



Earnings Forecasts and Accuracy: An Analysis of Brazilian Companies¹

Abstract: Accounting earnings are used by investors for investment decisions and decision-making; therefore, earnings forecasts are essential and typically used by stakeholders. Evidence has shown that mechanical forecasts can be as good or even more accurate than analysts' projections, which often have individual biases and are influenced by macroeconomic conditions and risk perception that can be associated with greater or lesser accuracy, especially in scenarios of uncertainty. This paper provides an accounting-based mechanical forecast estimation and compares the forecast accuracy with the available consensus analysts' earnings forecasts by using a sample of 316 Brazilian non-financial listed companies from 2009 to 2023 (3,750 firm-year observations) for accounting-based estimation and a sample of 1,605 firm-year observations of mean analysts' earnings forecast for accuracy comparison. The results show a lack of analyst coverage, especially in companies listed in traditional governance segments and that, overall, the estimation accuracy is higher for analysts' forecasts. However, accounting-based estimation performs better than analysts' forecasts based on more extreme values. This evidence suggests that the accounting-based model accommodated larger variances in earnings than analysts do. The findings of this study suggest that the model is a reasonable tool to monitor future earnings expectations of companies. Therefore, this research has practical contributions, as it demonstrates that investors can use the accounting-based earnings forecasts model as a tool to support their investments' evaluation and decision-making. Also, it has academic contributions to analysts' forecasts and earnings forecasts literature by comparing companies from a developing country.

Keywords: Earnings Forecasts, Analysts Forecasts, Accuracy, Biases, Governance, Brazilian Market.

1. Introduction

The reported accounting results represent the main element of the financial statements (Dichev et al., 2023) and depend on the adopted accounting system and the company's performance (Dechow et al., 2010). Accounting earnings, as a performance measure, are an essential part of the company's valuation (Ohlson, 1995). They are also used by investors to evaluate and monitor their investments, decision-making and base their rational earnings forecasts (Roychowdhury et al., 2019).

Short-term stock trading is guided by earnings projections, which demonstrate the analysts' earnings forecasts of a company (Sung & Ho, 2023; Dichev et al., 2023) and are used in stakeholders' decision-making and evaluation. Therefore, reliable projections support investors' decisions (Zhang, 2012).

Accounting and financial literature have deeply analysed earnings forecast role and its accuracy. However, evidence has refuted the idea of the superiority of analysts' forecasts and shown that mechanical accounting-based estimates (i.e., time series or cross-sectional approaches) can be as good as or even more accurate than analysts' estimates, which often have their individual biases (Olsen, 1996; Bradshaw et al., 2012; Lacina et al., 2011).

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Additionally, macroeconomic conditions are associated with a greater or lesser accuracy in their forecasts. Therefore, their estimates are influenced by risk perception, especially in crisis scenarios, where there is an increase in uncertainty and informational asymmetry (Avramov et al., 2009), which may contain analysts' pessimistic or optimistic biases and consequently influence investment evaluation and decision-making.

Providing that earnings forecasts may influence companies' valuation (Ohlson, 1995), this paper provides an accounting-based mechanical forecast estimation and compares the forecast accuracy with the available consensus analysts' earnings forecasts by using a sample of 316 Brazilian non-financial listed companies from 2009 to 2023 (3,750 firm-year observations) for accounting-based estimation, and a sample of 1,605 firm-year observations of mean analysts' earnings forecast for accuracy comparison

The results show a lack of analyst coverage, especially in companies listed in traditional governance segments and that, overall, the estimation accuracy is higher for analysts' forecasts. However, accounting-based estimation performs better than analysts' forecasts based on more extreme values. This evidence suggests that the accounting-based model accommodated larger variances in earnings than analysts do. The findings of this study suggest that the model is a reasonable tool to monitor future earnings expectations of companies.

This paper is justified, as few studies seek to evaluate estimates for valuation purposes and to analyze earnings forecast accuracy in an emerging market. Furthermore, earnings projections are relevant to investors' decision-making, based on the future expectations analysis regarding organizational performance, and a potential bias in analysts' forecasts, which may be optimistic or pessimistic in times of crisis.

Accounting-based projections are mainly important in studies that involve emerging markets, as analysts can be influenced by other information environments and different levels of efficiency and market asymmetry. In conclusion, a common forecast model applied, based on the informative content of the past local earnings, can provide a more precise basis for investors. Therefore, given Brazil's representativeness, the selection of this country for the study is justified.

Finally, this research has practical contributions regarding investors' evaluation and decision-making, by comparing reported earnings with accounting-based estimates and analysts' forecasts and comparing both estimates (accounting-based and analysts). It contributes to analysts' forecasts and earnings forecasts literature by comparing companies from a developing country, also because of conflicting evidence regarding the accuracy of analysts' forecasts and accounting-based estimates.

The remainder of this paper is divided into six sections: this introduction, which contextualizes the topic studied; the theoretical framework, which presents the literature and the hypothesis development; the methodology used to achieve the goal of the study; the results, conclusions, and bibliographic references.

2. Literature Review

Earnings quality is directly proportional to the amount of disclosed information about organizational financial performance, which is relevant for decision-making (Dechow et al., 2010). According to Scott (2015), earnings quality, from the perspective of analysts' earnings forecast revisions, follows earnings disclosure, however, such revisions raise questions about the reasons why it may occur on certain companies rather than others.



This way, an estimate model must consider such factors to generate potential future reliable perspectives for stakeholders' investment evaluation. According to Ohlson (2001), analysts' earnings projections for the subsequent year are considered a reasonable way to measure the earnings of a company.

Fama & French (2000) suggest that securities analysts must explore the earnings time series process, specifically considering earnings reversion to the mean property, but many studies have shown that analysts and investors cannot fully recognize this process (Chen, 2013). Furthermore, analysts' earnings forecasts contain positive bias and disappointing precision, as market agents may have incomplete knowledge and are driven by human desire for consensus Olsen (1996), which can lead to a herding behaviour.

Lacina et al. (2011) present that naive forecast models contain a large amount of incremental information about analysts' forecasts. Similarly, Bradshaw et al. (2012) demonstrate that naive extrapolation generates long-term more precise earnings estimates (2 and 3 years in advance). Additionally, Hou et al. (2012) argue that mechanical projections are more reliable than analysts' forecasts as they have greater coverage and higher earnings response coefficients (ERC) than analysts' estimates.

