Revista de Educação e Pesquisa em Contabilidade
Journal of Education and Research in Accounting

Periódico de Publicação Contínua, digital e gratuito publicado pela Academia Brasileira de Ciências Contábeis | Disponível online em www.repec.org.br

REPeC, Brasília, v. 19, 2025 | DOI: http://dx.doi.org/10.17524/repec.v19.e3675 | ISSN 1981-8610

Influence of countries' tax enforcement on the relationship between tax expenditure surprise and the accuracy of financial analysts' earnings forecasts

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Abstract

Objective: To examine the influence of countries' tax enforcement on the relationship between tax expense surprise and the accuracy of financial analysts' earnings forecasts. Method: Data from a sample of 4,775 companies across 35 countries from 2001 to 2019 were analyzed using descriptive statistics, correlation analysis, and Ordinary Least Squares (OLS) regression tests.

Results: Financial analysts systematically issue optimistic earnings forecasts, and tax expense surprise is incrementally relevant to earnings surprise in explaining analysts' future errors. These information intermediaries do not efficiently incorporate tax information when issuing their earnings expectations. The findings indicate that analysts use tax information more effectively and improve the accuracy of earnings forecasts in environments with high levels of tax enforcement. However, the results were insignificant when U.S. companies were excluded from the sample.

Contribution: These findings underscore the importance of tax enforcement and tax information in shaping financial analysts' expectations about future performance, contributing to greater efficiency in the capital market.

Keywords: Financial Analysts, Profit Forecasting, Tax Expenses Surprise, Tax Enforcement.

Published in Portuguese and English. Original Version in Portuguese.

Round 1: Received in 10/9/2023. Review requested on 3/1/2024. Round 2: Resubmited on 4/20/2024. Review requested on 6/3/2024. Round 3: Resubmited on 7/2/2024. Accepted on 7/4/2024 by Gerlando Augusto Sampaio Franco de Lima, PhD (Editor). Published on 3/27/2025. Organization responsible for the journal: Abracicon.

1 Introduction

Considered key information intermediaries in the capital market, financial analysts collect, organize, and disseminate information about companies (Kirk *et al.*, 2014). By incorporating this information into their earnings expectations and forecasts, they enhance the information environment and strengthen the monitoring function for investors (Sualihu *et al.*, 2021; Wang, 2019).

However, Abarbanell and Bushee (1997) argue that financial analysts may encounter limitations in incorporating available information into their assessments and earnings forecasts. For instance, complex tax information, such as income tax accounting, can lead to errors in profit forecasts, reducing accuracy.

Graham *et al.* (2012) state that evidence on how the market utilizes tax information is inconsistent and argue that inefficiencies in using tax information among market participants may stem primarily from the confidentiality of tax returns, with financial reports serving as the sole source of disclosure.

Furthermore, Dhaliwal *et al.* (2004) argue that the components of income tax expense not only involve complex estimation calculations but also reflect the tax planning strategies adopted by the company. Related information is often criticized for being unclear, incomplete, or non-standardized, making it costly to process (Weber, 2009).

Desai *et al.* (2007) argue that tax authorities function as a corporate monitoring mechanism, enhancing the validity and credibility of tax information disclosed in financial reports, particularly in environments with stricter oversight. Consistent with this view, Kerr (2019) provides evidence that the informativeness of tax expense surprises is more significant for companies headquartered in countries with stronger tax enforcement and that the incremental value relevance of such surprises is primarily driven by their interaction with the level of tax enforcement.

Noting that the market does not fully incorporate tax information when accounting disclosures are made, Hanlon *et al.* (2005) and Thomas and Zhang (2011) demonstrate that increases in income tax expense from one period to the next (tax expense surprise) are positively correlated with both contemporaneous and future returns. They conclude that tax expense surprises convey information about future earnings not reflected in current earnings and provide incremental insights beyond those contained in accounting profit.

Weber (2009) argues that the extent to which financial analysts effectively incorporate tax information into their expectations remains an open question though. Building on this discussion, this study examines the influence of Brazil's tax enforcement on the relationship between tax expense surprises and the accuracy of financial analysts' earnings forecasts.

Given the importance of understanding whether financial analysts effectively incorporate tax information when formulating earnings expectations, a sample of companies from 35 countries with shares traded in the U.S. capital market was analyzed. These analysts are key information intermediaries, considering their earnings forecasts influence resource allocation in the capital market.

This study contributes to the literature on the informational value of tax data disclosed in financial reports by examining a multinational sample and expanding the understanding of how tax expense surprises impact the future accuracy of financial analysts' earnings forecasts. The findings are relevant to various stakeholders, particularly financial analysts, as the evidence suggests that surprise tax expenses are associated with less accurate earnings forecasts. This highlights the need for analysts to process and interpret tax information more thoroughly to enhance the precision of their forecasts.

Furthermore, this study highlights an important inefficiency in analysts' reporting by showing that financial analysts' earnings forecasts exhibit an optimistic bias and fail to incorporate tax expense surprises, resulting in lower-quality earnings forecasts. Investors should be aware of this limitation to make more informed resource allocation decisions, especially when tax authorities provide less effective oversight.

2 Literature review and hypotheses development

Financial analysts gather public and private information (Healy & Palepu, 2001), analyze it, and generate insights for investors that can influence asset prices by conveying information about future cash flows (Kothari *et al*., 2016). According to Healy and Palepu (2001), these information intermediaries enhance the efficiency and value of the capital market and provide more accurate earnings forecasts than time series models, likely because they can incorporate company-specific and economic news into their projections more promptly.

Easterwood and Nutt (1999) argue that if the market considers analysts' earnings forecasts to be rational and statistically optimal, then inefficiencies in these forecasts may affect pricing efficiency in the securities market. Several studies indicate that financial analysts' earnings forecasts are biased, as they often underreact or overreact to new information (Abarbanell & Bernard, 1992; De Bondt & Thaler, 1990; Easterwood & Nutt, 1999), suggesting that analysts do not fully and rationally incorporate publicly available data into their forecasts.

