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The Quality of Financial Reporting and Its Measurements

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ABSTRACT

This paper reviews previous studies that have given an understanding of the quality of financial reporting earnings concepts. It provides and explains different definitions and measurements of earnings quality. Previous studies described and measured the quality of earnings by using real earnings management and accruals earnings management strategies, time-series properties of earnings including earnings smoothing, predictability, persistence, and associating earnings per share and book value per share with stock market metrics such as market value of shares.

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1. INTRODUCTION

The existing literature viewed earnings quality as a conceptual term that can be defined from many different perspectives, and therefore there is no consensus on earnings quality definition. Researchers have introduced different measures of earnings quality using certain characteristics of earnings and their components. This paper describes the definitions of earnings quality based on previous studies, discusses different measurements of earnings quality used in prior studies as proxies for earnings quality, and explains the limitations and functions associated with each measurement.

2. EARNINGS QUALITY DEFINITIONS

Earnings quality is contextual and it means different things to different people (Dechow & Schrand, 2004). For example, standard setters or regulators view earnings to be of high quality when it is with the accordance of Accounting Standards. In contrast, when earnings are easily convertible into cash then it is viewed as high quality from creditors' perspective. Researchers have considered earnings quality in different ways (Kamarudin & Ismail, 2014). For example, Abdelghany (2005); and Schipper & Vincent (2003) defined earnings quality from the decision usefulness concept. The latter said that decision usefulness is the only vital attribute of high earnings quality, because it is empirically good and captures the intent of standard setters. Moreover, prior studies defined earnings quality wider than the decision useful concept (Dechow & Schrand, 2004), by describing high earnings quality in three categories: First, high earnings quality reflect firms' current performance; second, high earnings quality should be a good indicator of future operating performance; and last, it is a useful measure for assessing the firm value. In short, high earnings quality accurately annuitizes the real value of the firm. Similarly, Dechow et al. (2010), in their study, defined earnings to be of higher quality when it gives more information about the future operating performance of a firm. In addition, some researchers found persistence earnings as important measure of earnings quality. For instance, Comiskey & Mulford (2000) defined high earnings quality as the ability to generate sustainable earnings while Penman & Zhang (2002) classified sustainable future earnings as high quality. On the other hand, Visvanathan (2006) stated that earnings which are closer to cash flow and hence contain comparatively small amount of accruals, are considered to be of higher quality.

Basu (1997), on the other hand defined, earnings to be of high quality when it timely recognizes losses. Similarly, Ashbaugh, Collins & LaFond (2006) defined high earnings quality when earnings include timeliness and value relevance. Moreover, a firm has an earnings quality problem if earnings lack transparency and include unusual items (Bhattacharya, Daouk & Welker, 2003). Previous studies considered high earnings quality when they are free from earnings manipulation. For example, Barth, Landsman & Lang (2008) stated that earnings which timely recognize losses, and involve less earnings management are considered to be of high quality earnings. This is consistent with the discussion of Guay, Kothari & Watts (1996), who stated that managerial opportunism decreases earnings quality and information accuracy. However, because of their business nature, some firms will have low earnings quality even without earnings manipulation (Dechow & Schrand, 2004). These firms comprise of firms working in unstable environments and high-growth firms. Consequently, both the underlying business nature and opportunistic management behavior can affect earnings quality. In this regard, Dechow et al. (2010) reported that earnings information consists of the errors made by the accounting system and fundamental earnings process. Similarly, Francis et al. (2006) revealed that earnings quality issue arises from both the business environment, and the financial reporting process, such as the reporting standards, governance activities, and managerial judgment.

3. EARNINGS QUALITY MEASURES

Previous studies measured earnings quality through certain characteristics of earnings such as accruals quality or abnormal accruals, predictability, sustainability or persistence, value-relevance, smoothness, earnings manipulation or earnings management. In general, earnings which are viewed as being of high quality are those that have higher accrual quality and lower level of earnings management, are more predictable, less volatile, a high level of persistence. The following subsections discuss each of the measures in details, which have frequently been used in prior studies.

