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Earnings quality measurements and determinants: the case of listed firms in Vietnam

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Abstract

The study aims to review different measurements of earnings quality and investigate its determinants, mainly derived from firm characteristics of Vietnamese listed companies from 2011 to 2019. Panel data analysis is implemented, and fixed-effect regression is employed along with post-estimation tests to achieve robust findings. The research results indicate that dividend yield and firm size are positively related to earnings quality while financial leverage, growth, profitability, and accounting losses negatively impact on earnings quality. Meanwhile, firm age and the Circular 200 have a positive partial impact on the quality of earnings of listed firms in Vietnam.

Keywords: Earnings management, Earnings quality, Accruals quality

1. Introduction

Earnings can be viewed as a basis in determining and signaling dividend payment, as a guideline for investment and decision-making process, as a proxy for firm's performance, as a criterion in pricing stock, and finally, as a prediction proxy to predict firm performance (Mohammady, 2010). Earnings quality (EQ) represents the degree of accountability and usefulness of the reported earnings figures. In the same stream of thinking, earnings are also considered to have better quality when they convey more information about the financial performance of firms (Dechow *et al.*, 2010). In addition, it is emphasized that EQ is an informative indicator if it can be used as a basis for predicting future earnings. As a result, high-quality earnings can reduce agency cost and information asymmetry and subsequently help firm management and

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other stakeholders make proper decisions, which is crucial for the well-functioning capital markets (Penman, 2003). EQ can be understood as the degree to which reported earnings in the income statement reflect the actual situation of firms.

However, with the material misstatements in the financial statements leading to a colossal corporate collapse in recent years, there has been great concern about the quality of reported earnings from listed companies in the stock market. This is justifiable because there is a significant difference between unaudited and audited financial statements, or even material misstatements can not be detected by auditors. A typical example of the latter is the dissolution of Arthur Andersen, the famous audit firm, in association with the collapse of Enron Corporation, an American energy company resulting from misrepresenting earnings to indicate good performance. Similarly, in Vietnam, a typical case can be related to Hoang Anh Gia Lai Joint Stock Company (HAG) with the sudden change from the profit after tax of 253 billion VND to the loss of 2,025 billion VND after being audited for the fical year 2019 (Ngoc and Thanh, 2020). Put differently, fraudulent financial reporting, earnings management (EM) practices, or poor performance can have adverse impacts on the quality of earnings, which affect the investors' belief and the going concern assumptions of the corporation in the future. As a result, EQ measurements and determinants have become topics of interest to many researchers.

In Vietnam, most studies use accounting-based measures focusing on accruals quality or detection of EM through changes in discretionary accruals (Dang, 2015; Nguyen and Le, 2016; Dao, 2017; Hoang and Dang, 2018). Most of these studies apply standard models developed by Friedlan (1994), Dechow *et al.* (1995), and Kothari *et al.* (2005). These models stand for the first two approaches to measure accruals quality, and subsequently, the role of accruals in recognising timely gain and loss asymmetrically, as proposed by Ball and Shivakumar (2006), has not been utilized. This study will focus on synthesizing the EQ measurements and examining its determinants in the context of Vietnamese listed firms. This research paper has been conducted a quantitative research methodology to examine the impacts of financial leverage, growth, profitability, dividend yield, firm age, and size on EQ. The sample includes 443 companies listed on the Hanoi Stock Exchange (HNX) and Ho Chi Minh Stock Exchange (HOSE) from 2011 to 2019, resulting in 3,987 firm-year observations. Multiple regression analysis and fixed-effect (FE) regression are employed to examine the determinants of EQ along with post-estimation tests to achieve robust findings. Our research results indicate that dividend yield and firm size are positively related to EQ while financial leverage, growth, profitability, and accounting losses negatively impact on EQ. Meanwhile, our study has not found any statistically significant relationships between firm age as well as the Circular 200 and the quality of earnings in Vietnam.

The study is organized into five parts as follows. Part 2 provides a theoretical background and a literature review on EQ measurements and determinants. Part 3 presents the data collection and research methodology. Part 4 discusses research results, and Part 5 concludes the paper.

2. Theoretical background on earnings quality measurements

2.1 Earnings quality

Dechow and Dichev (2002) considered that earnings could be viewed as a significant proxy that investors use to assess the firms' future cash flows. Lev (1989) defined EQ as the predictability of financial variables. He explained that the higher quality of earnings requires predictable events, which are assumed to have potential influences on the future cash flow, need to be impounded in the company's current earnings and values. Teets (2002) considered EQ to see a company's economic performance through primary events reported according to accounting standards, and thereby providing information about the quality of accounting information. Besides, EQ is defined as the extent to which profit is reported truthfully, and they proposed seven measures of profit quality: survival, predictability, variability, proportion of cash from operating activities, changes in accruals, and adjusted accruals (Schipper and Vincent, 2003). Moreover, EQ is considered the most comprehensive measure of financial statements quality (Lev, 1989). EQ is also used in many empirical studies to examine the changes in profitability over time and assess the impact of changes in accounting standards and regulatory environment, comparing financial statements across countries along with measuring market prices among businesses with different quality of reported earnings.

2.2 Earnings quality measurements

Francis *et al.* (2004) classified EQ measurements into two main groups: accounting-based measures (i.e., *accruals quality, earnings persistence, earnings predictability,* and *earnings smoothness*) and market-based measures (i.e., *value relevance, timeliness*, and *conservatism*). While the former focuses on using accounting numbers from financial statements to measure the reliability and predictability of earnings, the latter combines these figures with stock prices or returns to reflect the decision usefulness of accounting information.

2.2.1 Accounting-based measures

For an accounting-based approach to measure EQ, these measurements are constructed by using two main earnings components, namely cash and accruals. While the cash component is realized, the accrual component is considerably uncertain due to biases in management judgments and estimates (Francis *et al.*, 2005).

Accrual quality

Despite such bias, which can result in misrepresentation of economic phenomena, the accrual component is still considered a source of relevant information to investors. Therefore, to assess the reliability of EQ, several researchers have used accruals in different ways. According to DeAngelo (1986) and Schipper and Vincent (2003), the changes in total accruals can represent the degree of EM, resulting in an inverse relationship between this figure and EQ (Equation 1). From the model developed by DeAngelo (1986), Friedlan (1994) added revenues into the model to control for changes in performance (Equation 2) as below:

$$\Delta TAC = TAC_{it} - TAC_{it-1} \text{ and} \quad (1)$$

$$\Delta TAC = \frac{TAC_{it}}{REV_{it}} - \frac{TAC_{it-1}}{REV_{it-1}} \quad (2)$$

where TAC_{it} denotes total accruals of firm i at time t, equal to net income minus CFO; TAC_{it-1} means total accruals of firm i at time (t-1); REV_{it} denotes revenues of firm i at time t.