Analysts' forecasts may have biases that are not individual to them, but rather, have the purpose to get in touch with companies' managers, encouraging optimistic projections as this contact increases (Capstaff et al., 2001). Therefore, earnings forecasts, obtained by a model based on accounting information, may be an option for stakeholders to monitor their current and future investments, analyzing the expectations regarding organizations without those biases.

Anolli et al. (2014) study demonstrates that analysts make less reliable forecasts in crisis scenarios, due to the increase in uncertainty and informational asymmetry. In this case scenario, their estimates are especially influenced by risk perception (Avramov et al., 2009) and may contain biases, consequently, influencing investors' evaluation and decisions.

Another perspective is that the managers can reduce or increase their own reported estimates in the guidance or disclose new relevant information for the market to reach analysts' forecasts (Beccalli et al., 2015), for example, by adopting accruals. Therefore, organizations may be negatively influenced by investors when they do not reach analysts' estimates, through a reduction in the stock price, and they also evaluate if this happened due to an inability to achieve these forecasts, considering a future trend guide, or due to an organization poor management (Beccalli et al., 2015). It should be noted that analysts' projections may contain their individual biases, despite being considered a reference to evaluate future expectations of the companies.

This article relies on the Prospect Theory, which is defined by investors' utility based on gains and losses (positive or negative deviations) and the reference price used is the stock price (Kahneman & Tversky, 1979; Tversky & Kahneman, 1986). In addition, a psychological factor associated with optimistic earnings estimates is the propensity of analysts to engage in risky choice behavior during forecast revisions, due to incentives in brokerage firms, which can lead to optimistic earnings forecasts (Hunton et al., 2001) and optimistic biases, influencing investors' evaluation and decision-making.

As the literature suggests, analysts' forecasts contain biases, and the accounting-based mechanical forecast models may be more reliable than their estimates, and the objective of this study is to compare analysts' earnings forecasts accuracy of the companies listed in the Brazilian Stock Exchange (B3), except financial institutions, from 2009 to 2023, with the



estimates obtained by an earnings forecasts model based on an accounting information model. Therefore, the hypothesis (H1) of this study was generated.

H1: The accounting-based earnings forecasts are more accurate than the consensus of analysts' forecasts in Brazil.

3. Methodology

This research is divided into two parts. The first one is to calculate the accounting-based earnings forecasts based on an accounting information model, from Hou et al. (2012) study. The second one is to compare the obtained accounting-based estimates and analysts' projections, the accounting-based forecasts and reported earnings, and the analysts' estimates with the reported earnings to test the developed hypothesis, that the accounting-based earnings forecasts are more accurate than analysts' forecasts in Brazil, due to analysts' biases.

3.1 Sample

The sample includes all non-financial Brazilian listed companies available Refinitiv®, and the data collection considers the period between 2009 and 2023 due to adoption of IFRS in Brazil in 2010. Table 1 describes the sampling procedure starting from 726 Brazilian companies available at Refinitiv®. Investment funds (354), stock exchange counter (5), financial companies (48), and three companies without sector/industry classification were excluded, resulting in 316 non-financial companies. Therefore, the sample used to calculate the accounting-based earnings forecast consists of 316 firms (full sample).

Table 1 – Sample Selection

Companies	Number of Companies
Brazilian Public Companies	726
(-) Investments Funds	-354
(-) Stock Exchange Counter	-5
(-) Companies Without Defined Sector	-3
(-) Financial Companies	-48
Total Sample (Non-financial firms)	316

Source: Made by the authors (2024) from Refinitiv database.

Of the 316 firms in the sample, only 207 have information from “consensus” analysts' annual earnings forecasts (covered sample). Specifically, we use the “Analysts Net Income Mean”, which represents the statistical average of all broker estimates of after-tax income forecasts available at Refinitiv, as the analysts' consensus. Hence, the mean annual analysts' earnings forecasts were also collected from Refinitiv® for the same period (2009 to 2023)

Table 2 displays the sample segregated according to companies' sector for the full sample (316 firms) and the covered sample (207 firms). Specifically, construction and electric energy are the two sectors with the highest number of companies. These sectors are also the sectors with more companies in the sample, suggesting that analysts tend to cover more companies in bigger sectors, as expected.

Table 2 – Sample by Industry: firms with financial data and analysts' forecasts available



Industry	Firms with Financial Information Available		Firms with Consensus Analysts' Forecast Available	
	Number of Companies	%	Number of Companies	%
Electric Energy	37	11.7%	21	10.1%
Construction	28	8.9%	21	10.1%
Commerce	20	6.3%	14	6.8%
Clothing and Footwear Fabrics	17	5.4%	7	3.4%
Machines and Equipment	15	4.7%	8	3.9%
Programs and Services	15	4.7%	13	6.3%
Transport	14	4.4%	11	5.3%
Commerce and Distribution	12	3.8%	12	5.8%
Processed Foods	12	3.8%	8	3.9%
Diverse	11	3.5%	9	4.3%
Oil, Gas and Biofuels	11	3.5%	10	4.8%
Agriculture	10	3.2%	6	2.9%
Medical and Diagnostic Services	10	3.2%	10	4.8%
Steel and Metallurgy	9	2.9%	7	3.4%
Diverse Services	8	2.5%	4	1.9%
Transport Material	8	2.5%	5	2.5%
Chemicals	7	2.2%	4	1.9%
Telecommunications	7	2.2%	6	2.9%
Water and Sanitation	7	2.2%	5	2.5%
Travel and Leisure	6	1.9%	3	1.4%
Wood and paper	6	1.9%	4	1.9%
Building and Engineering	4	1.3%	1	0.5%
Mining	4	1.3%	4	1.9%
Others	38	12.0%	14	6.8%
Total Sample	316	100.0%	207	100.0%

Source: Made by the authors (2024) from Refinitiv database. Note: "Others" includes industries with less than three firms available in the sample.

Similarly, Table 3 presents the companies according to their governance level. Most companies that compose the sample are listed in the New Market and Traditional segments, which correspond to 54,1% (171 firms) and 31,6% (100 firms), respectively, of the sample. However, when it comes to firms with analysts' coverage, the New Market segment represents 81,2% of the firms (168 firms), and only 4.8% (10 firms) are listed in the traditional listing segment. This evidence suggests that the analysts' forecasts are not available for almost the totality of firms listed in the traditional segment (not available for 90 firms out of 100 firms) and that accounting-based estimation models can be highly useful to decision-making in these companies.