3.1 Earnings Management

Earnings management is the process of getting desirable earnings through manipulations, within the limitations of generally accepted accounting practice (Davidson, Stickney & Weil, 1985). Similarly, Healy & Wahlen (1999) defined earnings management as "intervention in the financial reporting process, with the intention to get some personal or private gain". Earnings management is possible due to the discretion available to managers in preparing financial reports (Kamarudin & Ismail, 2014). Managers have the discretions to transfer current income to future periods or they can even defer expense through different accounting techniques without the violation of general accepted accounting principles (Dechow & Schrand, 2004). In addition, managers involve in earnings management due to the need for external financing and avoid taxes (Bauwhede, 2001). Moreover, firms manage earnings to affect stock prices (Healy & Wahlen, 1999). Similarly, prior to seasoned equity offerings (SEO), firms manage earnings to increase share prices (Dechow & Schrand, 2004). Management is managing earnings to meet benchmark and target earnings (Burgstahler & Dichev, 1997). On the other hand, some management involves in earnings management to improve the financial image of the firm; through meeting the expectation of investors and forecasted profit of the analyst (Degeorge, Patel & Zeckhauser, 1999). Therefore, high earnings quality exists in the absence of earnings management, since unmanaged earnings are of higher quality when compared to managed earnings (Dechow & Schrand, 2004).

Moreover, firms manage earnings in two different ways (Badertscher, 2011): First, firms manage earnings through accruals to get the desired level of earnings. This method is known as accruals earnings management (AEM). Second, firms can manage earnings through changes in real business transactions, such as decreasing prices to increase sales, reducing discretionary expenses to increase current earnings, and overproducing goods (inventory) to reduce costs of goods sold. Managing earnings through real business transaction are known as real earnings management (Roychowdhury, 2006). Similarly, firms choose earnings management strategy based on its relative cost (Zang, 2011). It means that comparatively real earnings management (REM) is more useful than accruals earnings management (AEM) if the costs of using AEM relative to REM are higher and vice versa. The cost of manipulating incomes depends on the limitations that are required on relating AEM and REM. In addition, after the implementation of Sarbanes Oxley Act (SOX), the level of real earnings manipulation increases, while accruals based earnings manipulation decreases (Cohen, 2008). In contrast, throughout seasoned equity offering (SEO) firms use both earnings management strategies (Cohen & Zarowin, 2010). The study further revealed that the SEO firms' inclination to employ real earnings management activities is positively related to the costs of AEM in these firms.

Furthermore, focusing only one earnings management proxy at a time underestimate earnings management activities in a firm (Fields, 2001). Particularly, if managers employ both earnings management strategies to manipulate earnings, then examining only one earnings management strategy in isolation underestimates earnings management activities. Similarly, Braam et al. (2015) stated that using only accruals-based measure to estimate earnings management, underestimate the earnings management activities. Therefore, it is recommended to use both accruals earnings management and real earnings management as a measure of earnings management.

3.1.1 Real Earnings Management

Firms manage earnings to obtain the desired level of earnings, and managing earnings through real business activities is known as real earnings management (REM) (Roychowdhury, 2006). The author defined REM as "deviation from normal business practices, which is motivated by managers' desire to mislead some stakeholders into believing that certain financial objectives have been met in the normal course of operations". Although, these deviations economically do not add value to firm value; however, enable managers to achieve financial reporting objectives. Certain real earnings management practices, such as reduction of discretionary expenditures, overproduction of goods, and price discounts are often favorable measures in various economic situations. However, if managers are engaged more extensively in these activities with the objective of beating/meeting an earnings target, then managers are involved in real earnings management (Roychowdhury, 2006). In addition, Graham, Harvey & Rajgopal (2005) found in their survey that managers are willing to manage real earnings to meet earnings targets such as analyst forecasts, zero earnings and previous periods' earnings, although real earnings management potentially reduces firm value. Real earnings management adversely affects firms' value, since raising earnings currently can have adverse effects on future periods' cash flows. For instance, to meet short-term earnings target firms increase sales volumes through price discounts, which can lead customers to expect such price discounts in future periods. It means lower profit margins on future sales.

Despite the costs linked to real earnings management (REM), since it imposes greater long-term costs on the firm value. Managers are unlikely to rely only on accrual-based earnings management to manage earnings. In respect of loss linked to REM, Graham et al. (2005) stated that fifty percent of the CFOs in their survey said that they would accept small losses to meet current earnings targets by postponing new projects, while eighty percent of the CFOs said that they would decrease expenditure on advertising, maintenance and R&D to meet target earnings. Roychowdhury (2006), on the other hand, gave evidence that managers avoid reporting annual losses by decreasing selling, general and administration expenses, overproducing inventory goods to decrease cost of goods sold (COGS), and decreasing research and development costs. Moreover, firms have poorer performance in the following three years when they beat analyst forecasts by using both earnings management strategies compare to firms that miss analyst forecasts without earnings management (Bhojraj, 2009). In contrast, firms have better performance in the following three years when they meet target earnings through real earnings management when compared to firms that do not involve in real earnings management (Gunny, 2010).