Another approach used by Jones (1991), Dechow *et al.* (1995), and Kothari *et al.* (2005) in three respective equations (3), (4), (5) below is to identify the discretionary accruals resulting from intentional accounting treatments to manipulate earnings (also referred to as abnormal or unexpected accruals) as residuals from regressing total accruals on non-discretionary accruals derived from unmanaged economic transactions including changes in revenues, changes in accounts receivables and a book value of property, plant, and equipment. While the book value of PPE determines depreciation cost, the change in revenues implies changes in working capital. Assuming that change in credit sales could also be the sources of EM, the Jones model was modified by adjusting in the change in revenues (by Dechow *et al.*, 1995) subtracted the corresponding change in receivables from the changes in revenues). Moreover, Kothari *et al.* (2005) controlled for firm performance (ROA) in their model. Overall, the higher the discretionary accruals from each model, the lower the quality of earnings.

$$\frac{TAC_{it}}{TA_{it-1}} = \beta_0 + \beta_1 \frac{\Delta REV_{it}}{TA_{it-1}} + \beta_2 \frac{PPE_{it}}{TA_{it-1}} + \varepsilon_{it}, \quad (3)$$

$$\frac{TAC_{it}}{TA_{it-1}} = \beta_0 + \beta_1 \frac{\Delta REV_{it} - \Delta AR_{it}}{TA_{it-1}} + \beta_2 \frac{PPE_{it}}{TA_{it-1}} + \varepsilon_{it} \text{ and} \quad (4)$$

$$\frac{TAC_{it}}{TA_{it-1}} = \beta_0 + \beta_1 \frac{\Delta REV_{it} - \Delta AR_{it}}{TA_{it-1}} + \beta_2 \frac{PPE_{it}}{TA_{it-1}} + \beta_3 ROA_{it-1} + \varepsilon_{it} \quad (5)$$

where TAC_{it} denotes total accruals of firm i at time t, equal to net income minus CFO; TA_{it-1} means total assets of firm i at time (t-1); ΔREV_{it} indicates changes in revenue from time (t-1) to time t; ΔAR_{it} means changes in accounts receivables from time (t-1) to time t; PPE_{it} represents the book value of property, plant, and equipment of firm i at time t; ROA_{it-1} denotes return on assets of firm i at time (t-1).

Apart from the two approaches as mentioned above to measure EQ, given the relation between current accruals and cash flow, Dechow and Dichev (2002) measured EQ as the absolute value or the standard deviation of residuals from regressing changes in working capital[2] on the previous, current and future CFO, finding that the magnitude of this figure is inversely related to EQ as follows:

$$\frac{\Delta WCA_{it}}{TA_{it-1}} = \beta_0 + \beta_1 \frac{CFO_{it-1}}{TA_{it-1}} + \beta_2 \frac{CFO_{it}}{TA_{it-1}} + \beta_3 \frac{CFO_{it+1}}{TA_{it-1}} + \varepsilon_{it} \quad (6)$$

[2] Changes in working capital (ΔWCA) = Changes in current assets (ΔCA) - Changes in cash and cash equivalents (ΔCASH) - Changes in current liabilities (ΔCL) + Changes in short-term loans (ΔSTLOAN)

where ΔWCA_{it} indicates the changes in working capital of firm i from time (t-1) to time t; TA_{it-1} means total assets of firm i at time (t-1); CFO_{it-1} denotes cash flow from operating activities of firm i at time (t-1); CFO_{it} means cash flow from operating activities of firm i at time t; CFO_{it+1} denotes cash flow from operating activities of firm i at time (t+1).

Ball and Shivakumar (2006) controlled for this conservatism in previous models due to the importance of accrual accounting in recognizing unrealized gain or loss. This model significantly improves the specification and can explain up to three times the amount of variation in accruals compared with the conventional linear specifications as Jones (1991). At the same time, Ball and Shivakumar (2006) argued that conventional linear accruals models that omit the role of accruals in asymmetrically timely loss recognition (*conditional conservatism*) result in a relatively poor specification of the accounting accrual process. As a result, from modified Jones model, they have added CFO, DCFO, and their interaction as follows:

$$\frac{TAC_{it}}{TA_{it-1}} = \beta_0 + \beta_1 \frac{\Delta REV_{it} - \Delta AR_{it}}{TA_{it-1}} + \beta_2 \frac{PPE_{it}}{TA_{it-1}} + \beta_3 \frac{CFO_{it}}{TA_{it-1}} + \beta_4 DCFO + \beta_5 \frac{DCFO * CFO_{it}}{TA_{it-1}} + \varepsilon_{it} \quad (7)$$

where TAC_{it} denotes total accruals of firm i at time t, equal to net income minus CFO; TA_{it-1} represents total assets of firm i at time (t-1); ΔREV_{it} indicates the changes in revenue of firm i from time (t-1) to time t; ΔAR_{it} denotes the changes in accounts receivables of firm i from time (t-1) to time t; PPE_{it} means book value of property, plant, and equipment of firm i at time t; CFO_{it} denotes cash flow from operating activities of firm i at time t; DCFO denotes dummy variable equal to 1 when CFO_{it} is negative, and 0 otherwise.

Time-series properties

In addition, to evaluate the accrual quality, some researchers assess EQ through its time-series properties. Accordingly, earnings are considered to be of higher quality when earnings performance persists into the next period (*earnings persistence*) (Penman and Zhang, 2002; Schipper and Vincent, 2003), or when decision-makers can use the past earnings to make future predictions (*earnings predictability*) (Lipe, 1990; Barth *et al.*, 2001; Cohen, 2003; Barua, 2006). From the same Equation 8 below with previous and current earnings before extraordinary, while earnings persistence is measured as a regression coefficient, earnings predictability is expressed through the standard deviation of residuals from regression model:

$$\frac{EARN_{it}}{TA_{it-1}} = \beta_0 + \beta_1 \frac{EARN_{it-1}}{TA_{it-1}} + \varepsilon_{it} \quad (8$$

where $EARN_{it}$ indicates earnings before extraordinary items of firm i at time t; $EARN_{it-1}$ denotes earnings before extraordinary items of firm i at time (t-1); TA_{it-1} means total assets of firm i at time (t-1).

Last but not least, earnings smoothness is measured as income variability divided by cash flow variability (Leuz *et al.*, 2003). This measurement implies how much earnings will fluctuate from one unit of cash flow variability. As a result, this attribute is also referred to as a special case of EM, which means that the artificial smoothness is created by EM instead of earnings persistence. Overall, the lower the ratio, the higher the possibilities of EM along with the lower EQ:

$$Earnings\ smoothness = \frac{\sigma_{\left(\frac{EARN_{it}}{TA_{it-1}}\right)}}{\sigma_{\left(\frac{CFO_{it}}{TA_{it-1}}\right)}} \quad (9)$$

where $\sigma_{\left(\frac{EARN_{it}}{TA_{it-1}}\right)}$ is the standard deviation of the ratio of earnings before extraordinary items at time t to total assets at time (t-1); $\sigma_{\left(\frac{EARN_{it}}{TA_{it-1}}\right)}$ denotes the standard deviation of the ratio of cash flow from operating activities at time t to total assets at time (t-1).