Table 3 – Companies by Governance Level: firms with financial data and analysts' forecasts available

Firms with Financial Information Available	Firms with Consensus Analysts' Forecast Available
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Governance Level	Number of Companies	%	Number of Companies	%
New Market	171	54.1%	168	81.2%
Level 2	15	4.7%	15	7.2%
Level 1	16	5.1%	14	6.8%
Traditional	100	31.6%	10	4.8%
Bovespa Plus	14	4.4%	0	0.0%
Total Sample	316	100%	207	100%

Source: Made by the authors (2024) from Refinitiv database.

3.2 Empirical Model and Variables of Interest

The variables were collected from the Refinitiv® database, except for the operational cash flows, which were collected from Economatica® due to the higher verifiability of reported figures. Specifically, Refinitiv® re-estimates operating cash flows from accounts decomposition with adjustments, while Economatica® does not contain adjustments in the operational cash flows of the financial statements reported.

The accounting-based earnings forecasts were calculated by applying Hou et al. (2012) model, detailed in Equation 1, considering the 316 companies of the sample and their data from the period between 2009 and 2023, yielding 3,750 firm-year observations in total. These projections were obtained by longitudinal panel data regressions using Stata® software.

$$E_{i,t+1} = \alpha_0 + \alpha_1 A_{i,t} + \alpha_2 D_{i,t} + \alpha_3 DD_{i,t} + \alpha_4 E_{i,t} + \alpha_5 NegE_{i,t} + \alpha_6 AC_{i,t} + \varepsilon_{i,t+\tau} \quad (1)$$

Being, $E_{i,t+1}$, the estimated earnings in year $t + 1$, $A_{i,t}$, the total assets, $D_{i,t}$, the paid dividends, $DD_{i,t}$, a dummy variable in which 1 represents companies that pay dividends and 0 otherwise, $E_{i,t}$, the earnings of the year before of the estimates, $NegE_{i,t}$, a dummy variable in which 1 represents the earnings having loss and 0 the earnings, $AC_{i,t}$, the *accruals* (calculated by the difference between earnings and operational cash flows), and $\varepsilon_{i,t+1}$, the model error term (i.e. the portion of earnings not explained by accounting information considered in Hou et al. (2012) model). All financial variables are defined in billions of Reais in nominal terms.

After the earnings estimation, the accuracy between earnings forecasts and reported earnings was calculated by subtracting both accounting-based estimations in Eq. 1 and analysts' mean forecasts. It should be noted that accuracy was defined as the difference between reported earnings and estimated earnings for (1) the accounting-based model in the full sample (3,750 firm-year observations), (2) the accounting-based model in the matched sample (i.e. used the accounting estimation only for the firms with analyst coverage, yielding 1,605 firm-year observations) and (3) the mean analysts' earnings forecast (1,605 firm-year observations).

4. Empirical Results

4.1 Accounting-based earnings forecasts model

The results of the accounting-based earnings forecasts in Eq. 1 were estimated considering the unbalanced panel of 316 companies between 2009 and 2023 (3,750 firm-year observations). The estimation was conducted under different estimation approaches, and the figures reported in this paper were conducted using a random effects panel. Specifically, the



Hausman test did not reject the null hypothesis that the individual effects α_i and the independent variable present a correlation equal to zero ($\chi^2 = 2.18$, Prob.> $\chi^2 = 0.3363$). However, it is important to note that coefficients and estimates are qualitatively the same under a pooled OLS framework. The estimated coefficients in Eq 1 are reported in Table 4, together with standard errors and z-value.

Table 4 – Accounting-based Forecast Model Coefficients (Eq. 1)

Variable	Coefficient	Standard Error	z-value
Total Assets ($A_{i,t}$)	-0.077 ***	0.003	-27.460
Dividends Paid ($D_{i,t}$)	-0.605 ***	0.035	-17.450
Dummy Dividend ($DD_{i,t}$)	0.398 ***	0.121	3.300
Net Income ($E_{i,t}$)	1.405 ***	0.031	45.380
Dummy Losses ($NegE_{i,t}$)	-0.190	0.130	-1.460
Accruals ($AC_{i,t}$)	-1.086 ***	0.027	-39.920
Constant (α_0)	0.089	0.108	0.820
Obs. (N)	3,577		
Wald χ^2	8126.8 ***		
Overall R ²	0,695		

Source: Made by the authors (2024) from Refinitiv and Economática database.

Hence, considering the results in Table 4, Equation 2 was obtained based on the random effect panel data for accounting-based earnings estimation. The statistical significance of the independent variables allocated in the model can be verified from the Z probabilities ($P > |z|$).

$$E_{i,t+1} = 0.089 - 0,077 * A_{i,t} - 0,605 * D_{i,t} + 0398 * DD_{i,t} + 1,405 * E_{i,t} - 0.190 * NegE_{i,t} - 1,086 * AC_{i,t} + \varepsilon_{i,t+1} \quad (2)$$

Being, $E_{i,t}$, the next-year's estimated earnings, $A_{i,t}$, the total assets, $D_{i,t}$, the paid dividends, $NegE_{i,t}$, a dummy variable in which 1 represents the earnings having loss and 0 the earnings, $AC_{i,t}$, the *accruals* (calculated by the difference between earnings and operational cash flows), and $\varepsilon_{i,t+\tau}$, the model error term.

It should be noted that the variables total assets, dividends paid, and accruals have a significant and negative association with earnings forecasts, while the net income and the dividends dummy variable have a significant and positive association with the earnings estimates. Also, the losses dummy variable is not significant.

Different from Hou et al. (2012), who find that earnings projections are negatively related to total assets, and the losses dummy variable is not significant and negative in this research. Also, firms that pay dividends tend to have higher earnings forecasts independent of the paid amount.

The dividend dummy variable is positive, such as Hou et al. (2012), but significant. Also, the results corroborate their findings that firms with lower accruals tend to have higher earnings forecasts.

Table 5 displays the percentile distribution, mean, and standard deviation of estimated earnings divided into (1) the accounting-based model in the full sample (3,750 firm-year observations), (2) the accounting-based model in the matched sample (i.e. used the accounting



estimation only for the firms with analyst coverage, yielding 1,605 firm-year observations) and (3) the mean analysts' earnings forecast (1,605 firm-year observations). Additionally, Table 5 presents similar distribution and segregation for nominal estimation accuracy and accuracy of earnings scaled by total assets.