De Bondt and Thaler (1990) observe that larger-than-expected earnings changes are associated with lower accuracy in financial analysts' future earnings forecasts. Similarly, Abarbanell and Bernard (1992) argue that analysts do not efficiently incorporate past earnings news into their forecasts, as they tend to underestimate the implications of prior earnings changes. They further suggest that analysts become more optimistic after both positive and negative earnings news, resulting in negative surprises in subsequent earnings forecasts.

After analyzing whether financial analysts effectively incorporate information from the previous year's performance, Easterwood and Nutt (1999) found that analysts tend to underreact to negative information and overreact to positive information in their earnings forecasts. This behavior occurs because their forecasts do not proportionally reflect the information embedded in prior negative or positive performance changes. They argue that their findings support the view that financial analysts systematically exhibit an optimistic bias, regardless of whether the information is positive or negative (Easterwood & Nutt, 1999).

Nutt *et al*. (1999) observed that previous studies had not considered whether analysts' reactions varied based on the nature of the information—whether it was good or bad news. To address this gap, they reexamined the serial correlation in earnings forecast errors to investigate whether analysts respond differently depending on the type of information received. Their findings indicate that earnings forecast errors in one period are correlated with errors in previous periods, with more significant errors occurring in response to bad news and more minor errors in response to good news, suggesting greater accuracy in earnings forecasts when the information is positive (Nutt *et al.*, 1999).

Like Olsen (1996), Nutt *et al.* (1999) concluded that financial analysts tend to issue overly optimistic earnings forecasts by overestimating subsequent earnings. They further argue that this optimism is also evident in analysts' reactions to new information. Specifically, by responding optimistically, analysts produce earnings forecast errors positively correlated with bad news. Conversely, overreacting to good news generates forecast errors that are negatively correlated with positive information. In both cases, their reactions do not contribute to greater accuracy in earnings forecasting (Nutt *et al.*, 1999).

According to Ohlson and Penman (1992) and Thomas and Zhang (2014), higher revenues are considered "good" news for investors, while higher expenses are viewed as "bad" news, with returns responding accordingly. Based on this notion, when analyzing company information to generate insights—such as issuing earnings forecasts, buy/sell recommendations, and target prices—financial analysts typically perceive increasing tax expenses from period to period, as reported in financial statements, as bad news; higher tax expenses imply more significant cash outflows to tax authorities, leaving less cash available for shareholders (Baik *et al.*, 2016).

Despite the argument that expenses are "bad" news and that higher expenses should lead to lower returns, Ohlson and Penman (1992) found a positive correlation between tax expenses and contemporaneous company returns. Similarly, Lev and Thiagarajan (1993) identified a positive correlation between changes in effective tax rates (ETR) and current returns, as financial analysts and investors often perceive lower taxable income as bad news.

When examining the relationship between taxable income and accounting income as a predictor of earnings growth, Lev and Nissim (2004) found that the ratio of income tax to accounting income might predict earnings growth for up to five years. Similarly, Hanlon *et al.* (2005) provided evidence that taxable income serves as an alternative measure of firm performance and that, in the short term, higher tax expenses may indicate good news to investors, as they could indicate future earnings growth.

Nonetheless, Ayers *et al.* (2008) found a negative association between positive changes in book-tax difference (BTD) information and changes in credit ratings. Their findings indicate that credit rating revisions tend to be more negative when companies experience larger increases in BTDs, leading to the conclusion that financial analysts at rating agencies perceive positive changes in BTDs as bad news.

Examining whether financial analysts issuing sell recommendations incorporate BTD information to establish efficient earnings expectations, Weber (2009) found that analysts' forecasts in the U.S. market are, on average, more optimistic for companies whose taxable income is lower than their accounting income. This suggests a failure to anticipate that such companies typically experience lower future profits, indicating that financial analysts do not fully integrate BTD-related information into their earnings forecasts.

Thomas and Zhang (2011) found that seasonal fluctuations in quarterly tax expenses (tax expense surprises) are positively correlated with future stock returns. They concluded that investors initially underreact to the implications of tax expense surprises for future earnings and only fully respond once those earnings are realized.

Baik *et al.* (2016) examined whether pre-tax earnings forecasts mitigate investors' underreaction to the implications of tax expense surprises on future earnings. They found that pre-tax earnings forecasts significantly weaken the positive relationship between tax expense surprises and future returns, as documented by Thomas and Zhang (2011), by helping investors better recognize the persistence of current tax expense surprises in future earnings.

The literature examining whether tax information presented in financial statements provides relevant insights into firm value suggests that higher period-to-period tax expenses (tax expense surprises) are positively correlated with contemporaneous and future returns, stock prices, and earnings growth. Moreover, this information is incremental to that contained in earnings surprises (Baik *et al.*, 2016; Graham *et al.*, 2012; Hanlon *et al.*, 2005; Kerr, 2019; Thomas & Zhang, 2011).

Thomas and Zhang (2014) argue that tax expenditure serves two roles: matching and proxying future profitability. The matching role suggests that higher current tax expenditure is bad news, as it reflects greater cash outflows due to higher tax payments. In contrast, the proxying role indicates that higher tax expenditure from period to period (tax expense surprise) is good news, as it signals higher future profitability.

Although tax expense represents a company cost, and higher tax expenses from period to period indicate greater cash outflows to tax authorities and less cash available for shareholders (Baik *et al*., 2016), an increase in current tax expense relative to the previous year (tax expense surprise) may be interpreted by financial analysts as good news. This is because it can signal expectations of greater growth and future profitability.