2.2.2 Market-based measures

The other group is market-based measures, including value relevance, timeliness, and conservatism of earnings.

Value relevance

Value relevance, referred to as the ability of earnings, explains the changes in stock prices or returns, and the greater explanatory power is associated with high EQ (Collins *et al.*, 1997; Dumontier and Labelle, 1998; Cheng *et al.*, 2005). Accordingly, Edward Bell Ohlson (EBO) models have been employed to measure this property of EQ. In this model, the stock price is regressed on book value per share, earnings per share, or the change in earnings per share (used in modified EBO model), creating a price relevance model (Equation 10). Instead of using the stock price, some researchers have used stock return to create a return relevance model (Equation 11). Accordingly, EQ is determined based on the coefficient R^2 from these equations:

$$P_{it} = \beta_0 + \beta_1 BVPS_{it} + \beta_2 EPS_{it} + \beta_3 \Delta EPS_{it} + \varepsilon_{it}, \quad (10)$$

$$RET_{it} = \beta_0 + \beta_1 BVPS_{it} + \beta_2 EPS_{it} + \beta_3 \Delta EPS_{it} + \varepsilon_{it} \quad (11)$$

where P_{it} represents a closing stock price of firm i at time t; RET_{it} indicates the stock return of firm i at time t; $BVPS_{it}$ denotes book value per share of firm i at time (t-1); EPS_{it} means earnings per share of firm i at time (t-1); ΔEPS_{it} denotes the changes in earnings per share from time (t-1) to time t.

Timeliness and conservatism

Timeliness and conservatism describe the situation in which accounting earnings are used as proxies for economic income when promptly exposed to bad or good news. Specifically, Ball *et al.* (2000) define conservatism as a differential ability of accounting earnings to depict

economic losses against economic gains. In other words, timely recognition of losses is often refered to as a "conservative" accounting system (Basu, 1997; Pope and Walker, 1999). It is also pointed out that conditional conservatism is more likely to timely recognize terrible news than good news in earnings, decreasing EM practices and increasing EQ (Basu, 1997; Mora and Walker, 2015). As can be seen from Basu's regression function in Equation 12 below, this approach is similar to that of Ball and Shivakumar (2006) when considering conditional conservatism in accounting despite the differences in choosing variables to reflect excellent or inadequate information. Specifically, instead of considering negative CFO as an indicator of lousy information, Basu (1997) employed negative stock return. Accordingly, Basu's regression function is as follows:

$$X_{it} = \beta_0 + \beta_1 N + \beta_2 RET_{it} + \beta_3 N*RET_{it} + \varepsilon_{it} \quad (12)$$

where X_{it} denotes earnings per share of firm i at time t, divided by stock price at the beginning of the period; RET_{it} represents the stock return of firm i at time t; N denotes dummy variable equal to 1 in case of imperfect information ($RET_{it} < 0$), and 0 otherwise.

EQ measurement based on the accrual quality aspect is considered as an appropriate approach. Total accruals (TAC), which reflect EQ, are employed by most models. On the one hand, DeAngelo (1986) and Friedlan (1994) only consider the changes in TAC and do not run any kinds of regression. As a result, such models are less potent in measuring EQ as they do not consider the impact of the firms' operations and characteristics, which can impact EM behaviors and EQ. On the other hand, most models perform regressions with Pooled OLS model in which TAC are regressed on different factors such as revenues, the book value of PPE, accounts receivables, and CFO to identify the discretionary accruals. However, each model still has limitations, leading to low explanatory power. Specifically, Jones (1991), Dechow *et al.* (1995), and Kothari *et al.* (2005) did not consider CFO and conservatism of EQ, Dechow and Dichev (2002) only considered CFO and used working capital accruals (WCA) (short-term accruals) instead of TAC as previous studies. Accordingly, while the former ignored the role of accrual in timely gain or loss recognition, the latter is viewed as only appropriate for firms with a short operating cycle. Ball and Shivakumar (2006) controlled for the conservatism of EQ in modified Jones model developed by Dechow *et al.* (1995). This model offers an enhancement in specification improvement as it can explain up to three times the amount of changes in accrual compared to other previous studies.

2.3 Determinants of earnings quality

2.3.1 Leverage

Leverage, measured as total liabilities over total assets, represents a trade-off consideration between the benefits of tax shield and the costs of financial distress or even bankruptcy. Leverage reflects the firm's potential risk and the impact on the accrual accounting quality and the financial statements. Many previous studies have found the link between financial leverage and the quality of reported earnings (Dechow *et al.*, 2010; DeFond and Jiambalvo, 1994; Gopalan and Jayaraman, 2012). Expressly, the studies indicated that the higher leverage

the firm is using, the closer it is getting to the credit limit, and thus the managers will have incentives to manipulate earnings. By doing this, they can satisfy the debt covenants in existing credit granting contracts and it is possible to raise new debt with more favorable terms (Dechow *et al.*, 2010) or avoid the breach of loan contracts (DeFond and Jiambalvo, 1994). As a result, EQ might be reduced. This inverse relationship was also found in studies by Gopalan and Jayaraman (2012), Kamau and Waweru (2013), Hassan and Bello (2013), and Liu *et al.* (2017). In contrast, Barton and Waymire (2004) prove that the EQ is positively correlated with leverage. Parte-Esteban and Garcia (2014), and Vasilescu and Millo (2016) indicated that this relationship has no statistical significance.

Credit institutions have played an important role in the financial market in Vietnam. Debt often accounts for a high proportion of the capital structure in many firms, and thus this factor also impacts on earnings and EQ. Recent studies by Bui and Ngo (2017), and Hoang and Dang (2018) showed a negative impact of financial leverage on the quality of corporate earnings. Therefore, the hypothesis is developed as follows:

H1: There exists a negative relationship between financial leverage and earnings quality of listed firms in Vietnam.

2.3.2 Growth

Growth is measured as the difference between revenue of firm i at time t and t-1 over revenue of firm i at time t-1 [(REV_{it} - REV_{it-1})/REV_{it-1}]. When considering sales growth or growth in total net operating assets as an indicator of the firm growth rate, Nissim and Penman (2001) and Ghosh *et al.* (2005) show that companies with higher growth rates have lower EQ. This adverse impact of growth on EQ is also supported by the research of Dechow *et al.* (2010), Gopalan and Jayaraman (2012). However, Lee *et al.* (2006), Vasilescu and Millo (2016), and Liu *et al.* (2017) found insignificant result for this relationship. Given Vietnamese companies are in the early stages of their life cycle, the growth is increasing significantly. Specifically, descriptive statistics in this study show that companies in Vietnam have an average growth rate of 13.9%, while research by Liu *et al.* (2017) showed that this figure for US market is only 6.7%.