Table 5 – Earnings estimation distribution

	Estimated Earnings			Accuracy (Reported - Estimated Earnings)			Scaled Accuracy (Reported - Estimated Earnings, Scaled by Total Assets)		
	Full Sample	Matched Sample	Analysts Forecast	Full Sample	Matched Sample	Analysts Forecast	Full Sample	Matched Sample	Analysts Forecast
1%	-0.426	-0.691	-2.384	-2.342	-3.398	-6.474	-1.191	-0.151	-0.244
5%	-0.156	-0.175	-0.297	-0.505	-1.077	-1.572	-0.286	-0.071	-0.101
25%	-0.021	0.116	0.051	-0.068	-0.127	-0.114	-0.037	-0.023	-0.021
Med	0.104	0.282	0.215	-0.016	-0.031	0.009	-0.008	-0.007	0.002
75%	0.353	0.753	0.637	0.057	0.060	0.150	0.017	0.009	0.021
95%	1.874	2.86	2.897	0.33	0.679	1.364	0.603	0.039	0.073
99%	7.704	8.858	13.894	1.807	2.982	5.485	800.326	0.119	0.183
Mean	0.412	0.726	0.791	-0.033	-0.076	-0.141	96.624	-0.008	-0.002
Std Dev.	<u>1.17</u>	<u>1.463</u>	<u>4.079</u>	<u>0.534</u>	<u>0.744</u>	<u>3.677</u>	<u>2376.395</u>	<u>0.044</u>	<u>0.078</u>
Obs.	3,750	1,605	1,605	3,750	1,605	1,605	3,750	1,605	1,605

Source: Made by the authors (2024).

Comparing the matched sample and the analysts' forecasts, Table 5 indicates that, overall, the accuracy, defined as the difference between reported and estimated earnings, is higher for analysts' forecasts (i.e., median and mean values of accuracy are nominally lower for analysts' forecasts). However, accounting-based estimation performs better than analysts' forecasts based on more extreme values, specifically in the 25% and the 75% percentile. This evidence suggests that the accounting-based model accommodated larger variances in earnings than analysts do.

Additional analysis (not reported) indicates that the correlation between the reported earnings and accounting-based forecasts is 86,47%, while the correlation between the reported earnings and analysts' estimates is 61,74%, which may indicate analysts' biases. In this regard, Figure 1 shows the mean of analysts' forecasts of the 207 firms (the coverage sample), the mean accounting-based mechanical forecasts, and reported earnings of the 316 companies (full sample), considering the period between 2009 and 2023.

Figure 1 – Analysts' Forecasts, Accounting-based Forecasts, and Reported Earnings of the Companies



Source: Made by the authors (2024).

Although accounting-based mechanical earnings forecasts are higher than analysts' forecasts between 2009 and 2013, Figure 1 demonstrates that the accounting-based earnings estimates have the same mean as analysts' projections in two periods, 2016 and 2020. Also, the period between 2016 and the end of 2019 is characterized by higher analysts' forecasts than the accounting-based estimates and the reported earnings. Thus, it suggests that it consists of a period of analyst's optimistic projections.

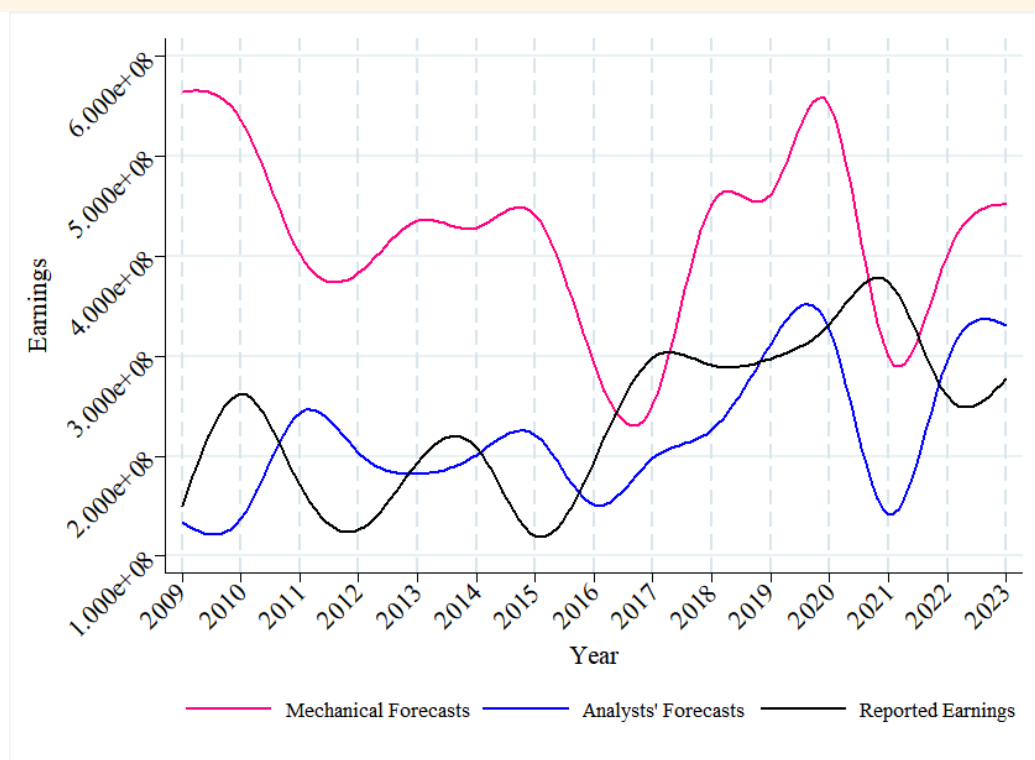
Therefore, the comparison between accounting-based forecasts, analyst's forecasts, and reported earnings, considering 304 companies of the sample, shows that the accounting-based estimates have higher coverage, despite being less accurate, on average, such as Hou et al. (2012) study. However, one possible reason is that it contains approximately 100 companies, more than the number of organizations the analysts cover. Consequently, the next section presents an analysis that considers only organizations with their coverage for comparative purposes (i.e. the matched sample).