Furthermore, managers are willing to manipulate earnings through real earnings management (REM) when compared to accruals earnings management (AEM), since relying only on AEM involves a risk and REM is not likely to draw regulators or auditors scrutiny (Braam et al., 2015). Prior studies such as Roychowdhury (2006) and Gunny (2005) have identified various methods of REM. These methods further divided into manipulations in financing, investing and operating activities (Xu, Taylor & Dugan, 2007). Baber, Fairfield & Haggard (1991) showed that managers reduce research and development (R&D) expenditure when spending on R&D risks the ability to report profits in the current. Similarly, Dechow and Sloan (1991) revealed that CEOs spend less on research and development in their final years in office. Moreover, Bens, Nagar and Wong (2002) found that managers cut capital expenditure and research and development cost when faced with earnings per share dilution due to stock option exercises. In contrast, Holthausen, Larcker and Sloan (1995) found that managers do not cut research and development expenditure to increase managerial bonuses.

Furthermore, operating activities are manipulated through overproduction of goods with the objective to decrease cost of goods sold (Roychowdhury, 2006). Costs of goods sold per product decreases because of overproduction of goods, as the fixed costs will then be divided over a larger number of products. In addition, the author stated that firms that involve in (REM) exhibit at least one or more of the following characteristics: Abnormally low discretionary expenses and abnormally high production costs. To capture REM through discretionary expenses, Roychowdhury (2006) estimated the following equation:

$$\frac{DISX_t}{A_{t-1}} = \beta_0 + \beta_1(\frac{1}{A_{t-1}}) + \beta_2(\frac{S_{t-1}}{A_{t-1}}) + \varepsilon_t$$

Where: $DISX_t$ is the discretionary expense at year t, which is computed as the sum of selling, general, and administrative expenses (SG&A) and research and development (R&D) expenses; A_{t-1} is the total assets in year t-1; S_{t-1} is the net sales in year t-1. Roychowdhury (2006) estimated the normal level of production costs using the following equation:

$$\frac{PROD_t}{A_{t-1}} = \beta_0 + \beta_1(\frac{1}{A_{t-1}}) + \beta_2(\frac{S_t}{A_{t-1}}) + \beta_3(\frac{\Delta S_t}{A_{t-1}}) + \beta_4(\frac{\Delta S_{t-1}}{A_{t-1}}) + \varepsilon_t$$

Where; all variables are same as above. $PROD_t$ is the sum of the cost of goods sold (COGS) in year t and the change in inventory from t-1 to t; S_t is the net sales in year t; and ΔS_t is the change in net sales from year t-1 to t. The abnormal level of production costs RM_{PROD} is measured as the estimated residual from the above equation. The higher the residual, the larger is the amount of inventory overproduction, and the greater is the increase in reported earnings through reducing the cost of goods sold. Earnings can also be manipulated through sales. Roychowdhury (2006) stated that managers attempt to temporarily increase sales by offering lenient credit terms or sales price discounts. The increased sales during the discounts are likely to disappear or reduce when the firm re-establishes the old prices. The cash inflow per sale item from these additional sales is lower as profit margins decline. Therefore, cost to sales ratio will be abnormally high because of the lower profits margins due to the price discounts. In addition, firms temporarily boost sales by offering lenient credit terms. For instance, automobile manufacturers and retailers often offer lower interest rates towards the end of their fiscal years. These are essentially discounts and lead to lower cash inflow over the life of the sales.

Roychowdhury (2006) first generated the normal levels of cash flow from operations (CFO); the study expresses normal CFO as a linear function of sales and change in sales. To estimate the model, the study runs the following cross-sectional regression for each industry and year:

$$\frac{CFO_t}{A_{t-1}} = \alpha_0 + \alpha_1(\frac{1}{A_{t-1}}) + \beta_1(\frac{S_t}{A_{t-1}}) + \beta_2(\frac{\Delta S_t}{A_{t-1}}) + \varepsilon_t$$

Where; all variables are same as above.

