

**VALUE RELEVANCE OF ACCOUNTING AND ANALYSTS? FORECASTS: DOES  
THE EMERGING COUNTRY'S INFORMATION ENVIRONMENT MATTER?****Emanuelle Priscila De Almeida Peixoto***Universidade Federal Da Paraíba ( João Pessoa )***Orleans Silva Martins***Universidade Federal Da Paraíba ( João Pessoa )***Resumo**

This study analyzes the value relevance of accounting information and the quality of analysts' forecasts in different information environments of emerging countries. To this end, it has the support of a theoretical framework on the relevance of information and the signaling of information in the market. 7,024 companies in 21 countries are analyzed for the period from 2000 to 2016. The qualities of the analysts' forecasts (AFQ) and the information environment (IEQ) of the countries are captured using indexes built by Principal Component Analysis. The value relevance of the AFQ is analyzed using the model proposed by Collins, Maydew, and Weiss (1997). The findings suggest that AFQ is value relevant in emerging markets, helping to explain the firms' stock price. Still, the evidence points out that the AFQ adds relevance to the accounting information, with emphasis on the information about shareholders' equity. With this, our study contributes to the existing literature by pointing out that AFQ is value relevant in emerging markets, especially when considering the information environment aspects of each emerging country, which helps investors in their investment decision making.

Palavras-chave: Analysts' Forecast; Accounting information; Country Informational Environment

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**Keywords:** Analysts' Forecast, Accounting information, Country Informational Environment.

**1. INTRODUCTION**

The capital market is an information-driven environment in which analysts play an important role in the decision-making process of managers and investors, as information agents, insofar as they analyze company data and express their opinions (Griffin, 1976, Givoly & Lakonishok, 1979, Imhoff & Lobb, 1984, Clement, 1999). They provide information essential to the efficiency of the markets, affecting the reaction to the disclosure of accounting information by companies since this accounting information can change stock prices (Ball & Brown, 1968, Beaver, 1968, Ohlson, 1995, Collins, Maydew, & Weiss, 1997). This phenomenon is especially observed in emerging markets, whose information environments are typically less developed (La Porta, Lopez-De-Silanes, Shleifer and Vishny, 1997; La Porta, Lopez-De-Silanes, Shleifer and Vishny, 1998). In this context, the motivation for this study arises, which analyzes the value relevance of accounting information and analysts' forecasts in the different information environments of emerging countries.

When an information agent has a higher level of information than another in the market, this information asymmetry can interfere in the reactions of market participants and, consequently, in stock prices (Martinez & Dumer, 2013). And analysts play an essential role in reducing this information asymmetry, contributing to market efficiency. When market participants base their investment decisions on analysts' forecasts, they create a direct relationship between stock prices and analysts' forecasts (Martinez, 2004, Dalmácio et al., 2013). And the closer to the real value reported by the firms are the analysts' estimates, which is measured by the analyst forecast accuracy, stronger is this relationship (Saito, Villalobos & Benetti, 2008, Goodman et al., 2013, Chen, Xie, & Zhang, 2017). Therefore, greater accuracy (or less dispersion) indicates a higher quality of forecasts, increasing the willingness of investors to invest in a certain company (Chen, Xie, & Zhang, 2017).

At the same time, the accounting information quality can be linked to their ability to influence decision making, which can be verified by their value relevance, or relevance in determining the firm's market value (Barth, Beaver, & Landsman, 2001). From the perspective of the Signaling Theory, the disclosure of information by firms is relevant to the market because it transmits signals to investors so that they can decide where to allocate their resources (Fatma & Abdelwahed, 2010). However, due to the lack of ability or knowledge to

interpret such information, or the difficulty of accessing that information, many investors base their decisions on analysts' forecasts, believing that they have more knowledge to make optimal choices (Martinez, 2004). This is ratified by Chen, Xie, and Zhang (2017) when they observe the impact of analysts' forecasts on the efficiency of investment decisions, especially when the information environment in which firms are inserted is of higher quality.

Bhattacharya, Daouk, and Welker (2003) and Takamatsu and Fávero (2017) reveal that specific factors of the countries' information environment can influence the relevance of information disclosed by firms, such as accounting standards, governance, and enforcement of institutions, especially in emerging countries. These characteristics affect the user's perception of the information and, consequently, the stock prices. Furthermore, uncertainties in the countries' information environment can also affect the quality of analysts' forecasts (Karamanou, 2012, Goodman et al., 2013, Dalmácio et al., 2013, Martinez & Dumer, 2013). This is reinforced for emerging markets, as the accuracy of analysts' forecasts tends to be strongly associated with the characteristics of the environments of each country (Karamanou, 2012). However, Huang and Boateng (2016) state that analysts have a better ability to understand the different accounting choices of firms, as well as the issues of the countries' information environment.

Emerging countries are characterized by markets that seem to be progressing towards development, that have some liquidity in the debt and equity markets, as well as regulatory bodies, but do not yet have a degree of efficiency, legal protection and quality of information environment similar to developed countries. (La Porta et al., 1997, 1998). Emerging markets have undergone extensive transformations in recent decades, both in property rights, commercial relationships, and in corporate governance, although it is possible to observe the late development of domestic capitalism in countries like China and Russia (McCarthy & Puffer, 2008). Despite this, it is possible to observe, on average, substantial growth in these markets, without the equivalent attention devoted to examining such information environments (Ghysels, Plazzi, & Valkanov, 2016). And as these markets are known for poor investor protection, in addition to financial reporting subject to a greater degree of manipulation due to lesser legal enforcement (Fatma & Abdelwahed, 2010, Takamatsu & Fávero, 2017), there is a natural demand from investors for complementary information to those released by companies, such as analysts' forecasts (Yu, 2011). Despite this, there is little empirical evidence that addresses this problem in emerging countries, and for this reason, this study aims to analyze the value relevance of accounting information and analysts' forecast quality in different information environments in emerging countries.

