The analysis of minimum and maximum values shows the high distance between the extremities; on the one hand, some companies do not have these resources accounted for. On the other hand, there are companies with this investment equivalent to 86% of total assets. This dispersion can be explained by sector particularities and the firms' idiosyncrasies, reflecting the particularity of these resources. This finding aligns with several studies that identified a substantial discrepancy in investments in intangible assets, which shows a heterogeneous demand for these resources (Rech, Schnorrenberger & Lunkes, 2012; Moura et al., 2014; Santos, 2015).

Additionally, adherence to accounting standards determines the volume of intangible assets recorded on balance sheets. It means, for instance, that two firms have a high investment in these resources; however, for regulatory reasons, one can account for it in assets, while the other must take it to the result.

Analysis of the indicator every year shows that the index stagnated at 0.18 from 2014 to 2016, declining until reaching 0.15 in 2019, showing no increase in the mean of intangible assets accounted for in the period. Furthermore, the analysis can be complemented with studies addressing previous periods, making up a more extensive historical series. Other authors show that capitalized intangible assets have risen since the advent of international accounting standards in Brazil. Rech et al. (2012) showed that these resources started from 1% in 2006 and reached 12% in 2010, while Santos (2015) found 19% in 2012. The authors verified the years after adopting IFRS, which coincided with economic growth. As this study found stagnation and subsequent decrease, the pace of growth of this type of investment may have ceased along with economic stagnation. Thus, while intangibility at market value is related to the financial market dynamics, intangibility at book value may be related to the dynamics of the economic situation.

4.2 Panel data regressions

Regressions were estimated for the original (equations 1 and 4) and adapted models (equations 2, 3, 5, and 6), which makes it possible to analyze whether accounting conservatism exists in firms before considering the variables of interest. In addition, the adapted models' regressions enabled analyzing the effect of including intangibility variables.

To test hypothesis 1, regressions were estimated according to equations 2 and 5, while equations 3 and 6 were used for hypothesis 2. The Stata® software was used for the Econometric processing. The Chow, Breusch-Pagan, and Hausman LM tests were applied to analyze the best regression model, and the results determined the use of estimators with fixed effects. Hence, we decided to control for the fixed effects by company, admitting each company's intercept dummy variable to reflect the singularity.

The results are presented in Table 2:

Table 2
Results of the regression of the original and adapted models

Variables	Basu's model (1997)			Ball and Shivakumar's model (2005)		
	Original model Equation 1	Adaptation *INT1* Equation 2 (H1)	Adaptation *INT2* Equation 3 (H2)	Original Equation 4	Adaptation *INT1* Equation 5 (H1)	Adaptation *INT2* Equation 6 (H2)
	Coef. Sig.	Coef. Sig.	Coef. Sig.	Coef. Sig.	Coef. Sig.	Coef. Sig.
Cons	0.2782 (0.001)	0.3437 (0.067)	-0.1175 (0.651)	2.6945 (0.001)	1.8155 (0.251)	2.7023 (0.244)
β_1	0.0470 (0.746)	-0.0248 (0.915)	0.1667 (0.402)	-5.4583*** (0.000)	-8.3917*** (0.000)	-6.4762*** (0.000)
β_2	-0.0261 (0.149)	2.6341*** (0.001)	-0.1417 (0.611)	-0.2146*** (0.000)	-0.1724 (0.181)	-0.1722** (0.018)
β_3	7.2074*** (0.000)	-0.1983 (0.972)	7.9952*** (0.000)	0.0478 (0.723)	0.0526 (0.819)	-0.0256 (0.867)
β_4	–	0.0292 (0.721)	2.3827 (0.113)	–	0.4479 (0.522)	-0.0932 (0.994)
β_5	–	-0.0169 (0.877)	-0.8715 (0.322)	–	1	6.1141 (0.376)
β_6	–	-2.6743*** (0.001)	1.4337 (0.679)	–	-0.0395 (0.401)	-0.2807 (0.376)
β_7	–	7.8542* (0.066)	-8.2336 (0.569)	–	-0.0149 (0.943)	1.3833 (0.460)
Adjusted R²	0.2148	0.3299	0.3148	0.0864	0.1054	0.0909
Observations	524	524	524	524	524	524
EF firm	Yes	Yes	Yes	Yes	Yes	Yes
Prob > F	0	0	0	0	0	0
Wald	0	0	0	0	0.0001	0.0004

* significant at 10%. ** significant at 5%. *** significant at 1%.

Source: developed by the authors.