In Vietnam, Hoang (2016), Nguyen and Nguyen (2019) found that growth impacts the company's EQ. However, their findings show different directions of correlation signs. Thus, the following hypothesis is proposed:

H2: There is a relationship between growth and earnings quality of listed firms in Vietnam.

2.3.3 Profitability

As indicated in previous studies, firm profitability significantly influences financial reporting and EQ (Lang and Lundholm, 1993; Hamidzadeh and Zeinali, 2015). On the one hand, firms with higher positive profits tend to provide a better quality of reported figures (Lin and Wu, 2014). On the other hand, high profitability can enhance the firm's financial position from the perspective of investors and other stakeholders, thus encouraging firms to provide income statements with outstanding numbers derived from fraudulent financial reporting or EM

behaviors. Meanwhile, Francis *et al.* (1996), and Liu *et al.* (2017) did not find any evidence regarding this relationship.

In Vietnam, previous studies have found empirical evidence on the impact of profitability on EQ. According to Bui and Ngo (2017), firms with outstanding performance and high profitability will have high-quality earnings, while Duong (2013), Hoang and Dang (2018) found a negative relationship between profitability and EQ. We measure profitability as EBIT/ Total assets. The hypothesis is suggested as follows:

H3: There exists a relationship between earnings quality and profitability of listed firms in Vietnam.

2.3.4 Accounting losses

In addition to the force majeure cases in which firms are negatively affected by outside factors such as unexpectedly high lending interest rate in 2011, the US-China trade war in 2018, or COVID-19 pandemic recently, firms may have subjective reasons to adjust negative profit. Specifically, motivated by tax evasion, managers tend to change the accounting policies to increase costs and reduce revenue in the period, leading to a negative profit and a lower EQ. This argument is also supported by Doyle *et al.* (2007) and Ran *et al.* (2015), in which they indicated that poor performance is associated with lower quality of earnings. In contrast, DeAngelo *et al.* (1994) argued that such poor performance might reduce firms' chances of earnings manipulation and thus results in a higher EQ. We use the dummy variable of loss (LOSS) which is equal to 1 when the firms have negative net income and 0 otherwise. The hypothesis is proposed as follows:

H4: There exists a negative relationship between accounting losses and earnings quality of listed firms in Vietnam.

2.3.5 Dividend yield

The dividend yield is measured as the percentage of dividend paid by firm i during the time t over the firm's stock price at the end of time t. Managers hesitate to raise dividends unless the dividend is believed to be sustained at the new level, and thus, a constant dividend policy is expected to be sustained over time (Lintner, 1956). Brav *et al.* (2005) also supported this finding as earnings persistence contributes mainly to firms' dividend payment decisions. Moreover, fraudulently reported earnings can not maintain sustainability and tend to reverse in the future, therefore, firms with EM behaviors are less likely to increase dividends (Dechow *et al.*, 1996). At the same time, according to signaling theory, changes in dividend payment could send signals of firms' earnings prospects to the market. Put differently, dividend rises may signal good news to the market, while dividend declines might convey bad news.

The positive relationship between EQ and dividend yield in emerging markets such as China and Indonesia is also found in the studies by Deng *et al.* (2017) and Sirait and Siregar (2014). Moreover, He *et al.* (2017) highlighted that this relationship might differ across countries in

terms of institutional strength and transparency. In general, these findings are in line with the information effect of dividends. Therefore, the following hypothesis is suggested:

H5: There is a positive relationship between dividend yield and earnings quality of listed firms in Vietnam.

2.3.6 Firm age

In addition to the financial determinants, firm age may also be related to the quality of earnings. With the same approach as McNichols (2002), we measure firm age as the difference between the year of observation and when the company was officially listed on the Vietnamese stock exchange. On the one hand, the greater the firm age, the more experience it gains, minimizing costs and enhancing quality. As a result, they would be less likely to engage in the behaviors that affect EQ and their reputation in the market (Ericson and Pakes, 1995). Similarly, McNichols (2002) argued that firms in growing stage have a lower quality of earnings than long-established firms. Therefore, firm age is positively related to EQ. This outcome was also supported by He *et al.* (2017), Deng *et al.* (2017), and Nguyen and Tran (2018), whereas Sirait and Siregar (2014) and Gul *et al.* (2009) found that firm age is negatively associated with EQ. Meanwhile, other studies did not find any significant relationship between EQ and firm age (e.g., Olowokure *et al.*, 2016). Therefore, the hypothesis is proposed as follows:

H6: Firm age and earnings quality of listed firms in Vietnam are positively related.

2.3.7 Firm size

Firm size is measured by the natural logarithm of its total assets. Under the requirements of obligatory compliance with the regulations set by the authorities and the market supervisors, large firms are under lots of pressure (Karami and Akhgar, 2014), and may have higher EQ compared to small ones. Previous research findings also found a positive relationship between firm size and EQ. The study by Ball and Foster (1982) indicated that firm size is positively related to earnings quality as large companies often have to spend fixed costs to maintain internal control systems in the process of financial reporting. On the contrary, small firms often have weak internal control systems and revise previously reported earnings targets (Doyle *et al.*, 2007). According to Parte-Esteban and Garcia (2014), Liu *et al.* (2017), Bui and Ngo (2017), there is a positive relationship between firm size and EQ. Nevertheless, they indicated that big firms might have lower EQ than small firms (Watts and Zimmerman, 1990; Gopalan and Jayaraman, 2012; and Vasilescu and Millo, 2016). Therefore, the following hypothesis is developed:

H7: Firm size and earnings quality of listed firms in Vietnam are positively related.

2.3.8 Circular 200

In Vietnam, from 2001 to 2005, the Vietnam Ministry of Finance (MoF) has issued 26 standards (VAS-Vietnam Accounting Stantands) which were customized to fit Vietnam based on the old versions of the respective International Accounting Standards (IAS). In addition, these standards have been supplemented by many guidances such as Circulars or Decisions.

The latest and most comprehensive one is the Circular 200/2014/TT-BTC dated 22 December 2014, which has come into effect since 01 January 2015. Accordingly, principles related to the presentation and disclosure of financial statements under this Circular No. 200 are viewed to be closer to the International Financial Reporting Standards (IFRS) than the previous ones. Therefore, to assess the impact level of this Circular on EQ, the authors will use dummy circular variable (CIR) which takes value of 1 when the year of observation is greater than 2014 and 0 otherwise. The hypothesis is advanced as follows:

H8: Circular 200 and earnings quality of listed firms in Vietnam are positively related.