In short, our findings indicate that there is a positive association between the quality of analysts' forecasts and the appreciation of firms' stock prices. That is, the quality of analysts' forecasts presents relevant informational content in emerging countries, playing an important role in the efficiency of these markets. Above all, both the accounting information and the analysts' forecasts are more relevant when the country has a better information environment, which confirms the importance of the countries' environment.

## 2. HYPOTHESIS DEVELOPMENT

The information disclosed by the companies serves as signals for the capital market (Morris, 1987). These signals are attributes or activities of firms that can modify the beliefs of market participants (Spence, 1973). However, such signals can be distorted by the existence of information asymmetry, which prevents efficient allocation of resources in the markets (Akerlof, 1970), but it can be minimized by signaling more information (Morris, 1987). Thus, adequate and timely disclosure has a relevant role in the efficiency of capital markets and, at this point, market analysts play an important role in monitoring firms, actively participating in

the process of evaluating and disseminating the information disclosed, significantly influencing investors decision making (Healy & Palepu, 2001, Martinez, 2004, Yu, 2011).

Analysts are demanded in the capital markets because, normally, they have greater expertise in the analysis of firms and, with this, they can interpret the signals emitted by companies more efficiently. They act as intermediaries in the process of signaling and interpreting the firms' future performance (Dalmácio et al., 2013), evaluating their capacity for growth, given the various combinations of signals issued, influencing investor investment decisions (Spence, 1973, Dalmácio et al., 2013). Karamanou (2012) reinforces this role by stating that the market tends to rely on earnings forecasts and Chung and Jo (1996) highlight that the monitoring of analysts contributes to the reduction of agency costs and to increases investor knowledge about companies.

Although there is evidence that analysts' forecasts are positively associated with asset prices (Piotroski & Roulstone, 2004, Martinez, 2004), this literature is limited to analyzing this phenomenon through individual proxies, such as accuracy and dispersion (Chen, Xie & Zhang, 2017). This study differs by building an Analysts' Forecasts Quality Index (AFQ) and analyzing the additional information content of this indicator. According to Lin, Pantzalis, and Park (2009), the construction of an index is a convenient way to use the information available about different proxies in a market to obtain the level of information, minimizing the redundancy and the influence of outliers in the proxies. Another advantage pointed out by Brave and Butters (2011) is the capture of the desired interconnection between the different proxies, allowing them to assess the systemic importance of each variable. Thus, since the quality of these forecasts can drive prices (Dalmácio et al., 2013) and they are expected to have informational content in emerging markets (Karamanou, 2012, Huang & Boateng, 2016), the first hypothesis of this study is presented.

**Hypothesis 1:** The level of analysts' forecast quality is positively associated with stock prices in emerging countries.

Studies that seek to analyze the quality of analysts' forecasts generally deal with measures such as the accuracy, dispersion, and bias of these forecasts (Saito, Villalobos & Benetti, 2008, Goodman et al., 2013, Chen, Xie, & Zhang, 2017), taking the financial statements of the companies as the basis for their forecasts. Chen, Miao, and Shevlin (2015) indicate that the quality of disclosure in firms' annual reports, measured by the level of detail in accounting information, is negatively associated with the dispersion of analysts' forecasts and positively associated with accuracy. Thus, companies that signal the consistency of their accounting practices show greater persistence and quality of profits over time, which is associated with less information asymmetry and greater coverage of analysts, whose forecasts must be more accurate and less dispersed (Peterson, Schmardebeck, & Wilks, 2015).

The value relevance of accounting information is represented by the usefulness of this information to investors in the asset pricing process (Francis & Shipper, 1999). The quality of analysts' forecasts has a positive association with accounting information (Mcewen & Hunton, 1999), and these forecasts have informational content that represents investors' expectations about the company's future results, with evidence that the analysts' consensus can be a proxy for the general market expectation (Ohlson, 2001). Accounting information is useful, reducing uncertainties and increasing the level of accuracy in the formation of earnings forecasts (Hope, 2003), so the better the quality of the accounting numbers, the better the analysts' forecast quality (Dalmácio et al., 2013). Based on this, the second hypothesis is assumed.

**Hypothesis 2:** Higher analysts' forecast quality is positively associated with greater value relevance of accounting information in emerging countries.

It is worth mentioning that the characteristics of the markets in which the firms are inserted can impact both the relevance of the information disclosed by the companies (Ali & Hwang, 2000), as well as the analysts' forecasts (Karamanou, 2012). For Ramnath, Rock and Shane (2008), when the environment in which companies compete is considered efficient from an informational point of view, accounting or economic information can change the market's perception of firms and, consequently, stock prices. However, the different specific characteristics of each country have different influences on the firm's accounting data, especially due to their interactions with countries' legal origins and enforcement (Bhattacharya, Daouk, & Welker, 2003; Takamatsu & Fávero, 2017).

Bhattacharya et al. (2013) report that in markets with weak informational environments there is a low quality of earnings and high levels of information asymmetry, differently from developed countries. Takamatsu and Fávero (2017) highlight that high-quality accounting standards have a greater influence on prices, especially in countries where there are stronger legal environments, with emerging countries being characterized by greater problems of information asymmetry in relation to developed countries. This leaves the accounting information more opaque since the emerging ones also have low investor protection, which results in a reduction in the effectiveness of the disclosure of high-quality information and, with this, negatively influences the perception of its users due to the greater propensity of manipulation in financial reports (Takamatsu & Fávero, 2017).

Different informational environments can influence the construction of analysts' forecasts, making them more or less accurate and dispersed, since these specialists use the information disclosed by firms to substantiate their forecasts, and this information disclosed by companies is impacted by specific factors of each country (Ali & Hwang, 2000). Soderstrom and Sun (2007) reinforce that the quality of accounting information is a function of the country's information environment, and even of the country's legal and political system. And the quality of accounting information is relevant to explain stock prices, both in developed and emerging countries, although this relationship is different between countries (Cahan, Emanuel, & Sun, 2009). In addition, the adoption of International Financial Reporting Standards (IFRS) attracts foreign analysts, especially if the analyst already follows companies in countries that already use the IFRS standard, and improves the accuracy of their forecasts (Tan, Wang, & Welker, 2011).