A comparison of the results obtained by the original and adapted models shows an increase in the adjusted R^2, suggesting that the intangibility variables are relevant to conservatism, increasing the models' explanatory power. The significance obtained by the F test indicates that the increase in R^2 is not the result of specification with the inclusion of an irrelevant variable. Furthermore, the Wald test showed the variables' significance.

The original models indicate the existence of conservatism in the companies addressed here. Basu's model (1997) returned a positive and significant result in β_3, showing timely recognition of negative returns. This result is in line with Moreira et al. (2010) and Demonier et al. (2015), who also report this finding for Brazilian companies based on this model. The model by Ball and Shivakumar (2005) also shows conservatism in the companies, given the negative result of the sum ($\beta_3 + \beta_3$). It shows timely recognition of losses as transitory dimensions of the result. This finding corroborates Demonier et al. (2015), who obtained similar results with this model in Brazil.

When verifying hypothesis 1 using the model adapted from Basu (1997), note that the inclusion of the *INT1* variable generated a change of signs in the coefficients obtained in the original model, denoting that the conservatism previously observed does not remain. Thus, when considering intangibility at market value, the model fails to return coefficients that point to conservative practices. Furthermore, the result of positive and significance denotes no conservatism but the anticipation of gains. The results suggest that intangibility at market value influences conservatism practices negatively, which makes good news (positive return) timelier than bad news (negative return). Thus, hypothesis 1 was confirmed. These findings align with studies that found a negative relationship between conservatism and market value (Roychowdhury & Watts, 2007; Silva et al., 2018).

The test of hypothesis 1 using the model by Ball and Shivakumar (2005), adapted with the inclusion of the variable *INT1* shows a decrease in the significance of . Thus, this attribute loses significance relative to the intangibility variable. The coefficient did not return the expected positive sign or significance, which is insufficient to make inferences about this attribute. The decrease in the statistical significance of conservatism when relating it to intangibility at market value indicates that there may be a negative relationship between the two. However, it is insufficient to confirm hypothesis 1.

To test hypothesis 2, the results of Basu's model (1997), adapted with the inclusion of the *INT2* variable, indicate the permanence of the conservatism found in the original model. In addition to an increase in β_3, it remained positive and significant, showing that the negative return reflects on profit to a greater extent than positive returns. As expected, the β_7 coefficient was negative, though without statistical significance. Thus, it is possible to confirm hypothesis 2, as evidence was found that intangibility at book value leads to conservative accounting practices. Furthermore, these results corroborate studies showing that intangible assets accounted for positively contribute to the quality of accounting information (Moura et al., 2014; Moura et al., 2016; Lopes et al., 2021; Machado & Machado, 2021; Al-Ani & Tawfic, 2021). In this line of reasoning, considering that conservative practices can reduce information asymmetry (LaFond & Watts, 2008), the beneficial informational effect that these assets can provide is evident.

As for the test of hypothesis 2 using the adapted model by Ball and Shivakumar (2005), it shows that the conservatism found by the original model remained after the *INT2* variable was included, as the sum $(\beta_2 + \beta_3)$ remains negative. Additionally, the β_3 coefficient changed sign and became negative, although without significance. The negative sum and the significance obtained in β_2 denote conservatism; hence, *H2* is accepted. On the other hand, contrary to the expected, the negative β_7 coefficient without significance is insufficient to confirm hypothesis 2 according to the adapted model. The absence of significance when including *INT2* does not allow us to state that this variable influences conservatism.

4.3 Robustness tests

To deepen the study, we opted for performing additional analysis, dividing the sample into two clusters according to the intangibility levels in each variable, considering intangible-intensive and tangible-intensive companies. Next, the original models were regressed in each group to compare the differences.

For intangibility at market value (*INT1*), the companies were separated according to the index result, i.e., above or below 2, according to Machado and Machado (2021). This decision considers that intangible-intensive companies have most of their market value reflected by resources not accounted for in the financial statements, which only occurs when the indicator is above 2.