3.1.2 Accrual-Based Earnings Management

Earnings are consisting of accruals and cash flows, however, accruals are discretionary and relied on estimations that is why cash flows are considered more consistent than accruals (Dechow, 1994). Earnings are mostly manipulated through accruals (Dechow, 2011) and numerous measures view that high accruals reduce earnings quality (Francis et al., 2006). As accruals give discretion to use judgements, it provides opportunity for earnings management (Dechow & Schrand, 2004). In addition, managers use their discretions in reporting process to manipulate earnings, which is known as accruals earnings management (Healy & Wahlen, 1999). However, discretions could be controlled by auditors' scrutiny (Becker, 1998). Moreover, using discretions in reporting process reduced substantially after regulator's scrutiny and adoption of Sarbanes Oxley Act (SOX) (Cohen et al., 2008). As the purpose of SOX is to protect shareholders, it implies that investor protection restricts firms from accruals earnings management. Similarly, Leuz et al. (2003) confirmed that investor or shareholder's protection is negatively related to accruals earnings management.

In contrast, some researchers reported that accruals are useful decisions. For example, Sloan (1996), in his study, found that earnings are more reliable when compared to cash flows. Whereas, Penman and Sougiannis (1998) stated that earnings produce smaller forecast errors. Dechow and Schrand (2004), on the other hand, revealed that accruals enhance decision usefulness by reducing irrelevant variations in cash flows. Moreover, a firm with high total accruals is not necessarily a sign of low earnings quality (Dechow & Schrand, 2004). The authors stated that

some firms could have low predictability and accruals quality, because of its business nature; such as firms with a large amount of intangible assets and high growth. Moreover, Levitt (1998) stated that earnings quality is on the decline when accruals earnings management is on rise. Current study is using accruals quality model to detect accruals earnings management. The next section will discuss in detail.

3.1.2.1 Accruals Quality

The accruals quality concept was initially introduced by Dechow and Dichev to detect or capture accruals earnings management activities in a firm. The model is based on the fact that accruals relied on estimates, the wrong estimates must be corrected in future earnings since accruals shift the recognition of cash flows over time. It measures accruals quality as such, where accruals quality decreases as the amount of accruals estimation errors increases. Consequently, incorrect estimations are noise that decreases the beneficial functions of accruals. The authors do not differentiate between abnormal and normal accruals, and they introduced an empirical measure of accruals quality which reflects working capital accruals into operating cash flows; as a result, a poor reflection indicates low accruals quality. In particular, the model regress change in working capital on last year, present, and next year's cash flow:

$$\Delta WC_{i,t} = \beta_0 + \beta_1 CFO_{i,t-1} + \beta_2 CFO_{i,t} + \beta_3 CFO_{i,t+1} + \mu_{i,t} \qquad \textit{Dechow-Dichev Model}$$

Where CFO is cash flows from operations scaled by lagged total assets; and WC is working capital less revenues scaled by lagged total assets. High variability in the estimation errors is an inverse measure of earnings quality since it yields non-persistent earnings. It is probable that firms with low accruals quality will also have low earnings persistence because the inconsistency of the residuals is the measure of accruals quality. McNichols (2002) modified Dechow-Dichev Model by including additional explanatory variables (i.e. Revenue and Property, Plant, & Equipment) which are important in forming expectations about current accruals. Kent, Routledge and Stewart (2010) found that both models perform equally well whereas; Francis, LaFond, Olsson and Schipper (2005) found that McNichols added greater explanatory power.

$$\Delta WC_{i,t} = \beta_0 + \beta_1 CFO_{i,t-1} + \beta_2 CFO_{i,t} + \beta_3 CFO_{i,t+1} + \beta_4 \Delta \mathrm{Rev}_{i,t} + \beta_5 PPE_{i,t} + \mu_{i,t}$$

Modified Dichew-Dichev Model

Where, all variables are as previously defined.

The Dechow-Dichev Model captures earnings management and unintentional errors; however, it is often used in research designs where manipulation is investigated. Initially the researchers proposed that the model was suitable for both situations. Afterward, McNichols (2002) stated that the model is only suitable to measure accruals quality when it is caused by unintentional errors, since the estimation errors are not independent when earnings management is present. The Dechow-Dichev model includes an important limitation, since it only concentrates on short-term working capital to detect accruals earnings management (Dechow et al., 2010). Similarly, instead of total accruals the Modified Dechow-Dichev model concentrates only on current accruals, and it does not consider the perceptions of analysts and investors (Barth & Landsman, 2008).