Analysts consider factors specific to the information environment of the countries in which firms are located to project their earnings forecasts, as good indicators of country governance and the adoption of IFRS (Morey et al., 2009; Karamanou, 2012). For example, the accuracy and dispersion of forecasts are affected by these environments, which also affect the level of investment efficiency (Chen, Xie, & Zhang, 2017). In this sense, it is assumed that these characteristics can impact the quality of forecasts, increasing or decreasing the degree of uncertainty (Karamanou, 2012), especially in emerging markets, where there is a greater degree of information asymmetry and weak protection for investors. This asymmetry can affect the level and quality of information disclosure by firms, due to country-specific factors (Takamatsu & Fávero, 2017). Based on this context, the last hypothesis is presented.

**Hypothesis 3:** Differences in information environments in emerging countries influence the value relevance of accounting information and analysts' forecast quality.

### 3. METHOD

This study analyzes publicly-traded non-financial companies from emerging countries that are members of the MSCI Emerging Markets Index. The data for analysis were collected in US dollars (USD) for the period from 2000 to 2016, in the following databases: Thomson Reuters Eikon (TRE), Worldwide Governance Indicators (WGI) and IFRS.org.

The final sample consists of 7,024 firms, totaling 35,937 observations, referring to 21 emerging countries: Brazil, Chile, China, Colombia, Czech Republic, Egypt, Greece, Hungary, India, Indonesia, Mexico, Peru, Poland, Qatar, Russia, South Africa, Saudi Arabia, South Korea, Taiwan, Turkey, and the United Arab Emirates. Malaysia, Pakistan and the Philippines were excluded from the sample due to the unavailability of any of the analyzed data. Regarding the extreme values in the analyzed variables, the Winsor technique at the level of 1% is used to treat outliers.

#### 3.1. Analysts' Forecasts Quality Identification

Different proxies are used to measure the quality of analysts' forecasts, such as accuracy, consensus, dispersion, error, surprise, among others (Bartov, Givoly, & Hayn, 2002, Martinez, 2004, 2007, Chen, Xie, & Zhang, 2017). For example, the greater the accuracy of the forecasts, or the lower the dispersion (error), the greater the quality of these analysts' forecasts (Martinez, 2004). However, these measures are strongly influenced by the number of analysts who follow the company (size effect). For this reason, in this study, we decided to create a composite index, which seeks to capture the quality of forecasts from different proxies. For this, Principal Component Analysis (PCA) is used, making it possible to identify the best relationship extracted from the data, through a common component among the proxies used. The Analysts' Forecasts Quality Index (AFQ) is based on five proxies: analysts' forecasts accuracy, the standard deviation of analysts' forecasts, number of analysts following the company, number of analysts' recommendations and surprise of earnings forecasts.

Earnings forecasts are based on December results for each year, a period with fewer biases and a greater amount of information (Martinez, 2004). The analysts' forecasts error (AFE) is the difference between real earnings per share (EPS) and consensus (average) of analysts' earnings forecasts (AEPS), divided by the absolute value of real earnings per share (|EPS|), for each company  $i$  in the country  $j$  in year  $t$ , according to Martinez (2004, 2007) and Dalmácio et al. (2013), as follows:  $AFE = (EPS - AEPS) / |EPS|$ . The analysts' forecast accuracy (AFA) is a measure contrary to the analysts' forecast error (AFE), that is, the smaller the error (dispersion), the greater the accuracy. As in Dalmácio et al. (2013), AFA is the prediction error module (|AFE|) multiplied by (-1). Thus, the closer the AFA is to zero, the smaller the number of errors in the forecasts and, thus, the greater the accuracy.

The analysts' earnings forecasts dispersion (AFD) is the standard deviation of earnings estimates, given by  $AFD_{ijt} = \sqrt{\frac{\sum(AEPS_{ijt} - \overline{AEPS}_{ijt})^2}{n}}$ . In this sense, the higher the AFD, the greater the uncertainty about the expected earnings (Martinez, 2004). The number of analysts who follow the company (AN) is represented by the sum of analysts who made at least 1 (one) forecast for the firm during each year  $t$ . The greater the number of analysts who follow the company, the greater the volume of information about the firm and, thus, there is a tendency of less dispersion and greater analysts' forecast accuracy (Martinez, 2004). In this sense, the number of analysts' recommendations (AR) represents the total earnings forecasts for the company  $i$  in year  $t$ . The higher the frequency of analyzes and recommendations made by specialists, with greater information content, the greater the quality of the forecasts and the impact on stock prices tend to be (Martinez, 2004, Moshirian, Ng, & Wu, 2009).

The earnings surprise (ES) is due to the earnings announced by the firms being different from the analysts' forecasts. When the reported earnings are lower than the analysts'

earnings forecasts, the surprise is negative, and when the reported earnings are higher, the surprise is positive (Martinez, 2004, Martinez & Dumer, 2013). In this study, the surprise of the earnings forecasts is expressed in magnitude, regardless of whether it is positive or negative. Thus, for each company  $i$  in the country  $j$  and year  $t$ , ES is the difference between reported earnings per share (EPS) and the consensus of earnings per share estimated by analysts (AEPS), based in Martinez (2004), according to  $ES = |EPS - AEPS|$ .

To identify AFQ, a Principal Component Analysis (PCA) is used from the 3 (three) main components with eigenvalues greater than 1 (one), which cumulatively explained 82.4% of the joint variations of the five proxies used. Still, the robustness of this construction is confirmed by the Bartlett sphericity test, which rejects the null hypothesis that the variables are not correlated (75,956.459,  $p < 0.001$ ), and the Kaiser-Meyer-Olkin statistic ( $KMO = 0.517$ ), which according to Fávero et al. (2009) is within the list of correlations considered acceptable for this type of analysis. Finally, the AFQ is presented in the range  $[0, 1]$ .