The results for intangibility at market value are shown in Table 3:

Table 3
Results for intangibility at market value

	Basu (1997)		BS (2005)	
	INT1 < 2	*INT1 > 2*	*INT1 < 2*	*INT1 > 2*
Cons	0.2797 (0.001)	0.0345 (0.005)	1.3406 (0.002)	8.6407 (0.001)
β_1	0.0901 (0.507)	0.0293 (0.220)	-1.8506** (0.004)	-1.1206** (0.003)
β_2	-0.0256* (0.069)	0.3887*** (0.000)	-0.0107 (0.826)	-0.0635 (0.566)
β_3	7.1990*** (0.000)	0.9449 (0.417)	0.0507 (0.914)	0.0716 (0.638)
Adjusted R²	0.5259	0.1725	0.0294	0.0548
Observations	369	182	369	182
Firm effects	Fixed	Fixed	Fixed	Random
Hausman	0	0.003	0.0003	0.8953
Prob > F	0	0	0.0353	0.0714
Wald	0	0	0.0321	0.0300

* significant at 10%. ** significant at 5%. *** significant at 1%.

Source: developed by the authors

When applying the original model by Basu (1997) in the group of tangible-intensive companies (*INT1<2*), the conservatism initially found by the model that included all companies without separation remains (*Table 2*). The positive and significant β_3 coefficient shows that conservatism is more pronounced in this group of companies. On the other hand, note that β_3 lost significance in intangible-intensive companies (*INT1>2*), indicating no conservatism in this group. These results confirm hypothesis 1, as tangible-intensive firms present the conservatism attribute more pronouncedly than intangible-intensive firms.

Ball and Shivakumar's (2005) model did not show a relevant change in β_2 and β_3, as they remained without significance after the companies were separated. However, it does not allow us to state that there is a significant difference in conservatism between the groups. Therefore, it is not possible to confirm hypothesis 1, but there is no significant evidence to reject it; hence, the result is inconclusive.

For the intangibility variable at book value (*INT2*), no previous studies were found separating companies according to accounted intangible assets. Thus, we decided to partition the observations according to the mean 0.17 calculated in the descriptive statistics (Table 1). The regressions' results are shown in Table 4:

Table 4
Results for intangibility at book value

	Basu (1997)		BS (2005)	
	INT2 < 0.17	*INT2 > 0.17*	*INT2 < 0.17*	*INT2 > 0.17*
Cons	0.2593 (0.005)	0.1080 (0.000)	7.1707 (0.001)	1.7006 (0.032)
β_1	0.1254 (0.418)	-0.0155 (0.421)	-1.0606 (0.000)	-1.9606 (0.082)
β_2	-0.0259* (0.081)	0.2738*** (0.005)	-0.0048 (0.932)	-2.1769*** (0.004)
β_3	7.2491** (0.042)	1.1677*** (0.000)	0.0331 (0.891)	2.1799*** (0.004)
Adjusted R²	0.5315	0.1732	0.0485	0.0596
Observations	320	204	320	204
Firm effects	Fixed	Fixed	Random	Random
Hausman	0	0	0.2429	0.9512
Prob > F	0	0	0.0047	0.0202
Wald	0	0	0.0034	0.0122

* significant at 10%. ** significant at 5%. *** significant at 1%.

Source: developed by the authors.

Note that when comparing the two groups of companies in the Basu model (1997), the significance of the parameter β_3 is higher for companies with intangible assets recorded above the market mean (*INT2*>0.17), statistically confirming the more conservative behavior of this group. Furthermore, a positive and significant β_2 suggests an increase in the opportunity for accounting earnings by improving the quality of information. Hence, according to these results, hypothesis 2 is confirmed.

Analysis of the Ball and Shivakumar's (2005) model for the *INT2* variable reveals results contrary to what was expected. β_2 and β_3 are respectively, significantly negative and positive, showing no conservatism in the group with greater participation of intangible assets (*INT2*>0.17). Thus, hypothesis 2 is rejected. Of all the tests performed, this was the only one with statistical significance that enabled rejecting the hypothesis.

This rejection of hypothesis 2, according to Ball and Shivakumar's (2005) model, opens space for future discussions and verifications, considering the possibility that intangibility at book value may also encourage financial reports with discretionary choices, given the subjectivity in the judgment of intangible assets. However, this result is opposed to that obtained by the previous model and also goes against studies showing that there is informational improvement with recorded intangible assets.