4.2 Analysis of companies with analysts' coverage

The analysis presented in this section considered the 207 companies with analysts' coverage for comparative purposes between reported earnings, accounting-based forecasts, and analysts' forecasts.

Figure 2 shows the mean of analysts' forecasts, accounting-based forecasts, and reported earnings of the companies with analysts' coverage, considering the period between 2009 and 2023.

Figure 2 – Analysts' Forecasts, Accounting-based Forecasts and Reported Earnings of Companies with Analysts' Coverage



Source: Made by the authors (2024).

Although, in general, the accounting-based forecasts have a higher mean than analysts' forecasts and reported earnings, it presents the same mean that reported earnings in four periods, which are 2016, 2017, 2020 and 2021. These periods were characterized by a Brazilian crisis and by the COVID-19 pandemic, respectively.

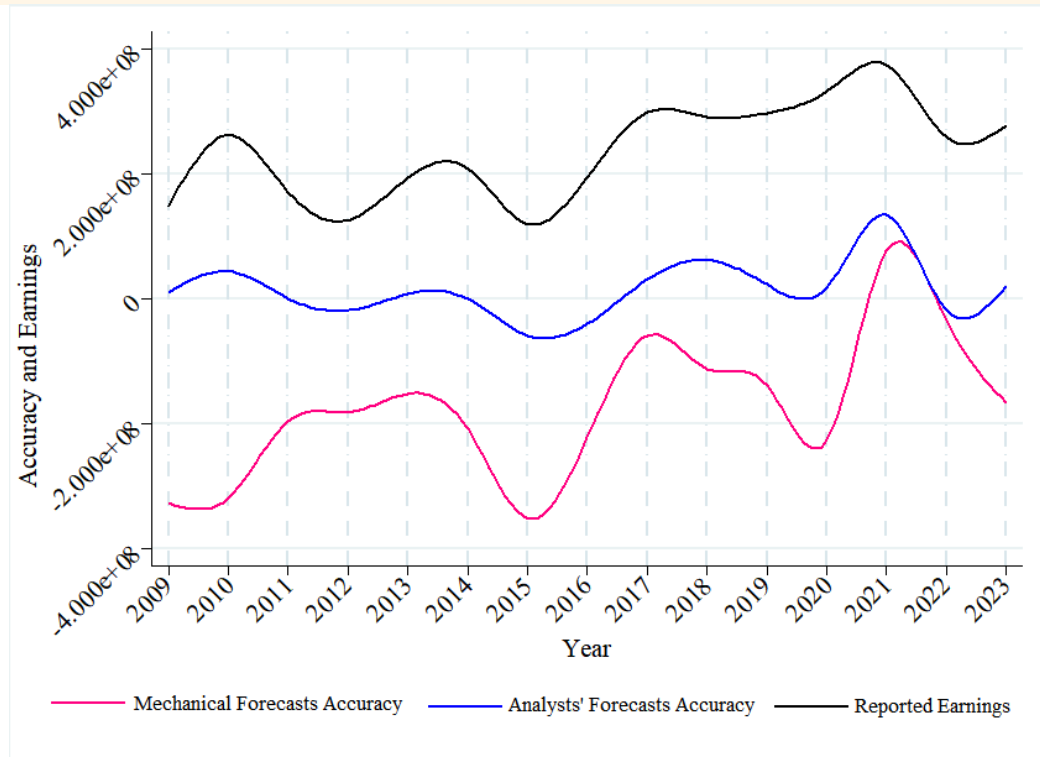
It should be noted that analysts' estimates were pessimistic in these periods. Thus, this research corroborates with Anolli et al. (2014) and Avramov et al. (2009), which shows that analysts' forecasts are less reliable in crisis scenarios due to increased uncertainty, information asymmetry, and risk perception during this period. This could be verified by the Brazilian crisis in 2016 and the COVID-19 pandemic.

In addition, it can be observed that analysts tend to do optimistic estimates due to biases, such as mentioned by Olsen (1996) and Capstaff et al. (2001). These biases can be individual and driven by macroeconomic conditions and risk perception.

Figure 3 presents the mean accuracy of analysts' projections, accounting-based estimates accuracy, and companies' reported earnings with analysts' coverage. Both forecasts have errors in relation to the reported earnings and they have the same mean in 2021 and 2022.

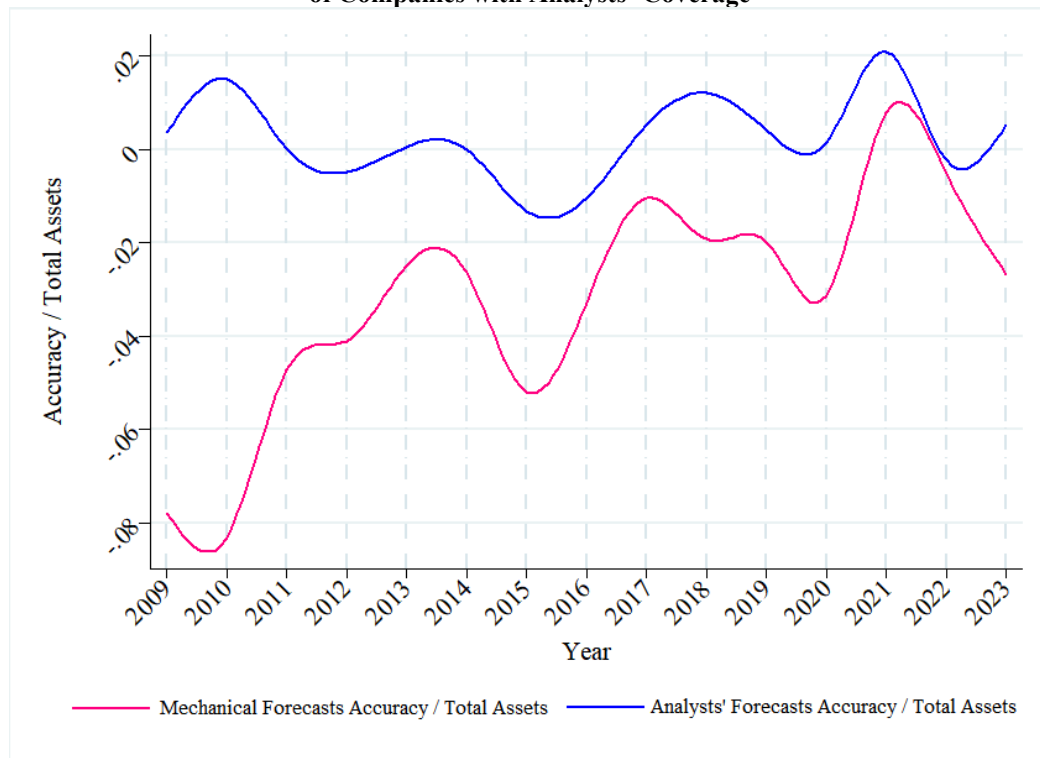
This result can also be seen in Figure 4, which presents the mean of analysts' projections accuracy and accounting-based forecasts accuracy divided by Total Assets. However, it should be noted that the accounting-based estimates seem to show future trends, which can be a tool for investors.