Given evidence that financial analysts tend to issue optimistic forecasts—often overestimating future corporate earnings or failing to fully incorporate the implications of tax expenses into their projections (Weber, 2009)—larger tax expense surprises from period to period are likely to be positively associated with subsequent earnings forecast errors. Furthermore, aligning with Easterwood and Nutt's (1999) argument that financial analysts underreact to both good and bad news while maintaining an optimistic outlook for the following period, the first research hypothesis is formulated:

H1: Larger tax expenditure surprises are associated with greater future errors in financial analysts' earnings forecasts.

The literature demonstrates a systematic correlation between a country's legal system and the development and liquidity of its financial markets (Lerner & Schoar, 2005). Admati (2017) highlights that in countries with underdeveloped legal systems and weak enforcement, political interference, inefficiencies, or corruption are often observed in the judicial system. This occurs because legal enforcement refers to activities aimed to ensure compliance with legislation in a given jurisdiction, which can vary significantly from one country to another (La Porta *et al*., 2000).

Hope (2003) investigated a sample of companies from 22 countries to analyze the relationship between analysts' forecast errors and the level of enforcement of accounting standards and found that a higher level of enforcement is associated with more accurate profit forecasting, concluding that a higher level of enforcement encourages managers to follow current accounting rules and, in turn, reduces financial analysts' uncertainty about future profits.

Lerner and Schoar (2005) found that transactions in countries with strong legal enforcement tend to have higher valuations and returns. They also provided evidence that investors in countries with weaker legal enforcement face greater challenges and higher costs in enforcing contracts, primarily due to the inability to uphold legal provisions effectively. According to the authors, transaction structures vary based on a country's level of legal enforcement, which plays a crucial role in shaping firms' contractual relationships, whether assessed directly or through legal origin.

The tax authority is a monitoring mechanism for legal entities, influencing both the capital market and companies' financing costs (Desai *et al*., 2007). Beyond tax laws and rates, tax enforcement can impact companies by generating benefits for shareholders and enhancing corporate performance in the long term. The reason is that it not only oversees company operations but also plays a crucial role in supervising and monitoring managers, thereby increasing investor confidence and capital market liquidity. When investors purchase shares, the price reflects a premium for a strong oversight environment (Xu *et al*., 2011).

According to Mironov (2013), firm tax enforcement enhances corporate performance by reducing revenue diversion. Hanlon *et al.* (2014) demonstrate that stricter tax enforcement is negatively associated with discretionary accruals, a key indicator of financial reporting transparency and quality. Furthermore, Bauer *et al.* (2021) find that companies headquartered in countries with stronger tax enforcement accumulate less bad news, reducing the risk of sharp declines in stock prices. Collectively, these studies provide evidence that strong tax enforcement is positively correlated with the quality of the corporate information environment.

Considering that the role of tax expense surprise as a proxy for future profitability depends on the capital, financial, and tax market systems, which vary across countries, Kerr (2019) analyzed an international sample and found that tax expense surprise serves as a proxy for a company's future profitability while providing incremental informational value beyond earnings surprises. Moreover, the study showed that stronger tax enforcement enhances the informational relevance of tax surprises. Additionally, the value relevance of tax surprises is primarily driven by their interaction with the level of tax enforcement.

In countries with a higher level of tax enforcement, where companies more strictly adhere to tax rules and regulations, tax authorities act as an external governance mechanism, monitoring corporate practices, which improve internal information systems, inhibit managers' discretionary behavior and increase the quality and relevance of tax information reported in tax returns and financial statements (Bauer *et al.*, 2021; Desai *et al.*, 2007; Gallemore & Jacob, 2020; Hanlon *et al.* 2014; Kerr, 2019; Xu *et al.*, 2011).

Furthermore, tax enforcement can help reduce the likelihood and magnitude of profit shifting through tax avoidance, leading to higher reported earnings and making them more accurately reflect a firm's economic performance (Gallemore & Jacob, 2020; Mironov, 2013). In this context, financial analysts issuing earnings forecasts for companies headquartered in countries with strong tax enforcement may place greater trust in the tax information disclosed in financial statements and more effectively incorporate the implications of tax expense surprises into their forecasts. Based on this discussion, the second research hypothesis is proposed:

H2: A country's level of tax enforcement attenuates the positive association between tax expense surprise and errors in financial analysts' earnings forecasts.

3 Method

The sample comprises 4,775 companies from 35 countries with shares traded on U.S. stock exchanges. These companies disclose their financial data through Compustat North America and have corresponding earnings forecasts in the Institutional Brokers' Estimate System (I/B/E/S). Additionally, tax enforcement data is sourced from the IMD World Competitiveness Online website, and maximum corporate income tax rates for the respective countries are obtained from the Organization for Economic Cooperation and Development (OECD) database.

The analysis period covers the fiscal years from 2001 to 2019, based on data availability at the time of collection. To ensure the robustness of the results, outliers, financial institutions, and companies headquartered in countries with a 0% income tax rate were excluded from the sample, as these entities have distinct tax characteristics that could distort the findings. As a result, the final sample comprises 35,237 observations from 4,775 companies across 35 countries, covering annual fiscal data from 2001 to 2019.

It is worth noting that the United States represents the majority of the sample, accounting for 88.66% of the observations and 86.53% of the companies. Hence, to address this imbalance and enhance the robustness of the results, the analyses are conducted on the entire sample (4,775 companies and 35,237 observations) and then separately for the subsample of 643 non-U.S. companies with 3,997 observations.