### 3.2. Country's Information Environment Identification

The mandatory IFRS adoption can impact the quality, or relevance of accounting information, as well as the accuracy and dispersion of earnings forecasts (Elbakry et. Al., 2017, Takamatsu & Fávero, 2017). In this understanding, to verify this influence, the experience of each country with IFRS (IFRSexp) is considered, calculated by the difference between year  $t$  of publication of accounting information and the year of mandatory adoption by country  $j$ . According to Houqe and Monem (2016), this procedure is more efficient than using a binary variable, as it captures the learning process over time. For these authors, the benefit of adopting IFRS is an increasing function, not constant. In this study, full IFRS adoption is used, as preliminary tests with voluntary IFRS adoption were not significant.

The Worldwide Governance Indicators (WGI) is a global governance indicator that measures six dimensions of the quality of governance in each country: (i) voice and accountability; (ii) political stability; (iii) government effectiveness; (iv) regulatory quality; (v) rule of law; and (vi) control of corruption (World Bank, 2020). This indicator can be used as a proxy to assess the level of governance in a given country (Langbein & Knack, 2010) and is intended to measure the perception of stakeholders about the quality of governance in a country, in addition to facilitating comparisons between countries, being used in studies related to the quality of the country's information environment (Langbein & Knack, 2010; Martins & Barros, 2018).

From Langbein and Knack (2010) and Martins and Barros (2018), the Countries' Information Environment Index (CIEI) is built with the six dimensions of the WGI and the IFRS experience. CIEI is represented by the only main component with an eigenvalue greater than 1 (one), which alone explains about 74.2% of the joint variations of the analyzed proxies. PCA's robustness tests confirm its reliability since Bartlett's sphericity test rejects the null hypothesis that the variables are not correlated (330,000,000,  $p < 0.001$ ) and the KMO statistic of 0.855 is suitable for analysis (Fávero et al., 2009). Thus, the CIEI is presented in the interval  $[0, 1]$ .

### 3.3. Moderator Effects of AFQ and CIEI

To measure value relevance, the Collins, Maydew, and Weiss (1997) model is used, which derives from Ohlson's (1995) valuation model, but considers that the value of a company is expressed in terms of its book values, disregarding the called "residual earnings". In addition, Collins, Maydew, and Weiss (1997) highlight greater relevance of equity in relation to net income to predict future results of firms, due to increases in the frequency and magnitude of extraordinary items present in earnings, changes in the size of the firm and a growing increase in negative earnings. In this sense, the stock price (P) at the end of the third

month after the end of year  $t$  is a function of earnings per share in year  $t$  (EPS) and the book value of shareholders' equity per share also at the end of year  $t$  (BV), according to Equation 1. As in Collins, Maydew, and Weiss (1997), the relevance of accounting information is captured by the explanatory power of regressions. Additionally, the coefficients  $\beta_1$  and  $\beta_2$  are expected to be positive and significant.

$$P_{ijt} = \beta_0 + \beta_1 EPS_{ijt} + \beta_2 BV_{ijt} + \delta_t + \gamma_s + \theta_j + \varepsilon_{ijt} \quad (1)$$

This relationship and the following ones are estimated using Ordinary Least Squares (OLS) models, with fixed effects for year, industry and country ( $\delta_t$ ,  $\gamma_s$  and  $\theta_j$ , respectively), allowing the control of temporal events and intrinsic characteristics firms and countries. The models are estimated with robust residues for autocorrelation and heteroscedasticity. This strategy is in line with Dong and Stettler (2011), who analyze the relationship between corporate disclosure and the specific characteristics of companies and the country, noting that such estimates at the company level are efficient and robust for impacts at the country level when controlled by dummies. As robustness tests not reported, Hierarchical Linear Models (HLM) were estimated, which presented essentially the same results.

Then, the relevance of the quality proxies of the analysts' forecasts is verified, individually, and of the composite index, according to Equation 2, in which  $X$  is replaced by analysts' forecasts accuracy (AFA), standard deviation of analysts' forecasts (AFD), number of analysts (AN), number of recommendations (RN), earnings surprise (ES) and quality of analysts' forecasts (AFQ). It is expected that, in addition to the coefficients  $\beta_1$  and  $\beta_2$ , the coefficients of the proxies for analyst information ( $\beta_3$ ) are also significant (Martinez, 2004, Martinez & Dumer, 2013, Chen, Miao & Shevlin, 2015, Chen, Xie & Zang, 2017).

$$P_{ijt} = \beta_0 + \beta_1 EPS_{ijt} + \beta_2 BV_{ijt} + \beta_3 X_{ijt} + \delta_t + \gamma_s + \theta_j + \varepsilon_{ijt} \quad (2)$$

The association of analysts' forecast quality with the value relevance of accounting information is verified through the interaction of the variable AFQ with earnings per share and shareholders' equity, according to Equation 3. AFQ is expected to present a positive and significant association with the stock price ( $\beta_3 > 0$ ), increasing the explanatory power of the model (Chen, Xie, & Zhang, 2017), in relation to the original version of Collins, Maydew, and Weiss (1997), indicating the aggregation of the information content of analysts' forecasts in the capital markets of emerging countries (Karamanou, 2012, Huang & Boateng, 2016). Still, AFQ is expected to have a positive influence on the value relevance of accounting information in emerging markets ( $\beta_4 > 0$  and  $\beta_5 > 0$ ).

$$P_{ijt} = \beta_0 + \beta_1 EPS_{ijt} + \beta_2 BV_{ijt} + \beta_3 AFQ_{ijt} + \beta_4 (EPS_{ijt} \times AFQ_{ijt}) + \beta_5 (BV_{ijt} \times AFQ_{ijt}) + \delta_t + \gamma_s + \theta_j + \varepsilon_{ijt} \quad (3)$$