3. Research methodology and data collection

3.1 Data collection

The data used in this study were collected from the audited financial statements of companies listed on both HNX and HOSE from 2010 to 2019 using the Fiinpro database. Among 18 industries according to Industry Classification Benchmark (ICB) level 2, three industries in the field of financials, including Banking, Insurance and Real Estate were excluded from the research sample due to their distinct features in the financial reporting system as well as accounting treatments. Meanwhile, the minimum number of observations for each industry in each year is required to be greater than 20 for regression with Ball and Shivakumar's (2006). Some of them are excluded from research sample. As a result, the research sample consists of 9 remaining industries with 443 firms from 2011 to 2019, resulting in 3,987 firm-year observations.

3.2 Research methodology

This research employed a quantitative research method. Multiple regression analysis is considered an appropriate approach to investigating the impact level of firm characteristics on its quality of earnings. Besides, the dataset used in this research is presented in panel data. Therefore, panel data analysis is implemented, and FE regression is employed as the primary model to capture the effects of all variables that are individual-specific and constant over time. In addition, FE regression is a powerful tool in solving omitted variable bias for panel data. FE regression has also been used in studies related to EQ and EM such as Nguyen and Bui (2018), Bui and Ngo (2017).

3.3 Research model

3.3.1 Measurement of earnings quality

Given the Vietnamese stock market conditions, EQ measurements by market-based approach tend to be inappropriate as changes in stock price or returns are mainly affected by psychological factors of individual investors or even market manipulation behaviors rather than accounting figures such as EPS or BVPS. Besides, Vietnamese stock exchanges have been established for a while, so the data are available for a short period of time. Thus, measuring EQ through accounting-based measures with time-series properties can be difficult. As a result, accounting-based measures are more appropriate compared to market-based ones.

Many previous studies in Vietnam have not yet considered cash flows for operating activities (CFO) and the role of accruals in recognising timely gain and loss asymmetrically. Therefore, we apply the method by Ball and Shivakumar (2006) to measure EQ as we believe this is an appropriate approach to measure EQ given the condition of the Vietnamese stock market. The model is as follows:

$$\frac{TAC_{it}}{TA_{it-1}} = \beta_0 + \beta_1 \frac{\Delta REV_{it} - \Delta AR_{it}}{TA_{it-1}} + \beta_2 \frac{PPE_{it}}{TA_{it-1}} + \beta_3 \frac{CFO_{it}}{TA_{it-1}} + \beta_4 DCFO + \beta_5 \frac{DCFO * CFO_{it}}{TA_{it-1}} + \varepsilon_{it} \quad (13)$$

where TAC_{it} means total accruals of firm i at time t, equal to net income minus CFO; TA_{it-1} represents total assets of firm i at time (t-1); ΔREV_{it} indicates the changes in revenue of firm i from time (t-1) to time t; ΔAR_{it} denotes the changes in accounts receivables of firm i from time (t-1) to time t; PPE_{it} indicates book value of property, plant, and equipment of firm i at time t; CFO_{it} means cash flow from operating activities of firm i at time t; DCFO denotes dummy variable equal to 1 when CFO_{it} is negative, and 0 otherwise; β_0 denotes intercept coefficient of a regression model; $\beta_1,\beta_2,\beta_3,\beta_4,\beta_5$ are estimated slope coefficients of a regression model; ε_{it} means residuals of the regression model.

We measure EQ by using the absolute value of residuals from regression model 11. This approach has also been applied in research by Cohen (2008), Li and Wang (2010). Following the research by Chen *et al.* (2010), we multiply the absolute values of the residuals by -1 (R). Thus, higher values of residuals represent higher EQ. Specifically, EQ is determined as follows:

$$EQ_{it} = -|\varepsilon_{it}| \quad (14)$$

where EQ_{it} denotes earnings quality of firm i at time t; $|\varepsilon_{it}|$ represents the absolute value of residuals from regression model (11).

3.3.2 Empirical model

With 3,987 firm-year observations of 443 companies listed on the HNX and HOSE from 2011 to 2019, as illustrated in research methodology, the study used the FE regression controlling for firm-specific characteristics as the primary model for such panel data. The regression model to investigate the impact level of factors influencing EQ is as follows:

$$EQ_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_2 GROWTH_{it} + \beta_3 OROA_{it} + \beta_4 LOSS_{it} + \beta_5 DIV_{it} + \beta_6 AGE_{it} + \beta_7 SIZE_{it} + \beta_8 CIR_{it} + \varepsilon_{it} \quad (15)$$

where EQ_{it} indicates earnings quality of firm i at time t; LEV_{it} represents financial leverage of firm i at time t; $GROWTH_{it}$ means a revenue growth rate of firm i at time t; $OROA_{it}$ denotes operating return on assets of firm i at time t; $LOSS_{it}$ means dummy variable equal to 1 if net income is negative, and 0 otherwise; DIV_{it} denotes dividend yield of firm i at time t; AGE_{it} represents the age of firm i at time t; $SIZE_{it}$ means the size of firm i at time t; CIR_{it} denotes

dummy variable equal to 1 if the year of observation is greater than 2014, and 0 otherwise; β_0 means intercept coefficient of a regression model; $\beta_1,\beta_2,\beta_3,\beta_4,\beta_5,\beta_6,\beta_7,\beta_8$ are estimated slope coefficients of a regression model; ε_{it} means residuals of the regression model.

4. Research results

4.1 Descriptive statistics

Table 1 shows the descriptive statistics of this study. After controlling missing values, the dataset is strongly balanced. Also, outliers for variables as EQ, GROWTH, OROA, and DIV are winsorized at 5%. EQ has an average value of -0.037, and its minimum and maximum value are -0.110 and -0.002, respectively. This indicates the existence of discretionary accruals in reported earnings from 2011 to 2019, and therefore, the higher the absolute value of discretionary accruals, the lower the EQ.

The average financial leverage (LEV) takes an average value of 0.504, implying that listed firms employ both debt and equity. However, the lowest figure for this ratio is 0.002, while the highest one is 1.294. This indicates that some firms have not utilized the advantage of leverage, whereas others can be at the risk of bankruptcy with total liabilities exceeding total assets. In addition, revenue growth rate (GROWTH) and operating returns on asset (OROA) are 13.9% and 7.4% on average, respectively. This is justifiable since Vietnamese firms are still in the early stages of their life cycle. Besides, accounting losses (LOSS) account for 5.7% of 3,987 observations from 2011 to 2019. Regarding the dividend yields (DIV), this figure points out that besides capital gain, which is the realized change in stock market value, investors will receive additional returns of 6.6% on average from holding this type of financial instruments.