Two regression models (Model I and Model II) are employed to test the first hypothesis regarding the impact of tax expense surprises on errors in financial analysts' future earnings forecasts.

$$ERRF_{i,t+1} = \alpha + \beta_1 TAXSURP_{i,t} + \beta_2 EARNSURP_{i,t} + \beta_3 TAM_{i,t} + \beta_4 ACC_{i,t} + \beta_5 ROA_{i,t} + \beta_6 D\_PLAIR_{i,t} + \beta_7 BIG4_{i,t} + \beta_8 ERRF_{i,t-1} + \beta_9 CSTR_{i,t} + \beta_{10} TAXENF_{i,t} + \varepsilon_{it} \quad \textit{(Model I)}$$

$$ERRF_{i,t+1} = \alpha + \beta_1 TAXSURPI_{i,t} + \beta_2 EARNSURP_{i,t} + \beta 3 TAM_{i,t} + \beta_4 ACC_{i,t} + \beta_5 ROA_{i,t} + \beta_6 D\_PLAIR_{i,t} + \beta_7 BIG4_{i,t} + \beta_8 ERRF_{i,t-1} + \beta_9 CSTR_{i,t} + \beta_{10} TAXENF_{i,t} + \varepsilon_{i,t} \quad \textit{(Model II)}$$

The dependent variable is financial analysts' future forecast errors. The analysis focuses on forecasts made in the period following *(t+1)* the disclosure of companies' earnings for year *t* to investigate the relationship between tax expense surprises and the accuracy of financial analysts' earnings forecasts. Following a similar approach to Weber (2009), the first earnings forecasts issued after the announcement of the previous period's earnings are used.

By using the first earnings forecast for the year following earnings release in year *t*, financial analysts will likely have access to all relevant information disclosed in the companies' annual financial statements. This approach allows for a more direct assessment of how analysts interpret and incorporate tax expense surprises into their forecasts of the companies' future economic performance.

Analysts' future forecast errors were obtained from the Institutional Brokers' Estimate System (I/B/E/S) database. This variable is calculated as the difference between the mean consensus earnings per share (EPS) forecast for firm *i* in year *t+1* and the firm's actual reported EPS in year *t+1*, divided by the mean consensus earnings forecast for firm *i* in year *t+1*.

The first independent variable is tax expense surprise (TAXSURP), measured following Kerr (2019) and Thomas and Zhang (2011, 2014). It is calculated as the total tax expense on the profits of company *i* in year *t* minus the total tax expense on the profits of company *i* in year *t-1*, weighted by the total assets of company *i* in year *t-1* (Equation 1).

$$TAXSURP_{i,t} = \frac{ETAX_{i,t} - ETAX_{i,t-1}}{AT_{i,t-1}} \quad \textit{(Equation 1)}$$

Kerr (2019) states that by directly measuring the incremental information content of the fiscal expenditure surprise, the unexplained part of the fiscal expenditure surprise (TAXSURPI) allows more direct inferences about the relevance of this information. Therefore, the relationship between TAXSURPI and the accuracy of financial analysts' earnings forecasts is analyzed using Model II. TAXSURPI is measured by estimating the regression error (ε) between the fiscal expenditure surprise (TAXSURP) and the pre-tax earnings surprise (EARNSURP), measured by year and country with control for the sector, according to Equation 2.

$$TAXSURP_{i,t} = \alpha + \beta_1 EARNSURP_{i,t} + \varepsilon_{i,t} \quad \textit{(Equation 2)}$$

Where:

TAXSURP = total income tax expense of company *i* in year *t* minus total income tax expense of company *i* in year *t-1*, weighted by the assets of the company *i* in year *t-1*;

EARNSURP = pre-tax income of company *i* in year *t* minus pre-tax income of company *i* in year *t-1*, weighted by the assets of company *i* in year *t-1*;

ε = regression error term of the company *i* in period *t*.

Aligned with the literature, the firm-level control variables included in the model are firm size (SIZE), measured by the natural logarithm of the firm's Assets at the beginning of the year, which is positively correlated with forecast errors (Weber, 2009); accruals (ACC) estimated according to Weber (2009), which are negatively correlated with forecast errors (Weber, 2009); Return on Assets (ROA), measured as operating profit weighted by Assets, which is positively correlated with future earnings forecast errors (McVay *et al.*, 2006); BIG4, which is assigned 1 when the firm is audited by one of the big four auditing firms (Weber, 2009); forecast errors from the previous year ($ERRP_{t-1}$) (Abarbanell & Bernard, 1992; Weber, 2009); earnings surprise (EARNSUPR) (Baik *et al.*, 2016; Kerr, 2019; Thomas & Zhang, 2011); and the dummy variable D_PLAIR, to which 1 is assigned to indicate companies with pre-tax profit forecast (Baik *et al.*, 2016).

Similarly to the study by Kerr (2019), the model includes the following country-level control variables: the maximum tax rate on profits applicable to companies in the country (CSTR), collected in the database of the Organization for Economic Cooperation and Development (OECD), and a variable corresponding to the country's tax evasion index, available on IMD World Competitiveness Online, as a proxy for tax enforcement (TAXENF); higher values indicate greater tax enforcement.

To test the effect of fiscal enforcement (TAXENF) on the relationship between the fiscal expenditure surprise and future errors in financial analysts' earnings forecasts, Model I includes the interaction variable between the fiscal expenditure surprise and fiscal enforcement (TAXSURP*TAXENF), and Model II includes the interaction variable between the unexplained fiscal expenditure surprise and fiscal enforcement (TAXSURPI*TAXENF).

Descriptive statistics, correlation analysis, and multivariate tests were used to analyze the data, applying the ordinary least squares (OLS) regression model with the panel data method. Fixed effects were grouped at the company level, and year-fixed effects were included in all regressions. In non-tabulated tests, the models were estimated using OLS regressions with panel data, incorporating fixed effects for the year and grouping by country. The results from these additional tests were consistent with those previously presented.

4 Results

Table 1 presents the variables' descriptive statistics at the company level. Considering that the sample concentrates 86.53% of observations from US companies, the metrics of the full sample (Panel A) are described, consisting of 4,775 companies and 35,237 observations from 35 countries. Next, descriptive statistics are obtained for a subsample from which US companies were excluded (Panel B), consisting of 643 companies and 3,997 observations from 34 countries.