Finally, the third hypothesis is tested from the CMW model modified by the inclusion of AFQ and CIEI, and their respective interactions, according to Equation 5. In addition to the relationships already established in the previous equations, it is expected that the quality of the countries' information environment (CIEI) has a positive moderating effect on the relevance of accounting information (Soderstrom & Sun, 2007) and on the relevance of analysts' forecasts quality (Morey et al., 2009, Karamanou, 2012). Therefore, positive and significant effects are expected for the coefficients  $\beta_9$ ,  $\beta_{10}$  and  $\beta_{11}$ .

$$P_{ijt} = \beta_0 + \beta_1 EPS_{ijt} + \beta_2 BV_{ijt} + \beta_3 AFQ_{ijt} + \beta_4 (EPS_{ijt} \times AFQ_{ijt}) + \beta_5 (BV_{ijt} \times AFQ_{ijt}) + \beta_6 CIEI_{jt} + \beta_7 (EPS_{ijt} \times CIEI_{jt}) + \beta_8 (BV_{ijt} \times CIEI_{jt}) + \beta_9 (AFQ_{ijt} \times CIEI_{jt}) + \beta_{10} (EPS_{ijt} \times AFQ_{ijt} \times CIEI_{jt}) + \beta_{11} (BV_{ijt} \times AFQ_{ijt} \times CIEI_{jt}) + \delta_t + \gamma_s + \theta_j + \varepsilon_{ijt} \quad (4)$$

#### 4. RESULTS

Our statistics are presented for the 7,024 companies analyzed in the 21 countries in US dollars (USD). The average stock price is USD 8.13, the average earnings per share is USD 0.53 and the average book value per share is USD 6.04. As for the measures for analysts' forecasts, the average of analysts' forecast accuracy indicates that the earnings forecast error reaches 74.3% ( $AFA = -0.7434$ , either higher or lower, since the negative occurs just by transforming the variable, according to section 3.1). The smallest forecasting error is 2.0% and the largest 497.7%, in relation to the actual earnings reported by the company. The average of analysts' forecast deviation (AFD) is USD 0.05, reaching a maximum value of USD 1.63. Linked to this, there is a negative surprise in earnings (ES) of USD -0.03, with a minimum value of USD -2.95, demonstrating that in the analyzed period the analysts tended to be optimistic, as observed by Martinez (2004).

On average, the companies analyzed have 5.2 analysts covering them (AN), as well as having an average of 5.8 recommendations (AR), values that are like the findings of Karamanou (2012) for emerging countries. With regard to the quality index of the analysts' forecasts (AFQ), the average is 0.26, in an interval [0, 1], suggesting that the average quality of the forecasts is close to the lower quartile of the sample (26%), taking the best quality parameter the company with the best index (maximum QPA value equal to 1). The median of this variable is even lower (0.1944), indicating that the average degree of accuracy of the analysts was low in the analyzed period.

Table 1  
Descriptive statistics of the analyzed variables. 2000-2016.

Variables	Mean	Standard	Median	Maximum	Minimum	Obs.
$P_{ijt}$	8.1295	24.6194	1.6740	191.8955	0.0057	35,937
$EPS_{ijt}$	0.5252	2.2698	0.0669	20.1364	-5.7068	35,937
$BV_{ijt}$	6.0411	24.1970	0.6864	231.3046	-0.4760	35,937
$AFA_{ijt}$	-0.7437	1.1454	-0.3092	-0.0207	-4.9766	35,937
$AFD_{ijt}$	0.0571	0.2101	0.0078	1.6310	0.0000	35,937
$ES_{ijt}$	-0.0304	0.7980	-0.0085	7.5362	-2.9486	35,937
$AN_{ijt}$	5.1760	4.8720	3.0000	17.0000	1.0000	35,937
$AR_{ijt}$	5.8351	5.6076	4.0000	19.0000	1.0000	35,937
$AFQ_{ijt}$	0.2605	0.1778	0.1944	1.0000	0.0000	35,937
$WGI_{jt}$	0.4587	0.2635	0.3153	1.0000	0.0137	35,937
$IFRSexp_{jt}$	1.1010	0.0000	2.4518	14.0000	0.0000	35,937
$CIEI_{jt}$	0.4187	0.2498	0.2781	1.0000	0.0000	35,937

Note: For company  $i$  in country  $j$  and year  $t$ ,  $P$  is the stock price;  $EPS$  is the earnings per share;  $BV$  is the book value of shareholders' equity per share;  $AFA$  is the accuracy of earnings forecasts;  $AFD$  is the dispersion of earnings forecasts;  $AN$  is the number of analysts;  $AR$  is the number of recommendations;  $ES$  is the surprise of the earnings forecasts;  $AFQ$  is the quality index of analysts' forecasts;  $WGI$  is the quality indicator of the country's governance;  $IFRSexp$  is the IFRS experience, and  $CIEI$  is the country's information environment index.

As for the quality measures of the countries' information environment, the average quality index of the countries' governance is 0.4587, indicating that on average 45.9% of good governance practices are achieved by the countries analyzed. About IFRS experience, on average emerging countries have 1.1 years ( $IFRSexp$ ), with countries that have not yet adopted mandatory IFRS and countries that already have 11 years of experience. Finally, the average countries' information environment index ( $CIEI$ ) in emerging countries is around 0.42, in an interval [0, 1], demonstrating that the average quality of the information environment in the countries analyzed is below the point scale (41.9%), with the country with the best index as the parameter for the best environment ( $CIEI = 1$ ). This indicates the low quality of the information environment in emerging countries, as Takamatsu and Fávero (2017) claim that in these countries there are greater governance problems.