Figure 3 – Analysts' Forecasts Accuracy, Accounting-based Forecasts Accuracy and Reported Earnings of Companies with Analysts' Coverage



Source: Made by the authors (2024).

Figure 4 – Analysts' Forecasts Accuracy, Accounting-based Forecasts Accuracy Divided by Total Assets of Companies with Analysts' Coverage

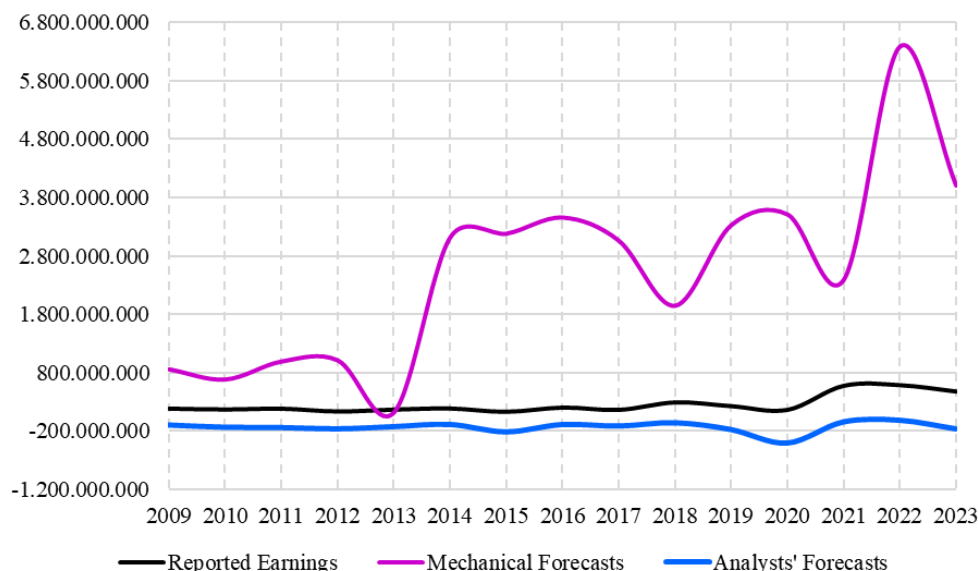


Source: Made by the authors (2024).



Figures 5 to 10 show the mean of analysts' projections, accounting-based forecasts and reported earnings per governance level, respectively, Traditional, Level 1, Level 2, New Market, Bovespa Plus and Bovespa Plus Level 2.

Figure 5 – Analysts' Forecasts, Accounting-based Forecasts and Reported Earnings of Companies with Analysts' Coverage at the Traditional Level

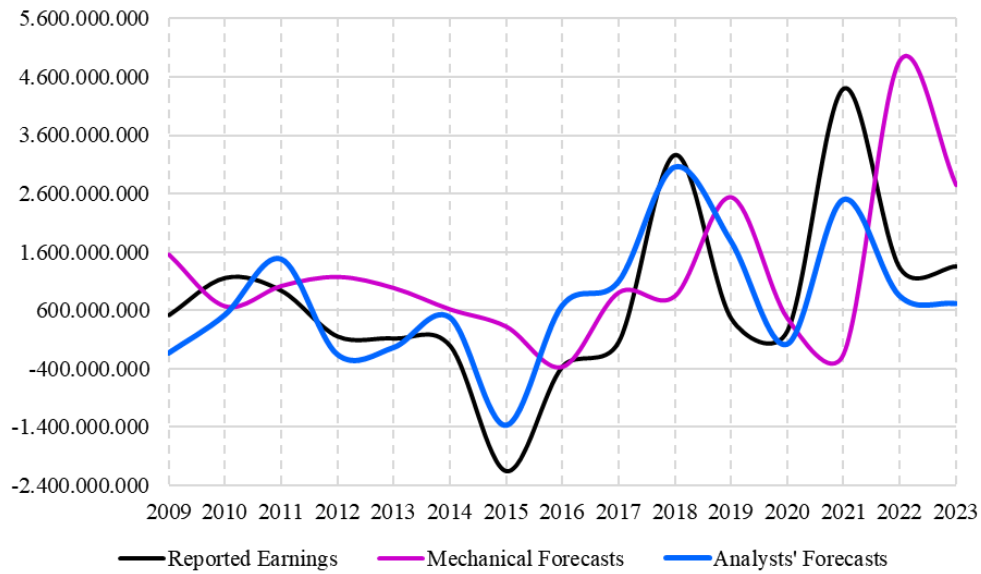


Source: Made by the authors (2024).

Figure 5 demonstrates the analysts' forecasts, accounting-based forecasts, and reported Earnings of companies at the Traditional level, with only ten companies covered by analysts. It shows that accounting-based projections have a higher dispersion in relation to analysts' estimates and reported earnings. However, accounting-based estimates had the same mean that reported earnings in 2012 and 2013.

This dispersion may be due to the small sample of companies at the Traditional level and different sizes. It should be mentioned that analysts followed the trends of the reported earnings, although their forecasts were lower.