Table 1
Descriptive Statistics

Panel A – Sample (35 countries)								
	No. of observations	**Mean**	**Standard Deviation**	**Minimum**	**1st Q**	**Median**	**3rd Q**	**Maximum**
ERRF	35.237	2,2424	7,5928	-16,5375	0,1518	0,9642	2,2654	5,7730
TAXSURP	35.237	0,0012	0,0280	-0,1186	-0,0041	0,0002	0,0076	0,1164
EARNSURP	35.237	0,0068	0,1125	-0,4235	-0,0181	0,0041	0,0322	0,5112
TAXSURPI	35.237	0,0001	0,0238	-0,0916	-0,0064	-0,0002	0,0066	0,0921
SIZE	35.237	3,1793	0,8591	1,2498	2,5728	3,1666	3,7324	5,4299
ACC	35.237	-0,0375	0,0701	-0,2803	-0,0701	-0,0338	-0,0015	0,1845
ROA	35.237	-0,0072	0,1796	-0,9837	0,0002	0,0269	0,0667	0,2571
D_PLAIR	35.237	0,1455	–	0	0	0	0	1
BIG4	35.237	0,8167	–	0	1	1	1	1
$ERRF_{t-1}$	35.237	2,0960	7,3627	-18,2857	0,1506	0,9243	2,1578	55,15
CSTR	35.237	32,78	5,46	8,50	35,00	35,00	35,00	48,32
TAXENF	35.237	5,5767	1,0231	0,6981	4,9423	5,7670	6,3019	9,0182
Panel B – Sample without US companies (34 countries)								
	No. of observations	**Mean**	**Standard Deviation**	**Minimum**	**1st Q**	**Median**	**3rd Q**	**Maximum**
ERRF	3.997	3,6452	8,8947	-12,500	0,1400	0,9375	2,5036	9,9822
TAXSURP	3.997	0,0017	0,0206	-0,0734	-0,0047	0,0003	0,0081	0,0775
EARNSURP	3.997	0,0067	0,1124	-0,3844	-0,0263	0,0050	0,0393	0,4892
TAXSURPI	3.997	0,0000	0,0175	-0,0579	-0,0073	-0,0004	0,0071	0,0573
SIZE	3.997	3,2890	1,0264	1,0648	2,5400	3,2758	3,9971	5,9663
ACC	3.997	-0,0452	0,0674	-0,2728	-0,0776	-0,0415	-0,0102	0,1676
ROA	3.997	0,0105	0,1502	-0,7765	-0,0023	0,0364	0,0776	0,2817
D_PLAIR	3.997	0,2334	–	0	0	0	0	1
BIG4	3.997	0,9224	–	0	1	1	1	1
$ERRF_{t-1}$	3.997	3,6111	12,8779	-12,5	0,155	0,9151	2,4193	97,9903
CSTR	3.997	22,99	7,53	8,5	15,0	24,0	28,0	48,32
TAXENF	3.997	5,1702	1,5965	,6981	4,1702	5,3846	6,56	9,0182

Countries included in the sample: Argentina (ARG); Australia (AUS); Belgic (BEL); Brazil (BRA); Canada (CAN); Switzerland (CHE); Chile (CHL); China (CHN); Colombia (COL); Germany (DEU); Denmark (DNK); Spain (ESP); Finland (FIN); France (FRA); United Kingdom (GBR); Greece (GRC); Hong Kong (HKG); India (IND); Ireland (IRL); Iceland (ISR); Italy (ITA); Japan (JPN); South Korea (KOR); Luxembourg (LUX); Mexico (MEX); Netherlands (NLD); Peru (PER); Portugal (PRT); Russia (RUS); Singapore (SGP); Sweden (SWE); Turkey (TUR); Taiwan (TWN); United States of America (USA); South Africa (ZAF).

Source: developed by the authors.

Panel A (all sample companies) shows a mean financial analysts' earnings forecast error (ERRF) of 2.2424, with a standard deviation of 7.5928, indicating substantial dispersion in forecast errors. However, the median of 0.9642 suggests that at least 50% of the sample's forecast errors are 1.2782 (2.2424 - 0.9642) below the overall mean. Based on the third quartile (3rd Q), 25% of the companies exhibit earnings forecast errors above the mean. According to the quartile distribution, financial analysts' earnings forecast errors remain positive from the first quartile (1st Q) onward, indicating that at least 75% of the earnings forecasts issued for the sample companies are optimistic.

The results of Panel B (non-US companies) indicate that financial analysts' mean earnings forecast errors are higher than the overall sample mean and that, based on the standard deviation, the dispersion in analysts' forecast accuracy is also greater. Thus, although the findings for both groups of countries (Panel A and Panel B) highlight the low accuracy of financial analysts, the evidence suggests that analysts issue more accurate forecasts for US companies than non-US companies.

Regarding pre-tax profit forecasts (D_PLAIR), the results indicate that financial analysts issued both profit forecasts and pre-tax profit forecasts (D_PLAIR) in 23.34% (0.2334) of the 3,997 observations from non-US companies (Panel B), a proportion higher than the 14.55% (0.1455) observed for the entire sample (Panel A).

According to Table 1, the mean income tax expense surprise (TAXSURP) and the mean earnings before income tax surprise (EARNSURP) are positive. This indicates that, on average, companies reported higher earnings before income tax and higher tax expenses in period *t* than in period *t-1*. A comparison between the results for the entire sample (Panel A) and the non-US companies (Panel B) reveals that the tax expense surprise (TAXSURP) and earnings before income tax surprise (EARNSURP) in the latter follow the same pattern. In addition to having positive means, at least 25% (Q1) of both groups exhibit negative values.

The Pearson correlation matrix was generated to assess potential multicollinearity among the variables used in the multivariate analysis (Table 2).