Table 1. Descriptive statistics of the research variables

Variables	Obs	Mean	Sd	Min	Max
EQ	3987	-0.037	0.030	-0.110	-0.002
LEV	3987	0.504	0.225	0.002	1.294
GROWTH	3987	0.139	0.299	-0.388	0.661
OROA	3987	0.074	0.070	-0.017	0.240
LOSS	3987	0.057	0.231	0.000	1.000
DIV	3987	0.066	0.069	0.000	0.241
AGE	3987	7.209	3.854	1000	21.000
SIZE	3987	27.077	1.486	23.330	32.254
CIR	3987	0.556	0.497	0.000	1.000

Notes: EQ is earnings quality. LEV is financial leverage. GROWTH is the revenue growth rate. OROA is an operating return on assets. LOSS is a dummy accounting losses variable. DIV is the dividend yield. AGE is firm age. SIZE is a firm size. CIR is a dummy control Circular 200 variable.

Source: The authors' calculation

Two non-financial determinants, including firm age and firm size, take an average value of 7.209 and 27.077, respectively. This indicates that most of the companies are officially listed on the Vietnamese stock exchange since the beginning of 2013, and thus, they are still in the early stages of their operating cycles.

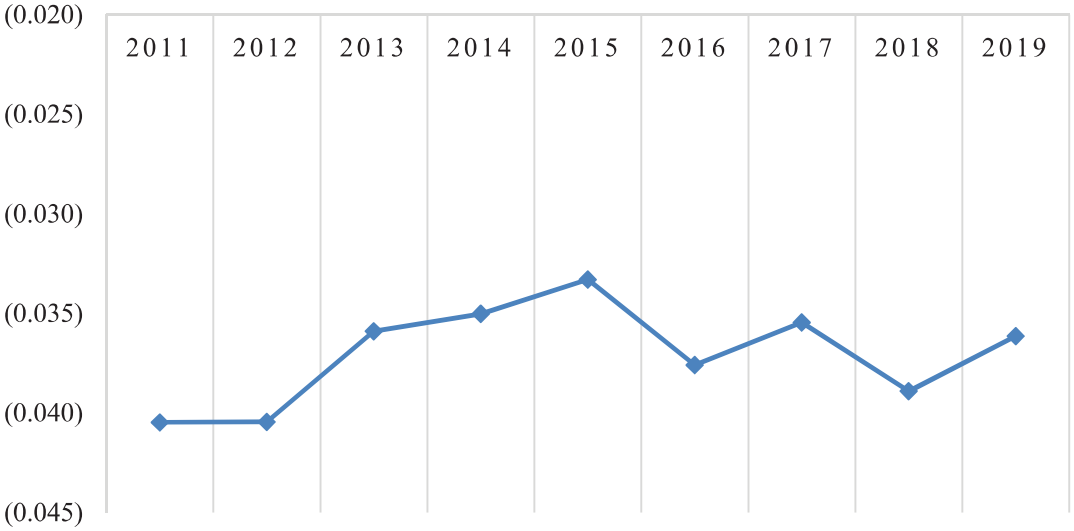

Figure 2. Earnings quality (2011-2019)

Source: The authors' calculation

The research sample consists of nine remaining industries with 443 firms from 2011 to 2019. From processed and calculated figures, detailed descriptive statistics of EQ is implemented by year (Figure 1) and by industry (Figure 2). Regarding EQ in Vietnam during the nine years, as illustrated in Figure 1, the figure gradually increased from 2011 before reaching the highest 4 years later and subsequently experienced a fluctuation during the remaining years of the study period.

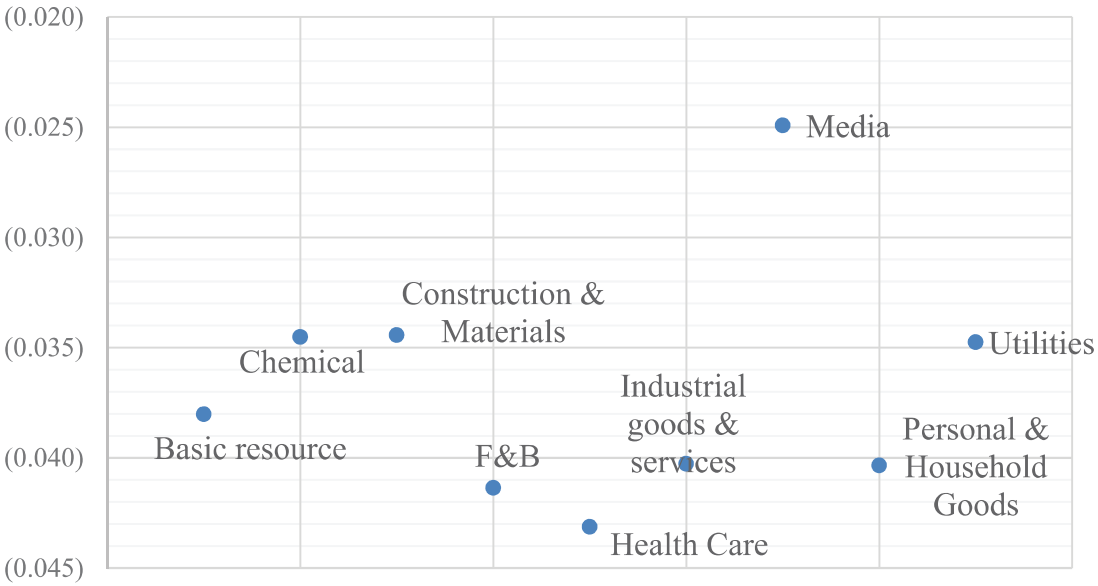

Figure 3. Earnings quality across industries

Source: The authors' calculation

To some extent, this trend of EQ is consistent with that of economic development in Vietnam. Specifically, after the global financial crisis in 2008, with changes in economic policies such as adjusting interest rate for credit growth while controlling the inflation at an appropriate level, Vietnamese firms not only had lending opportunities to make investments and productions but also witnessed the increase in consumption demand, thereby improving the earnings along with the quality of these figures.

Meanwhile, since the issuance of Circular 200 in early 2015, financial statements have been provided to investors with a higher degree of transparency in both presentation and disclosure than previous ones, enhancing EQ. However, the fluctuation of this figure from 2015 to 2019 can be interpreted as a sign of the Vietnamese stock market's unsustainable development. As a result, this can be attributed to EM behaviors or poor performance, which have a negative impact on the quality of earnings, affecting not only investors' beliefs but also the corporation's future going concern assumptions.

Regarding the EQ across nine industries in the research sample, Figure 2 indicated that the Media industry has the highest EQ while Health Care industry is the one with the lowest EQ. In addition, Utilities, Construction and Materials, and Chemical industries are at the same level followed by the four remaining ones.