Figure 6 – Analysts' Forecasts, Accounting-based Forecasts and Reported Earnings of Companies with Analysts' Coverage at Level 1

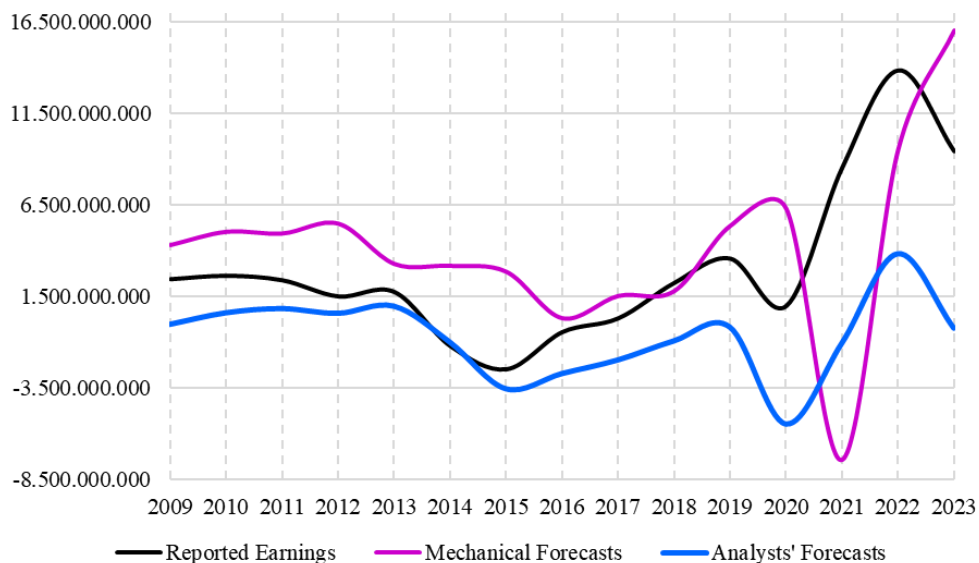


Source: Made by the authors (2024).

Figure 6 demonstrates the mean of the two earnings forecasts and companies' reported earnings at Level 1, which contains 15 companies with analysts' coverage. The mean of accounting-based forecasts was the same as reported earnings and analysts' estimates in many years of the sample. The same results can be seen in Figure 7, which demonstrates the mean of the companies at Level 2, which has 15 companies with analysts' coverage.

It should be noted that for the companies at Level 2, the accounting-based forecasts were more accurate than analysts' forecasts, corroborating with the hypothesis of this study. Therefore, it suggests that the earnings forecasts based on an accounting information model is potentially a reasonable tool for investors to monitor future earnings expectations of companies at Levels 1 and 2.

Figure 7 – Analysts' Forecasts, Accounting-based Forecasts and Reported Earnings of Companies with Analysts' Coverage at Level 2



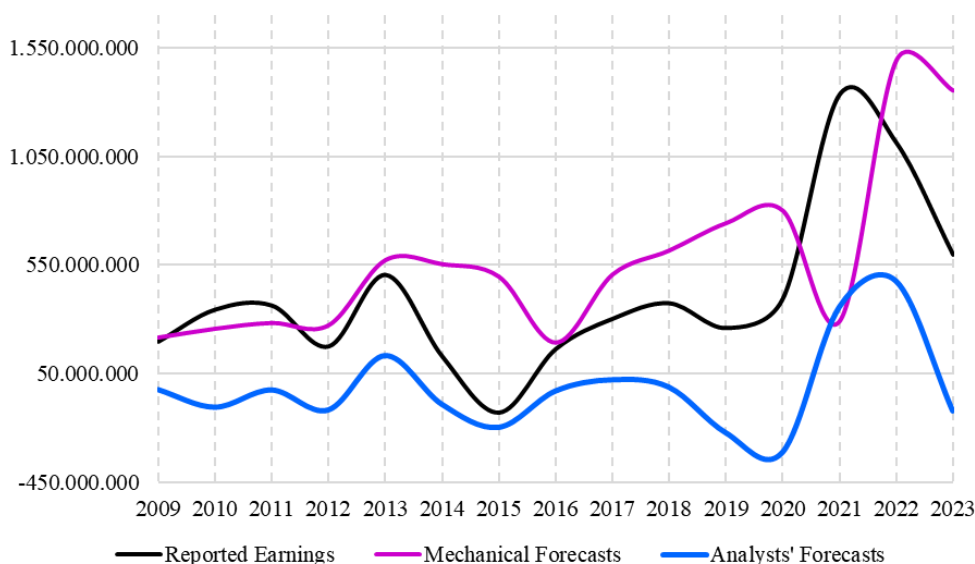


Source: Made by the authors (2024).

Figure 7 demonstrates that companies at the New Market level have accounting-based forecasts more accurate than analysts' estimates, also corroborating with the hypothesis of this research. In addition, analysts' forecasts had the same mean as accounting-based projections in 2020 and 2021, but they did not have the same mean as reported earnings in none of the fifteen years of the sample.

It should be noted that the New Market is the level of governance with the highest number of companies with analysts' coverage (168 organizations, corresponding to 81,2% of the sample, as shown in Table 5). Therefore, the accounting-based forecasts were more accurate than analysts' forecasts for the companies at the New Market, corroborating with the hypothesis of this study.

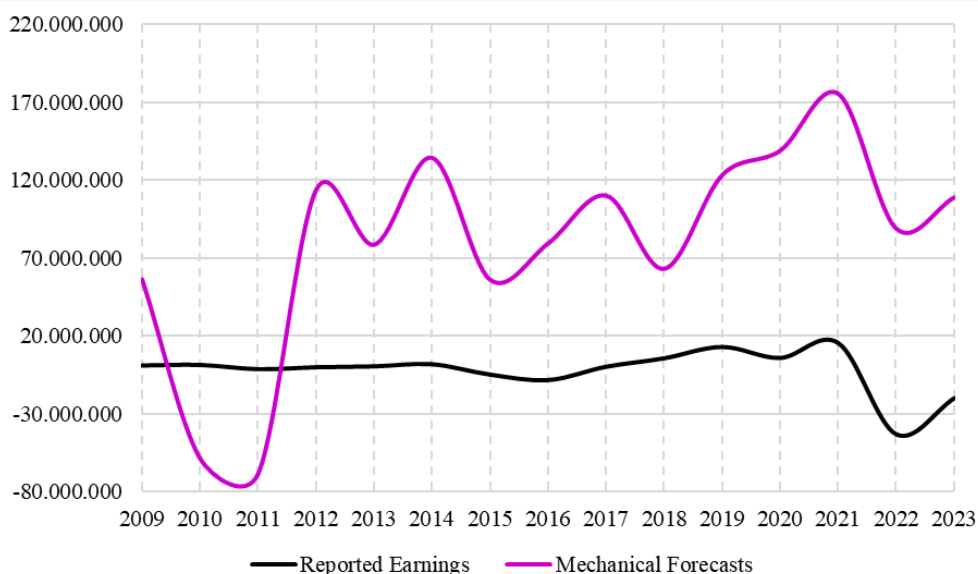
Figure 8 – Analysts' Forecasts, Accounting-based Forecasts and Reported Earnings of Companies with Analysts' Coverage at the New Market Level



Source: Made by the authors (2024).