Table 2

Análise de multicolinearidade

	1	2	3	4	5	6	7	8	9	10
ERRF	1									
TAXSURP	0,022 (***)	1								
EARNSURP	0,046 (***)	0,357 (***)	1							
TAXSURPI	0,004	0,919 (***)	0,032 (***)	1						
SIZE	0,165 (***)	-0,012 (**)	-0,010 (**)	-0,012 (**)	1					
ACC	0,011 (**)	-0,023 (***)	0,063 (***)	-0,053 (***)	0,061 (***)	1				
ROA	0,178 (***)	0,045 (***)	0,301 (***)	-0,072 (***)	0,353 (***)	0,076 (***)	1			
ERR_{t-1}	0,728 (***)	0,013 (***)	0,037 (***)	-0,003	0,177 (***)	0,016 (**)	0,215 (***)	1		
CSTR	-0,034 (***)	0,013 (***)	0,010 (**)	-0,004	-0,079 (***)	0,005	0,012 (**)	-0,036 (***)	1	
TAX_ENF	-0,016 (**)	-0,032 (***)	-0,055 (***)	-0,001	0,034 (***)	0,009	-0,064 (***)	-0,015 (***)	-0,148 (***)	1

(*). (**). (***) Statistical significance at $p < 0.1$. $p < 0.05$, and $p < 0.01$ respectively.

Source: developed by the authors

Table 2 shows a positive and significant association at the 1% level between tax expense surprise (TAXSURP) and financial analysts' forecast errors of future earnings, as well as between earnings surprise (EARNSURP) and forecast errors of future earnings. Table 1 indicates that, on average, both EARNSURP and TAXSURP are positive. According to Hanlon *et al.* (2005), taxable income is an alternative measure of a company's short-term performance, suggesting that a higher tax expense may signal good news to investors. Furthermore, Lev and Thiagarajan (1993) argue that financial analysts and investors perceive lower taxable income as bad news. Consequently, considering that EARNSURP and TAXSURP contribute to financial analysts making earnings forecast errors more frequently, they reduce earnings forecasts' accuracy.

Additionally, no significant correlation was found between financial analysts' earnings forecast errors (ERRF) and the unexplained tax expense surprise (TAXSURPI), a metric that represents the portion of the tax expense surprise not explained by the earnings surprise. The non-significant association between TAXSURPI and ERRF suggests that the unexplained tax expense surprise does not contribute to explaining financial analysts' earnings forecast errors.

As argued by Dhaliwal *et al.* (2004), the significant and negative correlation between CSTR and earnings forecast errors (ERRF) suggests that financial analysts take the effective tax rate (ETR) into account when evaluating stocks. Additionally, the negative and significant association between earnings forecast errors (ERRF) and the level of tax enforcement (TAXENF) indicates that analysts tend to issue more accurate earnings forecasts in markets with stronger monitoring and oversight. Therefore, consistent with the findings of Hope (2003), the evidence suggests that analysts incorporate available information more efficiently when forming expectations about a company's future performance.

4.1 Value relevance of tax expense surprise on the future earnings forecast accuracy of financial analysts

Multivariate regressions were conducted to examine how financial analysts react to tax expense surprise (TAXSURP) and unexplained tax expense surprise (TAXSURPI) when forming their earnings expectations. In this analysis, the earnings forecast errors following the release of annual financial reports serve as the dependent variable. First, a simple regression is estimated using TAXSURP, EARNSURP, or TAXSURPI as the independent variable, along with earnings forecast errors (ERRF). Then, additional independent variables are incorporated into the model to assess the incremental relevance of TAXSURP and TAXSURPI and to control for other factors that may influence the accuracy of financial analysts' future earnings forecasts. Table 3 presents the tests' results.

Table 3
Influence of tax expenditure surprise on financial analysts' future earnings forecast errors

Panel A – Sample (35 countries)							
	(1) ERRF	**(2) ERRF**	**(3) ERRF**	**(4) ERRF**	**(5) ERRF**	**(6) ERRF**	**(7) ERRF**
TAXSURPI				0,7461			2,1041 (**)
TAXSURP	3,0566 (***)		0,8301		1,6957 (*)	1,6934 (*)	
EARNSURP		1,7051 (***)	1,6300 (***)		0,8359 (***)	0,8366 (***)	
SIZE					0,3118 (***)	0,3139 (***)	0,2973 (***)
ACC					-0,2151	-0,2143	-0,1403
ROA					0,1948	0,1904	0,4167 (**)
D_PLAIR					0,3461 (***)	0,3436 (***)	0,3460 (***)
BIG4					0,0376	0,0359	0,0378
ERRFt-1					0,7392 (***)	0,7392 (***)	0,7390 (***)
CSTR					-0,0016	-0,0025	-0,0025
TAXENF						-0,0375	-0,0372
Year and sector fixed effectr	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	35.237	35.237	35.237	35.237	35.237	35.237	35.237
F *(p-value)*	432,25 (***)	456,99 (***)	454,54 (***)	433,37 (***)	4951,53 (***)	4956,20 (***)	4951,99 (***)
R-SQ	0,0356	0,0376	0,0377	0,0351	0,8567	0,8568	0,8563
LM (χ^2)	35,41 (***)	34,42 (***)	35,19 (***)	33,54 (***)	32,45 (***)	32,66 (***)	36,69 (***)
Hausman (χ^2)	52,32 (***)	54,63 (***)	61,35 (***)	56,32 (***)	56,37 (***)	68,44 (***)	219,87 (***)