4.2 Regression results

Table 2 illustrates the regression analysis results from FE regression model. Regarding financial leverage (LEV), this ratio is negatively associated with EQ at the significance level of 5%. Specifically, the regression coefficient equal to -0.010 indicates that when the other factors are held constant, a 1-percent increase in leverage leads to a decrease in EQ by 0.01% on average. Although this result has statistical significance, it has pretty low economic significance. However, our finding indicates that companies with a high level of financial leverage are viewed as having low-quality of earnings.

Our finding implies that Vietnamese listed firms that employ more debt in their capital structure are more likely to manipulate earnings to meet the requirements of creditors and to extend the ability to raise additional debt in the future. Hence, their EQ might be decreased. Our finding is consistent with the results by DeFond and Jiambalvo (1994), Dechow *et al.* (2010), Gopalan and Jayaraman (2012), Nguyen and Nguyen (2019). In addition, Nguyen and Tran (2018) also indicated that EM behaviors are in association with the use of financial leverage in Vietnamese listed companies.

In terms of growth (GROWTH) which is measured as the growth rate of net revenues, this ratio has an adverse partial impact on EQ at the significance level of 1%. With the regression coefficient equal to -0.005, the study indicates that when the other factors are held constant, a 1-percent increase in revenues growth results in a decrease in EQ by 0.005% on average. Although our result has low economic significance, it implies that companies with a high revenues growth rate have low-quality of earnings, which is similar to the research outcomes

by Nissim and Penman (2001), Ghosh *et al.* (2005), Dechow *et al.* (2010), Gopalan and Jayaraman (2012), and Hoang (2016).

Table 2. Result of regression analysis

	FE regression
LEV	-0.010**
	(0.005)
GROWTH	-0.005***
	(0.002)
OROA	-0.188***
	(0.012)
LOSS	-0.040***
	(0.002)
DIV	0.022**
	(0.008)
AGE	-0.000
	(0.000)
SIZE	0.002*
	(0.001)
CIR	0.002
	(0.002)
Constant	-0.080**
	(0.034)
Observations	3,987
R-squared	0.13

Notes: Standard errors in parentheses; *, **, *** indicate statistical significance at the 10%, 5%, and 1% test levels, respectively. EQ is earnings quality. LEV is financial leverage. GROWTH is revenue growth rate. OROA is operating return on assets. LOSS is dummy accounting losses variable. DIV is dividend yield. AGE is firm age. SIZE is firm size. CIR is dummy control Circular 200 variable.

Source: The authors' calculation

Operating ROA (OROA), measured as the profit or loss from operation divided by average total assets, is also negatively associated with EQ at the significance level of 1%. With the regression coefficient equal to -0.188, the outcome shows that when the other factors are held constant, an average decrease of 0.188% in EQ is derived from a 1-percent increase in OROA. As a result, companies with high OROA are viewed to have low-quality of earnings. This can be explained from the context of the Vietnamese stock market that many investors are mainly

concerned with the profitability of their capital, thereby only investing in companies that can yield high and sustainable profit ratios over time. Consequently, this has put pressure on the managers to make overproduction decisions or cut discretionary expenses and apply "creative accounting treatments" to manipulate reported earnings, thereby reducing EQ. In Vietnam, such findings are also found in the studies by Duong (2013), and Hoang and Dang (2018).

The dummy accounting losses variable (LOSS) is found to have a negative relationship with EQ at a significant level of 1% with a coefficient of -0.040. This result is consistent with Doyle *et al.* (2007) and Ran *et al.* (2015). This outcome implies that negative earnings can be derived from poor performance or intentional adjustments of management to increase costs to lower profit figure. Therefore, companies can lower or even avoid the tax liabilities and create "hidden reserves" which will eventually be used to increase income in future periods. In some cases, such an accounting treatment is also referred to as "artificial earnings smoothness" or "income smoothing".

The relationship between EQ and dividend yield (DIV) is found to be positive and statistically significant at 5%. Specifically, with the regression coefficient equal to 0.022, our finding indicates that a 1-percent increase in dividend yield also leads to a rise in EQ by 0.022% on average. Accordingly, higher dividend yields result in higher EQ, which is consistent with the information effect of dividends and other previous findings by Sirait and Siregar (2014), Deng *et al.* (2017), and He *et al.* (2017).

In terms of firm size (SIZE), the research result is consistent with many previous studies. Specifically, this ratio has a positive impact on EQ at the significance level of 10% under this thesis. With the regression coefficient equal to 0.002, the outcome indicates that when the other factors are held constant, a 1-percent increase in firm size results increases EQ by 0.002% on average. This means companies with a larger scale have a higher quality of earnings, which is understandable given the economies of scale. Accordingly, large companies have a lower cost per unit produced than small ones, thereby increasing profit and the competitive advantage in the market. In addition, as pointed out by Ball and Foster (1982), firm size is positively correlated with the quality of earnings as large companies often have to incur fixed costs to maintain an internal control system during the financial reporting process. Such findings are also agreed by Parte-Esteban and Garcia (2014), Liu *et al.* (2017), and Bui and Ngo (2017).

Firm age (AGE) and Circular 200 (CIR) are found to have no significant relationships with EQ. However, the positive relationship between Circular 200 and EQ implies that in addition to comprehensive and updated guidance provided by the Circular, there have been specific existing gaps that firms can manipulate their earnings in some ways. Therefore, despite the highest level of EQ achieved during 2015, it could not maintain a stable level or continued to increase in 4 years later. Such an outcome also implies the need for higher financial reporting standards such as International Financial Reporting Standards (IFRS), which can create a better quality of earnings in terms of accountability and decision usefulness for listed companies in Vietnam.

4.3 Post-estimation tests and results

4.3.1 Multicollinearity

The multicollinearity phenomena have been tested by using Variance Inflation Factors (VIF), and the results are shown in Table 3. If the VIF values of all variables are under 5, there is no signal of multicollinearity problem in the research model. At the same time, such a result is consistent with the matrix of correlation in which the correlation coefficients between the independent variables are lower than 0.85. Therefore, it can be concluded that the multicollinearity problem does not exist in this research model.

Table 3. Multicollinearity test

	VIF	**1/VIF**
LEV	1.63	1.28
GROWTH	1.16	1.08
OROA	1.65	1.29
LOSS	1.16	1.08
DIV	1.14	1.07
AGE	1.50	1.23
SIZE	1.21	1.10
CIR	1.49	1.22
Mean VIF	1.37	

Notes: EQ is earnings quality. LEV is financial leverage. GROWTH is the revenue growth rate. OROA is an operating return on assets. LOSS is a dummy accounting losses variable. DIV is the dividend yield. AGE is firm age. SIZE is a firm size. CIR is a dummy control Circular 200 variable.