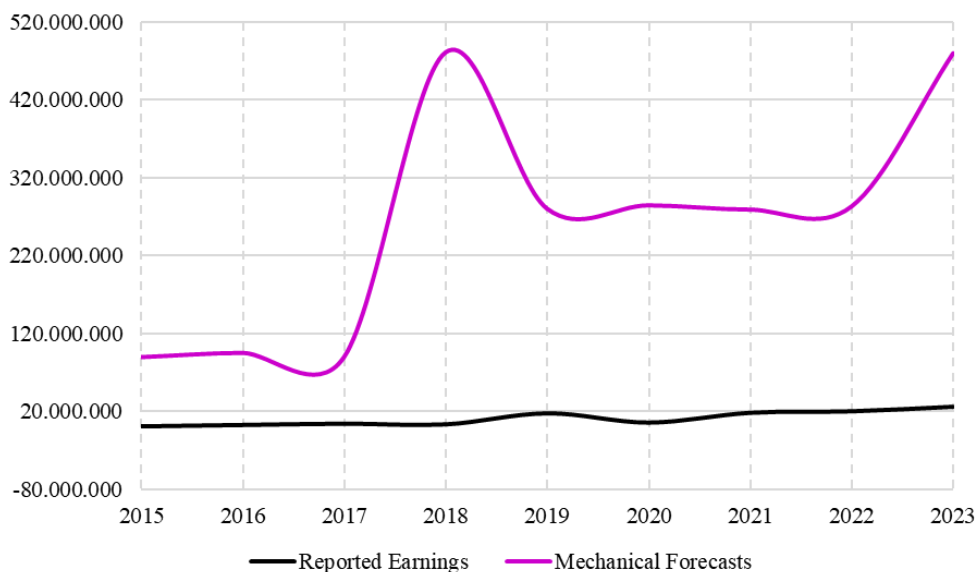
Figures 9 and 10 demonstrate the mean of analysts' and accounting-based projections and reported earnings of companies at the segments Bovespa Plus and Bovespa Plus Level 2, respectively. The accounting-based estimates had the same mean that reported earnings only in two periods for Bovespa Plus organizations. However, analysts did not cover any company of these levels during this research period (2009 to 2023). Therefore, the accounting-based earnings forecasts model has higher coverage, such as Hou et al. (2012) study.

Figure 9 – Analysts' Forecasts, Accounting-based Forecasts and Reported Earnings of Companies with Analysts' Coverage at the Bovespa Plus Level



Source: Made by the authors (2024).

Figure 10 – Analysts’ Forecasts, Accounting-based Forecasts and Reported Earnings of Companies with Analysts’ Coverage at the Bovespa Plus Level 2



Source: Made by the authors (2024).

The results partially corroborate this study's hypothesis (H1) that accounting-based earnings forecasts are more accurate than analysts' forecasts consensus in Brazil. Additionally, it suggests that the earnings forecasts based on an accounting information model are potentially a reasonable tool for investors to monitor future earnings expectations of companies in the New Market and at Levels 1 and 2. Thus, this research shows that investors could use earnings forecasts based on an accounting information model to support their investment evaluation and decision-making.

5. Conclusions



Earnings forecasts are relevant for the decision-making process in portfolio allocation and firm valuation. However, in many emerging economies, such as the Brazilian market, analyst coverage is reduced, which restricts the availability of earnings estimation, and market agents may not have the required skills for proper earnings estimation. Moreover, the literature documented that, even when available, analysts' earnings forecasts can often contain their individual biases.

In this regard, this paper provided an accounting-based mechanical forecast estimation suggested by Hou et al. (2012) and compared the forecast accuracy with the available consensus analysts' earnings forecasts by using a sample of 316 Brazilian non-financial listed companies from 2009 to 2023 (3,750 firm-year observations) for accounting-based estimation and a sample of 1,605 firm-year observations of mean analysts' earnings forecast for accuracy comparison.

The results show a lack of analyst coverage, especially in companies listed in traditional governance segments. Specifically, analysts' forecasts are unavailable for almost all firms listed in the traditional segment (not available for 90 firms out of 100). Hence accounting-based estimation models can be highly useful to decision-making in these companies.

Comparing the matched sample and the analysts' forecasts, results indicate that, overall, the accuracy, defined as the difference between reported and estimated earnings, is higher for analysts' forecasts (i.e., median and mean values of accuracy are nominally lower for analysts' forecasts). However, accounting-based estimation performs better than analysts' forecasts based on more extreme values, specifically in the 25% and the 75% percentile. This evidence suggests that the accounting-based model accommodated larger variances in earnings than analysts do. Results corroborate Hou et al. (2012) since accounting-based estimates have higher coverage than analyst coverage, despite being less accurate, on average, in Brazilian companies.

Overall, the results of this study do not fully corroborate the hypothesis developed in this study that accounting-based earnings forecasts are more accurate than analysts' forecasts consensus in Brazil, considering the period between 2009 and 2023. However, it suggests that this hypothesis is valid for the more extreme values.

Additional results also corroborate Anolli et al. (2014) and Avramov et al. (2009), which show that analysts' forecasts are less reliable in crisis scenarios (e.g., the Brazilian crisis in 2016 and the COVID-19 pandemic) due to the increase in uncertainty, information asymmetry, and risk perception during this period.

Therefore, this study shows that investors could use earnings forecasts based on an accounting information model to support their Brazilian investment evaluation and decision-making, especially to monitor future earnings expectations of companies at three governance levels (New Market and Levels 1 and 2).

However, this research has limitations, such as the consideration of annual earnings, which may not capture market volatility, and the panel data regression does not allow the cluster approach to do a deep analysis of the Brazilian market, which is a suggestion for future research. Also, earnings forecasts based on an accounting information model can be improved by evaluating the inclusion of other accounting and economic variables, increasing the data sample, and comparing Brazil's results with those of other countries.



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