Panel B – Sample of Non-US companies (34 countries)							
	(1) ERRF	(2) ERRF	(3) ERRF	(4) ERRF	(5) ERRF	(6) ERRF	(7) ERRF
TAXSURPI				3,0928			0,1365
TAXSURP	9,0046		-0,1500		-1,0388	-1,0099	
EARNSURP		4,6621 (**)	4,6724 (**)		4,0204 (*)	4,0149 (*)	
SIZE					0,1125	0,1102	0,0543
ACC					-0,3448	-0,3387	-0,2530
ROA					0,3447	0,3364	1,7014
D_PLAIR					0,3619	0,3705	0,3579
BIG4					-0,1529	-0,1460	-0,1491
$ERRP_{t-1}$					0,6765 (***)	0,6829 (***)	0,6813 (***)
CSTR					0,0076	0,0046	0,0021
TAXENF						0,0155	0,0249
Year and sector fixed effect	Sim	Sim	Sim	Sim	Sim	Sim	Sim
No. of observations	3.997	3.997	3.997	3.997	3.997	3.997	3.997
F *(p-value)*	49,19 (***)	49,04 (***)	49,11 (***)	48,52 (***)	595,48 (***)	635,28 (***)	574,85 (***)
R-SQ	0,0365	0,0387	0,0387	0,0362	0,8144	0,8149	0,8174
LM (χ2)	31,54 (***)	33,64 (***)	34,76 (***)	31,28 (***)	35,27 (***)	54,88 (***)	169,33 (***)
Hausman (χ2)	53,65 (***)	49,36 (***)	51,27 (***)	55,34 (***)	54,38 (***)	58,45 (***)	166,31 (***)

Fixed effects models were estimated using the White estimator.

(*). (**), (***) Statistical significance at $p < 0.1$, $p < 0.05$, and $p < 0.01$ respectively.

Source: developed by the authors.

In Table 3, columns 1 and 2 of Panel A show that tax expense surprise (TAXSURP) and pre-tax earnings surprise (EARNSURP) have independent value relevance. Since the coefficients in both regressions are positive and significant at the 1% level, TAXSURP and EARNSURP are considered to independently contribute to an increase in financial analysts' future earnings forecast errors (ERRF). Column 3 of Panel A presents the results of a model that includes both TAXSURP and EARNSURP, revealing that only the coefficient of EARNSURP remains positive and significant at the 1% level.

The results in columns 5 and 6 of Panel A indicate that when the remaining control variables are included, the association between TAXSURP and ERRF remains positive and becomes significant at the 10% level. This suggests that tax expense surprise (TAXSURP) has incremental relevance beyond EARNSURP in explaining future errors in financial analysts' earnings forecasts. Column 4 of Panel A shows no significant correlation between unexplained tax expense surprise (TAXSURPI) and future earnings forecast errors (ERRF). However, after incorporating independent control variables into the model (column 7), the association between TAXSURPI and ERRF becomes positive and significant at the 5% level at both the company and country levels, indicating that TAXSURPI has incremental value relevance in explaining future errors in financial analysts' earnings forecasts.

The positive association between tax expense surprise (TAXSURP and TAXSURPI) and future earnings forecast errors, as shown in Panel A, indicates that financial analysts do not fully and rationally incorporate publicly available data. This finding contradicts the conclusions of Kerr (2019) and Thomas and Zhang (2011, 2014), who suggest that tax expense serves as an alternative measure of profitability. It also challenges the argument by Hanlon *et al.* (2005) that, in the short term, higher tax expenses convey good news to the market.

The results for non-U.S. companies, presented in columns 1, 2, 3, 5, and 6 of Panel B, indicate that only the EARNSURP variable has positive and significant coefficients. Thus, unlike the findings for the entire sample, there is no evidence that tax expense surprise (TAXSURP) is incrementally relevant in explaining financial analysts' future earnings forecast errors. Furthermore, in contrast to the results for non-U.S. companies, unexplained tax expense surprise (TAXSURPI) does not show significant coefficients in columns 4 and 7. Therefore, the evidence suggests that TAXSURPI is not associated with financial analysts' future earnings forecast errors.

Abarbanell and Bushee (1997) might explain the inefficiency of financial analysts in utilizing tax information when preparing earnings expectations for non-U.S. companies (Panel B). They suggest that financial analysts are less likely to incorporate complex information, such as tax data, into their earnings assessments and forecasts due to their inability to interpret and integrate this information into their expectations or because the costs outweigh the benefits.

Contradicting the argument of Nutt *et al.* (1999), the results in Table 3 indicate that financial analysts do not provide statistically optimal earnings forecasts and tend to underreact or overreact to new information, such as pre-tax earnings surprises (EARNSURP) and tax expense surprises (TAXSURP and TAXSURPI). Thus, although financial analysts act as information intermediaries, contributing to greater efficiency in the capital market (Healy & Palepu, 2001), the results in Table 3 – Panel A suggest that hypothesis H_1 cannot be rejected, confirming that the greater the tax expense surprise, the more inaccurate financial analysts' earnings forecasts will be.

4.2 Tax enforcement as a proxy for tax information credibility

The interaction variable between tax expense surprise and the tax enforcement proxy (TAXSURP*TAXENF and TAXSURPI*TAXENF) was included in the model to examine the effect of a country's tax enforcement on the relationship between analysts' future forecast errors and tax expense surprises.

Thus, for the hypothesis that tax enforcement enhances the credibility of tax information, enabling analysts to incorporate tax expense surprises when forming earnings expectations more efficiently, we expect to find a negative and significant coefficient between ERRF and TAXSURP*TAXENF, as well as between ERRF and TAXSURPI*TAXENF. Consequently, a positive or insignificant coefficient refutes hypothesis H_2. The results are presented in Table 4.