#### 4.1. The Relevance of Accounting Information and Analysts' Forecasts

The starting point of this study is the analysis of the relevance of accounting numbers using the Collins, Maydew, and Weiss (1997) model. Model 1 in Table 2 shows that earnings per share (EPS) and book value (BV) are positively and significantly associated with the firm's stock price ( $p < 0.01$ ). This confirms that the accounting information of companies in emerging countries explains about 71.06% of changes in stock prices, in a convergent way with Collins, Maydew, and Weiss (1997). In these countries, an average increase of USD 1.00 in earnings per share represented a positive change of USD 0.57 in the stock price, while an average increase of USD 1.00 in shareholders' equity per share represented a positive change of USD 2,96 in the stock price.

Models 2 to 6 consider the inclusion of individual proxies for analysts' forecasts in the CMW model, demonstrating that, except for accuracy, all others have the potential to increase the explanatory power of the models (the  $R^2$  adjusted is higher). In all of them, earnings and equity per share continue to have a positive and significant association for explaining the price. Analyzing each proxy, we note that only the accuracy of the analysts' forecasts (AFA) is not significant (model 2).

Table 2  
The relevance of accounting information and proxies for analysts' forecasts. 2000-2016.

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
$(\beta_0)$ Constant	2.58*** (7.85)	2.48*** (7.18)	1.62*** (4.49)	2.34*** (7.10)	0.78* (2.3)	0.70*** (1.54)	-0.49 (-1.07)
$(\beta_1)$ $EPS_{ijt}$	0.57*** (23.18)	2.97*** (11.56)	2.77*** (11.47)	3.61*** (12.89)	2.90*** (11.48)	2.85*** (11.27)	2.81*** (62.08)
$(\beta_2)$ $BV_{ijt}$	2.96*** (11.63)	0.56*** (23.08)	0.46*** (18.17)	0.54*** (12.89)	0.56*** (23.20)	0.56*** (23.30)	0.56*** (29.48)
$(\beta_3)$ $AFA_{ijt}$	-	-0.09 (-1.04)	-	-	-	-	-
$(\beta_3)$ $AFD_{ijt}$	-	-	22.19*** (10.41)	-	-	-	-
$(\beta_3)$ $ES_{ijt}$	-	-	-	-3.53*** (-7.94)	-	-	-
$(\beta_3)$ $AN_{ijt}$	-	-	-	-	0.32*** (13.81)	-	-
$(\beta_3)$ $AR_{ijt}$	-	-	-	-	-	0.32*** (14.81)	-
$(\beta_3)$ $AFQ_{ijt}$	-	-	-	-	-	-	0.56*** (23.18)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted $R^2$	0.7106	0.7106	0.7295	0.7215	0.7143	0.7153	0.7168
F Test	170.97***	169.04***	183.04***	175.84***	167.57***	169.75***	189.63***
VIF (mean) <sup>a</sup>	1.75	1.74	1.77	1.75	1.74	1.75	1.75
Observations	35,937	35,937	35,937	35,937	35,937	35,937	35,937

Note: Models estimated with robust standard errors and Newey-West correction, showing the coefficient and t-statistics (in parentheses). For company  $i$  in country  $j$  and year  $t$ , the dependent variable is *Stock Price*; *EPS* is the earnings per share; *BV* is the book value of shareholders' equity per share; *AFA* is the earnings forecasts accuracy; *AFD* is the earnings forecasts dispersion; *ES* is the earnings surprise; *AN* is the number of analysts; *AR* is the number of recommendations, and *AFQ* is the analysts' forecasts quality index. VIF is the Variance Inflation Factor for multicollinearity. \*\*\* Significant at 1%, \*\* at 5% and \* at 10%.

This result differs from that observed by Karamanou (2012) from the stock returns. This can be explained by the fact that the price variable has less amplitude and an upward trend (although it does not have a unit root). This is confirmed by the findings for the

analysts' forecasts dispersion (AFD, in model 3), which shows a positive and significant association with the stock price ( $\beta_3 = 22.19$ ), indicating that in higher prices the consensus of the analysts' forecasts tends to be less assertive (greater forecast error). This finding also differs from Karamanou (2012). This suggests that in emerging countries, firms with a higher value per share show greater volatility in their results and greater difficulty for analysts to predict their results, which leads them to have a greater standard deviation from analysts' forecasts.

The earnings surprise (ES) shows a significant and negative association with the stock price ( $\beta_3 = -3.53$  in model 4), according to Bartov, Givoly, and Hayn (2002) and Martinez (2004). This suggests that analysts tend to be more optimistic in their forecasts, when estimating future earnings higher than the earnings reported by companies, transmitting this optimism in advance as a signal, creating expectations of high prices in the markets, which are then reduced with the dissemination of the firm's real earnings. According to Martinez (2004), this confirms the trend of optimism present in the analysts' forecasts, which tends not to be confirmed.

The number of analysts (AN) and the number of recommendations of these analysts (AR) also show significant associations, but this time is positive ( $\beta_3 = 0.32$  in both cases, in models 5 and 6). Analyst coverage works as a mechanism for reducing earnings management (Martinez, 2004), as there are "more eyes" on management, which leads to more accurate consensus on analysts' forecasts, even because outliers on these forecasts have less effect when more analysts are following the company. Likewise, a greater number of recommendations indicates more information about the firm, which, in turn, tends to positively impact stock prices, reducing information asymmetry, as verified by Moshirian, Ng, and Wu (2009), especially in emerging countries, where there is a more positive bias compared to developed countries when prices react strongly to these recommendations.

The analysts' forecasts quality index (AFQ) has a positive and significant association with the stock price in emerging countries ( $\beta_3 = 0.56$  in model 7). In addition, we note that the AFQ carries informational content since its inclusion in the Collins, Maydew, and Weiss (1997) model improves the explanation of changes in stock prices (adjusted  $R^2$  increases from 71.06% to 71,68%). This confirms Hypothesis 1 in this study, demonstrating that, even when using a composite index, the increase in the quality (or precision) of analysts' forecasts in emerging countries has a positive relationship with the increase in stock prices. This finding is relevant, as it demonstrates that, even when an isolated proxy may not seem significant for the explanation of stock prices (like AFA), a composite index can better capture the extent of the forecast effect.