3.2 Earnings Aggressiveness

Earnings aggressiveness is the propensity to speed the realization of gains and delay the realization of losses, which would eventually result in more positive or high accruals (Bhattacharya, 2003). The author adopted the magnitude of accruals as a measure of earnings quality. Bhattacharya (2003) stated that the opportunistic overstatement of earnings increases the level of total accruals. Earnings aggressiveness reduces earnings quality because it increases total accruals, and high accruals represent less persistent earnings (Dechow et al., 2010). The authors further stated that firms have high total accruals when they involve in earnings manipulations. Similarly, Leuz, Nanda and Wysocki (2003) used the magnitude of accruals as a measure for earnings management. Whereas, Bhattacharya (2003) measured earnings aggressiveness as the magnitude of accruals:

$$ACC_{kt} = (\Delta CA_{kt} - \Delta CL_{kt} - \Delta CASH_{kt} + \Delta STD_{kt} - DEP_{kt} + \Delta TP_{kt}) / TA_{kt-1}$$

Earnings aggressiveness

Where; ACC_{kt} are the total accruals of firm k in year t; ΔCA_{kt} is Change in current assets of firm k in year t; ΔCL_{kt} is the change in current liabilities of firm k in year t; $\Delta CASH_{kt}$ is the change in cash of firm k in year t; ΔSTD_{kt} is the change in long-term debt included in total current liabilities for firm k in year t; DEP_{kt} is the amortization and depreciation expenses of firm k in year t; ΔTP_{kt} is the change in tax payables of firm k in year t; TA_{kt-1} is the total assets of firm k in year t-1. The earnings aggressiveness model is simplistic and cannot be seen independently, that is why it has rarely been employed as the only proxy of earnings quality (Dechow & Schrand, 2004). Due to business nature some firms have higher level of accruals (Dechow & Schrand, 2004). Moreover, Dechow et al. (2010) stated that underlying performance of firms is probably different between firms with low accruals versus high accruals and hence the variations in accruals are probably to arise from bases other than AEM.

3.3 Earnings Persistence

Sustainability in earnings is known as earnings persistence (Ahrens, 2010). It refers to the expectation of how far current earnings are embodied enduringly in future earnings. Persistent earnings are of higher quality because it has the ability to predict future earnings and thus users yield better input to equity valuation models (Dechow et al., 2010). Similarly, if earnings are expected to recur, it is considered of high quality (Melumad & Nissim, 2009). In respect of investor response, Schipper and Vincent (2003) stated that persistent earnings attract many investors because they can predict future earnings. Various studies have used persistence as a proxy of earnings quality. Using U.S firms' data, Baber, Kang and Kumar (1998) mentioned that compensation committee in firms takes not only the current-period earnings innovations into consideration but also their persistence into the future when rewarding management based on earnings. Considering earnings persistence by the compensation committees encourage managers of firms to look beyond the current-period earnings (Ashley & Yang, 2004; Baber, Kang & Kumar, 1998). Francis et al. (2004) are evident that firms with persistent earnings has lower costs of equity compare to firms with least persistent earnings. Researchers considered autocorrelation (AR1) model as desirable measure for earnings persistence, since it regresses between present and past income (Heij, Boer, Franses, Kloek & Dijik, 2004). Francis et al. (2004) used an autoregressive model to measure persistence earnings:

$$NI_{i,t} = \beta_0 + \beta_1 NI_{i,t-1} + \mu_{i,t} \qquad \text{Earnings Persistence}$$

Earnings are persistent if β_1 indicate large values.

Prior researchers criticized earnings persistence as a measure of earnings quality, because high earnings persistence could be a result of opportunistic earnings smoothing (Dechow et al., 2010). It is recommended to employ both earnings persistence and earnings smoothing simultaneously. In unpredictable economic conditions, highly non-sustainable earnings do not signify poor earnings quality since it could be the result of a neutral use of accounting standards (Schipper & Vincent, 2003).

3.4 Earnings Predictability

Earnings predictability concept is a desirable measure of earnings quality which is closely linked to earnings persistence. Schipper and Vincent (2003) defined earnings predictability as "the ability of past earnings to predict future earnings". It refers to the extent where investors can predict future earnings of a firm. Subsequent to Schipper and Vincent (2003), volatility decreases predictability. Therefore, high earnings quality should enable investors or shareholders to better estimate firms' future earnings (Hussainey, 2009). In addition, since the current earnings are more useful in anticipating future earnings, analysts prefer high predictable earnings (Kiattikulwattana, 2008). Dechow et al. (2010), on the other hand, defined earnings predictability as the ability of earnings numbers to anticipate future cash flows of a firm. Furthermore, Valury and Jenkins (2006) stated that the significance of earnings predictability is pronounced when earnings numbers are used in valuating firms' equity, which requires shareholders or investors to anticipate the firms' expected future cash flows. Earnings predictability and earnings

persistence could be measured using the same model (Dichev & Tang, 2009). The authors calculated same AR1 model for earnings predictability as above:

$$NI_{i,t} = \beta_0 + \beta_1 NI_{i,t-1} + \mu_{i,t} \qquad \text{Earnings predictability}$$