Table 4

Influence of tax enforcement on the relationship between profit forecast errors and surprise tax expenditure

Variable	Panel A – Sample (35 countries)		Panel B – Sample of non-US companies (34 countries)	
	(1) ERRF	(2) ERRF	(3) ERRF	(4) ERRF
TAXSURPI		22,7402(**)		43,4947
TAXSURP	14,0634(*)		26,7190	
EARNSURP	0,8261(***)		4,0341(*)	
SIZE	0,3135(***)	0,2967(***)	0,1092	0,0485
ACC	-0,2170	-0,1523	-0,3402	-0,2712
ROA	0,1888	0,4078(*)	0,3079	1,6734
D_PLAIR	0,3445(***)	0,3465(***)	0,3785	0,3722
BIG4	0,0364	0,0383	-0,1311	-0,1304
$ERRP_{t-1}$	0,7392(***)	0,7390(***)	0,6823(***)	0,6863(***)
CSTR	-0,0024	-0,0024	0,0043	0,0020
TAXENF	-0,0345	-0,0370	0,0096	0,0219
TAXSURPI* TAXENF		-3,7001(**)		-8,1988
TAXSURP*TAXENF	-2,2299		-5,2887	
Year and sector fixed effect	Sim	Sim	Sim	Sim
N.º de observações	35.237	35.237	3.997	3.997
F *(p-value)*	4958,65(***)	4973,58(***)	631,60(***)	590,66(***)
R-SQ	0,8569	0,8568	0,8148	0,8187
LM (χ^2)	36.31(***)	33.65(***)	33.42(***)	36.40(***)
Hausman (χ^2)	69.38(***)	67.44(***)	69.34(***)	218.25(***)

Fixed effects models were estimated using White's estimator.

(*). (**), (***) Statistical significance at $p < 0.1$, $p < 0.05$, and $p < 0.01$ respectively

Source: developed by the authors.

Column 1 of Panel A shows that the inclusion of the interaction variable between TAXSURP and TAXENF (TAXSURP*TAXENF) resulted in the coefficients of TAXSURP and EARNSURP being positive and significant at 10% and 1%, respectively. This finding is consistent with columns 5 and 6 of Panel A in Table 3, indicating that tax expense surprise has incremental value relevance to earnings surprise for the entire sample. However, since the coefficient of TAXSURP*TAXENF is not significant, we cannot conclude that tax enforcement attenuates the positive correlation between tax expense surprise (TAXSURP) and analysts' future earnings forecast errors (ERRF) when considering all companies in the sample.

Column 2 of Table 4 shows that in addition to unexplained tax expense surprise (TAXSURPI) having a positive coefficient significant at 5%, the coefficient of the interaction variable between TAXSURPI and TAXENF (TAXSURPI*TAXENF) is negative, and significant at the same level. Therefore, hypothesis H_2, which states that the level of tax enforcement in a country attenuates the positive association between tax expense surprise and analysts' future earnings forecast errors, cannot be rejected.

However, the results for non-U.S. companies (Panel B) differ from those found for the full sample (Panel A). Given that U.S. companies account for 86.53% of the sample, the evidence suggests that tax enforcement enhances the credibility and reliability of the tax information disclosed in financial statements. This finding aligns with the evidence from Xu *et al.* (2011), indicating that tax enforcement mitigates the positive correlation between tax expense surprise and analysts' future earnings forecast errors for U.S. companies only.

These results support the findings of La Porta *et al*. (2000), which suggest that because tax enforcement is related to compliance with tax legislation, it varies significantly across countries. The findings indicate that managers in countries with higher levels of tax enforcement, such as the United States, are subject to stricter oversight and are less likely to engage in discretionary strategies when preparing financial information (Desai *et al*., 2007). This reduces financial analysts' uncertainty regarding the quality of tax information, leading to more accurate earnings forecasts (Hope, 2003), as tax enforcement serves as a measure of transparency and financial reporting quality (Hanlon *et al*., 2014).

5 Conclusions

This study examines the effect of a country's tax enforcement on the relationship between tax expense surprise and the accuracy of financial analysts' future earnings forecasts. It provides evidence on how the level of tax enforcement influences the informational relevance of tax data for these capital market information intermediaries.

The positive and significant association between tax expense surprise and future earnings forecast errors, found in the entire sample, suggests that analysts do not efficiently incorporate changes in tax expenses into their subsequent forecasts. Consequently, the greater the tax expense surprise, the more inaccurate the earnings forecast. In contrast, the insignificant correlation between tax expense surprise and future earnings forecast errors observed for non-U.S. companies (34 countries) indicates that tax expense surprise (income tax expense) does not significantly influence financial analysts' expectations regarding the performance of non-U.S. companies.

These findings suggest that financial analysts' earnings forecasts do not fully reflect the information contained in the tax expense surprises. By failing to incorporate tax expense surprise data, analysts underreact to the implications of income tax expense, which, beyond serving as an alternative measure of firm performance and signaling good news to investors, also predicts future earnings growth.

By showing a positive and significant correlation between earnings surprise and financial analysts' earnings forecast errors, the results indicate that analysts not only fail to incorporate information about tax expense surprise efficiently but also inadequately account for previous changes in earnings. Since earnings surprise contributes to less accurate earnings forecasts, this suggests that analysts do not fully integrate past earnings variations into their projections.

Furthermore, given that financial analysts' earnings forecast errors are, on average, positive—indicating that they tend to issue optimistic forecasts about companies' performance—and that the mean tax expense surprise and earnings surprise are also positive, meaning companies report higher income tax expenses and current profits compared to the previous period, the evidence suggests that financial analysts systematically react to information with an optimistic bias.

Although the results for the entire sample indicate that tax expense surprise is incrementally relevant in explaining financial analysts' less accurate forecasts, the findings from the model that includes the interaction between unexplained tax expense surprise and tax enforcement suggest that the informational relevance of unexplained tax expense surprise increases for analysts in companies operating in environments with higher levels of tax enforcement, thereby helping to reduce errors in earnings forecasts.

In general, the findings of this study contribute to the ongoing debate on the relevance and use of tax information by financial analysts when issuing earnings expectations. Specifically, the results suggest that financial analysts do not efficiently process tax information. One way for these information intermediaries to improve the accuracy of their earnings forecasts and enhance market efficiency is by more thoroughly processing and incorporating the information contained in tax expense surprises.

These results highlight opportunities for future research, such as exploring other characteristics of the information environment in which companies operate, including governance structure, culture, and the level of development of a country's capital market. Such investigations could provide a deeper understanding of how financial analysts process tax expense surprises in their earnings forecasts.

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