#### 4.2 Moderating Effects of AFQ and CIEI on Accounting Information

Based on the assumption that greater and better coverage by analysts is associated with a better quality of accounting information (Mcewen & Hunton, 1999, Hope, 2003, Martinez, 2004), we verify the moderating effect of the analysts' forecasts quality on value relevance firms' accounting information. Model 1 in Table 3 considers the interaction between AFQ and the firms' earnings and equity information. In this finding, we verify that, especially on earnings per share, the increase in the analysts' forecasts quality has a positive and significant moderating effect ( $\beta_4 = 2.14$  in Model 1), demonstrating that in firms where AFQ is higher, earnings per share also tend to be higher, as well as their joint effect on stock prices. This finding converges with Martinez (2004), who identified in Brazil that better quality of forecasts is positively associated with a better quality of accounting information. On the other hand, there is no significant effect on the equity information per share ( $\beta_5$  is not different from zero, when analyzed together with earnings per share).

As a complementary analysis, we verify separately the effect of AFQ on earnings per share and shareholders' equity per share. In Model 2, we verify that the isolated effect of AFQ on EPS is even stronger ( $\beta_4 = 3.02$ ), suggesting that, when only earnings per share are considered as a deciding factor on the stock price, its effect is even more pronounced. In Model 3, when only the information on shareholders' equity per share is considered, we note that the AFQ effect becomes positive and significant, although the magnitude of the coefficient is less than that of EPS ( $\beta_4 = 0.21$ ). With regard to the explanatory power of Model 1 in Table 3, we note that the interaction of AFQ with the other variables also promotes a higher adjusted R<sup>2</sup>, since it is greater than the explanatory power of the original CMW model (R<sup>2</sup> = 71.06% in Table 2). This confirms that the analysts' forecast quality has informational content and that this quality is positively associated with the relevance of accounting information, confirming Hypothesis 2 of this study.

Table 3  
Moderating effects of AFQ and CIEI on the relevance of accounting information. 2000-2016.

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
( $\beta_0$ ) Constant	0.16 (0.45)	0,10 (0,24)	-0,49 (-1,24)	4,89*** (4,04)	3,24** (2,12)	8,82*** (5,73)	3,14*** (2,47)
( $\beta_1$ ) $EPS_{ijt}$	1.78*** (3.98)	5,17*** (14,56)	-	2,39** (2,00)	2,29* (1,86)	6,73*** (9,79)	-
( $\beta_2$ ) $BV_{ijt}$	0.55*** (13.09)	-	0,63*** (20,43)	0,65*** (5,69)	0,65*** (5,64)	-	0,82*** (18,04)
( $\beta_3$ ) $AFQ_{ijt}$	9.67*** (13.09)	12,79*** (11,92)	12,16*** (17,30)	2,85*** (3,59)	12,08*** (6,38)	0,07 (0,06)	2,14*** (2,58)
( $\beta_4$ ) $AFQ_{ijt} \times EPS_{ijt}$	2.14** (2.57)	3,02*** (5,82)	-	-5,51 (1,64)	-7,29** (-2,10)	-0,20 (-0,12)	-
( $\beta_5$ ) $AFQ_{ijt} \times BV_{ijt}$	0.0002 (0.00)	-	0,21*** (17,30)	0,53* (1,79)	0,60** (2,01)	-	-0,02 (-0,17)
( $\beta_6$ ) $CIEI_{jt}$	-	-	-	-11,09*** (-4,18)	-9,30*** (-2,95)	-20,24** (-6,18)	-8,63*** (-3,08)
( $\beta_7$ ) $CIEI_{jt} \times EPS_{ijt}$	-	-	-	-0,92 (-0,44)	-0,83 (-0,39)	-2,86** (-2,30)	-
( $\beta_8$ ) $CIEI_{jt} \times BV_{ijt}$	-	-	-	-0,20 (-1,03)	-0,19 (-1,00)	-	-0,38*** (-4,24)
( $\beta_9$ ) $CIEI_{jt} \times AFQ_{ijt}$	-	-	-	16,66*** (8,15)	5,18* (1,91)	28,63*** (9,27)	22,69*** (9,38)
( $\beta_{10}$ ) $CIEI_{jt} \times AFQ_{ijt} \times EPS_{ijt}$	-	-	-	12,53** (2,31)	15,27*** (2,73)	5,24* (1,86)	-
( $\beta_{11}$ ) $CIEI_{jt} \times AFQ_{ijt} \times BV_{ijt}$	-	-	-	-0,86* (-1,81)	-0,99** (-2,05)	-	3,14** (2,47)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R <sup>2</sup>	0.7199	0,5908	0,6900	0,7252	0,7283	0,5949	0,6939
F Test	169,26***	159,06***	152,20***	162,59***	147,93***	153,09***	156,05***
VIF (mean) <sup>a</sup>	2.26	1,84	1,83	18,53	18,72	6,84	6,91
Observations	35,937	35,937	35,937	35,937	19,326	35,937	35,937

Note: Models estimated with robust standard errors and Newey-West correction, showing the coefficient and t-statistics (in parentheses). For company  $i$  in country  $j$  and year  $t$ , the dependent variable is *Stock Price*;  $EPS$  is the earnings per share;  $BV$  is the book value of shareholders' equity per share;  $AFQ$  is the analysts' forecast quality index, and  $CIEI$  is the country's information environment index. VIF is the Variance Inflation Factor for multicollinearity. \*\*\* Significant at 1%, \*\* at 5% and \* at 10%.