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The summary of evidence obtained and repercussions on the hypotheses is presented below:

Table 5
Summary of the results of the hypotheses tests

H	Model	Coefficient	Status	Repercussion on H1
	Basu's model adapted (Table 2)	β_3 β_7	Significance is lost when the *INT1* variable is included Positive and significant as expected	Accept Accept
H1	Basu's original model (Table 3)	β_3	Positive and significant for the *INT1*<2 group It loses significance in the INT1>2 group	Aceitar
	BS's model adapted (Table 2)	$(\beta_2 + \beta_3)$ β_7	Negative and loses significance when *INT1* is included Sign is unexpected and with no significance	Inconclusive Inconclusive
	BS' original model (Table 3)	$(\beta_3 + \beta_3)$	No significance	Inconclusive

H	Model	Coefficient	Status	Repercussion on H2
	Basu's model adapted (Table 2)	β_3 β_7	Remains significant when *INT2* is included Negative with no significance	Accept Inconclusive
H2	Basu's original model (Table 4)	β_3	Positive and significant in *INT2*>0.17 And significance is higher than in *INT2*<0.17	Accept
	BS's model adapted (Table 2)	$(\beta_2 + \beta_3)$ β_7	Negative when *INT2* is included Negative with no significance	Accept Inconclusive
	BS' original model (Table 4)	$(\beta_2 + \beta_3)$	Positive and negative in *INT2*>0.17	Reject

Source: developed by the authors.

While the two models showed different results, note that Basu's model (1997) showed higher statistical significance, given the results of the *F* test (Tables 3 and 4). This model showed the highest increase in the adjusted R^2 when the intangibility variables were included in the adaptations. It provided greater statistical relevance, which supports the decision to confirm the two hypotheses.

5. Final Considerations

The current scenario of the relevance of intangible assets leads to discussions about how they impact the quality of information a company reports. Considering conservatism as one of the quality information attributes, this study aimed to analyze the influence of the level of intangibility on accounting conservatism practices.

The results obtained by Basu's model (1997) show that conservatism was not found in intangible-intensive firms when intangibility at market value was considered. Including this variable in the econometric model showed that the conservatism previously found in the original model no longer exists. Furthermore, the robustness tests indicated conservatism in the group of companies with less intangibility, which was not found in the intangible-intensive companies. Thus, hypothesis 1 was confirmed, as evidence was found that the intangibility of firms at market value negatively influences accounting conservatism. For intangible-intensive companies, the absence of a cautious approach to measuring future events suggests worse quality of information. In these firms, negative returns are not timely recognized, as losses are recognized less quickly than gains.

Regarding intangibility at book value, including this variable in the adapted Basu's model (1997) provided results that indicate conservatism. It was also found that conservatism was more significant in the group of companies with recorded intangible assets that exceeded the sample's mean. Thus, in this model, hypothesis 2 was confirmed. When considering this variable in the regression, the results indicate an increase in the opportunity for accounting profit, suggesting that intangible assets recorded on the balance sheet contribute to improving the quality of information. As these assets are subject to rigorous recognition criteria, their high participation in balance sheets may motivate managers to be cautious when preparing financial reports. Such cautious behavior may propagate a conservative mindset when judging other equity items.

Basu's model (1997) obtained higher statistical significance and an increase in explanatory power after the intangibility variables were included. As a result, the study hypotheses were confirmed.

Note that the fact that the two hypotheses were confirmed supports Lev and Gu's (2016) argument that resistance to recognizing intangible assets can generate substantial costs for the entire economy. On the one hand, not recognizing intangible assets increases the difference between the shares' market and book values. The intangibility at market value generated by this situation negatively influences the quality of information, causing an environment more prone to information asymmetry. Complementarily, recorded intangible assets can improve the quality of reported earnings. Both results shed light on understanding how intangible assets can impact the informational environment. Moreover, the finding that they are related to conservatism is an important factor, given the demands for transparency, accountability, and the need to prevent information asymmetry. Therefore, these important results can encourage a reflection among regulatory bodies, investors, and other stakeholders.

The model proposed by Ball and Shivakumar (2005), adapted for the two hypotheses, did not obtain statistical significance; hence, the results are inconclusive. Only the robustness tests obtained significance and enabled rejecting hypothesis 2, as conservatism was not found in companies with high intangibility at book value. This finding is opposed to studies showing that recorded intangible assets improve the quality of information. This observation shows that these assets may also be subject to discretionary decisions. As these elements are subjective, they may favor accounting choices with a bias of interest.

This study's limitations include the limited sample, which does not allow for the generalization of results, and the fact that two different empirical models were used to measure conservatism. Therefore, different results may be obtained.

Future studies are suggested to use other econometric models to study conservatism and verify other information attributes such as relevance, persistence, and timeliness. One can deepen the analysis of the inconclusive results by considering, for example, sectorial particularities.

With the development of businesses and the growing flow of capital worldwide, high-quality accounting information must be an objective of accounting professionals' and market participants' requirements, showing the importance for the academic community to dedicate efforts to conduct research in this context.

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