Source: The authors' calculation

4.3.2 Heteroskedasticity

Modified Wald test for groupwise heteroskedasticity in FE regression model has been employed to test the heteroskedasticity phenomena in this study. Under the null hypothesis, the variance of the error is the same for all individuals (homoskedasticity). The testing result indicates that the p-value is equal to 0.000, which leads to a significant rejection of the null hypothesis. Thus, it can be concluded that heteroskedasticity is present in the model.

4.3.3 Autocorrelation

Autocorrelation (also referred to as serial correlation) is responsible for too optimistic standard errors. Wooldridge's test for autocorrelation in panel data is performed with the null hypothesis assuming that there is no first-order autocorrelation in the model (Wooldridge, 2002). The test result indicates the p-value equal to 0.1663 greater than 0.1; therefore, we failed to reject the null hypothesis. It can be concluded that autocorrelation is not present.

4.3.4 Cross-sectional dependence

With many cross-sectional units and a few time-series observations as panel data, there are possibilities of significant cross-sectional dependence, which may arise because of the existence of standard shocks and unobserved components that become part of the error term as indicated in many previous studies. Pesaran's CD test of cross-sectional independence is performed under the null hypothesis that the error terms are not correlated across entities (cross sectional independence). The result shows that FE model produces regression residuals that are cross-sectional dependent. The average absolute value of correlation between the residuals is 0.293. Therefore, Pesaran's CD test rejects the cross-sectional independence at any significance level. In other words, it can be concluded that cross-sectional dependence is present in the model.

4.3.5 Omitted-variable bias

Ramsey RESET test has been employed to test whether the omitted variables bias. The result shows that the p-value is all significant, and thus, the study rejects the null hypothesis that the model has no omitted variables. However, FE regression assumes that unobservable factors that may affect the two sides of the regression simultaneously are time unchanged. Moreover, FE regression deploys within-group changes over time, and by including FE (i.e., firm and time effects), we can control the mean differences across the firms in any observable predictors. Thus, the FE coefficients absorb all the across-firm variance the entire time. As a result, FE regression is considered an optimal solution to deal with omitted variables bias for panel data.

4.3.6 Endogeneity

Regarding the endogeneity problem, we consider financial leverage an endogenous variable as financial leverage depends on many other factors (Booth *et al.*, 2001; Frank and Goyal, 2009). Accordingly, by using capital intensity as an instrumental variable, measured by the gross amount of PPE divided by total assets, the result shows that this instrumental variable is appropriate, and the endogeneity problem is not present in this research as the p-value of the endogenity test is equal to 0.2565, which fails to reject of the null hypothesis that financial leverage is an exogeneous variable.

4.3.7 Post-estimation results

Table 4 reports the comparison between estimates using different regressions, including FE, ordinary least squared (OLS), and FE with Driscoll-Kraay standard errors (1998). At the same time, using Huber-White standard errors, the results of FE and OLS are robust to heteroskedasticity, whereas FE with Driscoll-Kraay standard errors is asymptotically robust to heteroskedasticity and cross-sectional dependence.

As shown in Table 4, OLS regression has a higher R-squared than FE and FE with Driscoll-Kraay standard errors. Specifically, while the R-square of OLS with Huber-White standard errors equals 0.20, which means the independent variables explain 20% of the dependent variable, that of FE and FE with Driscoll-Kraay standard errors is only 0.13. However, FE and FE with Driscoll-Kraay standard errors tend to share the same results, and especially the

latter approach is robust to problems of the research model and is consistent with previous studies. Three models report relatively consistent results in leverage, growth, operating ROA, dividend, age, EQ, and significance levels. However, the significant positive impacts of size and Circular 200 on EQ are found at 5% and 10% levels of significance, respectively. The positive impact of Circular 200 on EQ implies that despite the updated guidance provided by the Circular 200, there have been specific existing gaps that firms can manipulate their earnings in some ways. There is a need for higher financial reporting standards such as International Financial Reporting Standards (IFRS) to create a better quality of earnings to ensure both accountability and decision usefulness for listed companies in Vietnam.

Table 4. Summary of post-estimation research results

	FE with Huber-White standard errors	OLS with Huber-White standard errors	FE with Driscoll-Kraay standard errors
LEV	-0.010*	-0.001	-0.010*
	(0.006)	(0.002)	(0.005)
GROWTH	-0.005***	-0.005***	-0.005***
	(0.002)	(0.002)	(0.001)
OROA	-0.188***	-0.176***	-0.188***
	(0.016)	(0.009)	(0.012)
LOSS	-0.040***	-0.045***	-0.040***
	(0.003)	(0.003)	(0.001)
DIV	0.022**	0.027***	0.022**
	(0.009)	(0.006)	(0.007)
AGE	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
SIZE	0.002	0.000	0.002**
	(0.002)	(0.000)	(0.001)
CIR	0.002	0.002*	0.002
	(0.002)	(0.001)	(0.001)
_cons	-0.080*	-0.030***	-0.080**
	(0.041)	(0.008)	(0.025)
Observations	3987	3987	3987
R-squared	0.13	0.20	0.13

Notes: EQ is earnings quality. LEV is financial leverage. GROWTH is the revenue growth rate. OROA is an operating return on assets. LOSS is a dummy accounting losses variable. DIV is the dividend yield. AGE is firm age. SIZE is a firm size. CIR is a dummy control Circular 200 variable.

Source: The authors' calculation

5. Conclusion

Our study reviews the measurements of EQ and investigates its determinants that are mainly derived from firm characteristics. The panel data with 3,987 firm-year observations were collected from 443 listed firms on the HNX and HOSE from 2011 to 2019. Our research findings indicate that dividend yield and firm size are positively related to EQ while financial leverage, growth, profitability, and accounting losses negatively impact on EQ. Also, firm age and Circular 200 are found to have a positive partial impact on EQ on listed firms in Vietnam.

Our results imply that firms should mitigate EM while maintaining attractive dividend yields alongside a balanced capital structure, stable revenue growth, and operating ROA. Despite its possible short-term benefits, EM would not be an effective solution in the long run. If such manipulation of earnings is detected and published, it will affect the investors' belief and the going concern assumptions of enterprises in the future. For big firms, utilizing their economies of scale and having a solid internal control system are better solutions to achieve higher profits and higher degrees of transparency, and higher accounting information quality.

Our study has some shortcomings. We focused mainly on the accrual quality aspect of EQ, which was regressed on seven independent variables and one control variable. Although compared with previous research results and obtained a certain degree of similarities, our study has not considered EQ in a multi-dimensional approach due to the lack of data. Thus, this is the gap for future study. Also, we only focus on firm characteristics. Further study can be conducted so that other macro factors at the industry level and the country level might be included in the empirical model. Lastly, the endogeneity problem has not been fully controlled. The research can be extended by applying the GMM model to control endogeneity.

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