These findings converge with the related literature (Francis & Shipper, 1999, Mcewen & Hunton, 1999, Dalmácio et al., 2013, Chen, Miao, & Shevlin, 2015, Peterson,

Schmardebeck, & Wilks, 2015). This suggests that in emerging countries both the disclosure of accounting information (Collins, Maydew, & Weiss, 1997, Hope, 2003) and the opinion of analysts (Ohlson, 2001, Martinez, 2009) are relevant to the definition of stock prices, demonstrating that investors consider both information in their investment decisions (Martinez, 2004, Dalmácio et al., 2013, Chen, Xie and Zhang, 2017). These results indicate that analysts' forecasts contribute to the understanding of accounting information by investors in the stock markets of emerging countries.

Considering that the country's information environment quality may affect the accounting information quality and the analysts' forecasts quality (Ali & Hwang, 2000, Karamanou, 2012, Takamatsu & Fávero, 2017), in Model 4 the Country's Information Environment Index (CIEI) is included, which is interacted with the other variables of the previous models, in order to identify its moderating effect. In this model, EPS, BV and AFQ continue to have positive and significant associations, while CIEI alone has a negative association with price, suggesting that stock prices tend to be lower in emerging countries with better governance and more experience in IFRS ( $\beta_6 = -11.09$ ). This may be linked to less exposure to investment risk.

Still, looking at Model 4, we note that the isolated effect of CIEI on earnings per share and shareholders' equity is not significant, however, when considering analysts' forecasts (AFQ) and the information environment (CIEI) together, yes (as in Karamanou, 2012). When the emerging country has a better information environment quality (higher CIEI), the positive effect of the analysts' forecasts quality (AFQ) on stock prices is stronger ( $\beta_9 = 16.66$ ). The combined effect of AFQ-CIEI also makes earnings per share more positively important in explaining price changes ( $\beta_{10} = 12.53$ ), which implies that in more informative environments and with better analysts' forecast quality, investors have greater information security so the positive effect on the price is greater. However, this same joint effect on shareholders' equity is negative, reducing the strength of the previously positive association ( $\beta_{11} = -0.86$ ).

This suggests that in emerging countries with better AFQ and CIEI, information about firms' equity, which accumulates over time, is less relevant than earnings information, even if the latter is subject to extraordinary factors, as pointed out by Collins, Maydew, and Weiss (1997). For these authors, in developed countries, the lower relevance of equity is explained by the increases in the frequency and magnitude of extraordinary items. However, for emerging countries, where legal protection for shareholders is lower (La Porta et al., 1997, 1998), we find that earnings are more relevant, certainly because it represents more quickly the financial situation of firms in a risky environment. These findings converge in part with Gatsios, Lima and Assaf Neto (2016), who highlight that aspects of the countries' information environment, such as the IFRS adoption, may not have uniform effects on the accounting information quality.

Among the countries analyzed, China and India are those with the highest number of observations, representing about 46% of the total sample. Therefore, as a complementary analysis, we chose to perform an analysis without China and India, which is presented in Model 5 of Table 3. In general, the previous results persist, which demonstrates that our findings are not conducted by these countries. Finally, there is the joint effect of AFQ and CIEI on each of the accounting information of the CMW model, earnings and equity. In Model 6, it is possible to verify that the increase in the information environment quality in the emerging country has an effect of reducing the strength of the positive association of earnings with the stock price ( $\beta_7 = -2.86$ ). However, when the company has good coverage by analysts (higher AFQ) and is in a better environment (higher CIEI), the association is stronger ( $\beta_{10} = 5.24$ ). This indicates that AFQ has an indispensable role in emerging markets, given that, even if the company is in a stronger information environment, its reported earnings will have a greater effect on the price when it also has a higher AFQ. In Model 7, the estimates for equity

point in a similar direction, but with more robust results, when both CIEI alone ( $\beta_9 = 22.69$ ) and accompanied by AFQ ( $\beta_{11} = 3.14$ ) presented positive and significant coefficients.

These findings converge with previous evidence (Ali & Hwang, 2000, Soderstrom & Sun, 2007, Cahan, Emanuel, & Sun, 2009, Karamanou, 2012, Chen, Xie, & Zhang, 2017) and confirm the third last research hypothesis of this study. Despite the occurrence of correlated evidence, no study had aggregated in the same analysis different proxies of analysts' forecast quality and, also, of information environment quality. Thus, its main contribution is to ratify with robust evidence and in emerging markets that there is a strong positive association between the quality of accounting information and analysts' forecasts and that the information environment of these countries matters to explain the variations in stock prices.

## 5. CONCLUSION

The value relevance of accounting information has been analyzed and verified for decades, whether in developed or emerging markets. It is known that information about the earnings or equity of companies matters when setting the price of their shares. In this context, many studies have been developed in order to point out the effects of other factors on firms' stock prices, even Ohlson's so-called "other information". Part of them carefully considered the role of analysts in the capital market, in the context of the signaling that these professionals provide to investors, playing an important role, but a gap in this literature does not specifically address the relationship between accounting information and analysts' forecasts. It is known that such forecasts are not limited to the analysis of accounting information, but that this is the main source of these professionals.

Given the capital markets of emerging countries, characterized by weak protection for shareholders, lower enforcement and a greater degree of information asymmetry, we can see that accounting information remains relevant for companies' pricing and that it becomes more relevant when there is a higher quality of analysts' forecasts for the company. Above all, both the accounting information and the analysts' forecasts are more relevant when the country has a better information environment. Greater reliability in the country's environment is associated with a better quality of accounting information and, consequently, analysts are more assertive in their forecasts.

This study contributes to the expansion of the literature related to the accounting information quality and the role of analysts in the capital markets. There are specificities of the emerging markets that point to the lower value relevance of shareholders' equity, at the expense of corporate earnings per share. This is especially useful for investors operating in these markets, as well as the bodies responsible for organizing the markets, demonstrating that the concern with the quality of accounting information, as well as with the role of analysts, must be a frequent and meticulous practice.

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