Where, the variance of the error term captures the variation in earnings, μ is the inverse measure of predictability. Although the measures of predictability and persistence begin from the same autoregressive regression, they are two different measurements. In other words, Dichev & Tang (2009) argued that the earnings stream is easier to predict, if the variance persistence is low. In contrast, Schipper & Vincent (2003), criticized earnings predictability measure for having the same problems as earnings smoothing, because it has not been cleared whether earnings predictability is the result of opportunistic earnings smoothing or signify high earnings quality. Moreover, unpredictable earnings are not necessarily a sign of earnings manipulation if the underlying economics of the firm is difficult to predict.

3.5 Earnings Smoothing

There are two contradictory views on earnings smoothing literature: One view said that earnings numbers are less informative when managers artificially smooth informative and relevant variations in cash flows. In this perspective, earnings smoothing signify low earnings quality. The second view is that to achieve persistent or sustainable earnings numbers, managers use secret information to smooth out irrelevant and transitory variations in cash flows. In this perspective, smooth earnings signify high earnings quality (Francis et al., 2006). The first view is that smooth earnings have many incentives, since management decreases (increases) accruals to respond positive (negative) cash flows (Barth et al., 2008). Smooth earnings are expected to be more precise and thus market rewards smooth earnings with less cost of debt and equity (Kirschenheiter & Melumad, 2002). The authors also stated that smooth earnings increase share prices because consistently positive or sustainable earnings increase the expectations of investors. Similarly, Francis et al. (2004) said that managers smooth earnings to appear less risky to attract inexpensive capital (i.e. cost if debt and equity).

The second view is that earnings smoothing increases the quality of earnings. Implying that earnings smoothing is not necessarily opportunistic, it increases earnings quality by moving transitory fluctuations and value irrelevant in cash flows, which does not reflect firms underlying performance (Dechow & Schrand, 2004; Dechow & Skinner, 2000). In contrast, many researchers agree that earnings smoothing is an indicator of earnings manipulation, since it appears to be a general practice in many countries (Dechow et al., 2010). Earnings smoothing is measured as variations of earnings to the variations of cash flows (Francis et al., 2004; Leuz et al., 2003). Cash flows are non-discretionary to a great extent that is why earnings smoothing is measured relative to cash flows (Francis et al., 2006). Accruals reverse over time because accruals and cash flows are inversely connected over time as a result of accrual accounting, however, a large inverse relationship between cash flows and accruals indicating low earnings quality, since accruals are employed to smooth variations in cash flows (Dechow, 1994). Thus, earnings are of high quality and represent true and fair value of the firm when earnings are closely linked to the cash flows (Schipper & Vincent, 2003):

$$\frac{\sigma(CFO_{j,t})}{\sigma(NIBE_{j,t})} \qquad \text{Variability of Earnings to Cash Flow}$$

Where; CFO is cash flows from operating activities; and NIBE is net income before extraordinary items. All variables are scaled by lagged total assets.

3.6 Value Relevance

Earnings are considered to be of higher quality if it is more value- relevant. Bao and Bao (2004) claimed that:

"If quality of earnings is improved, then the association between firm value and reported earnings should also be improved. If quality of earnings is impaired, then the association between firm value and reported earnings should also be impaired."

Earnings are of high quality when earnings have greater explanatory power of stock returns and accounting numbers explain the variations in stock returns (Francis et al., 2006). While Barth, Beaver & Landsman (2001) stated that value relevance measures the relevancy and reliability of accounting number. Barth et al. (2008) defined value relevance as "a measure of how well earnings numbers reflect a firm's underlying performance".

In addition, value relevance measure is based on the concept that investors respond to information that has value implications, that is why it is measured empirically as the explanatory power from a regression of stock returns on core earnings (Dechow et al., 2010). The study further revealed that earnings reflect underlying performance when earnings have higher correlation with share prices. On the other hand, Holthausen and Verrecchia (1988) proposed a model where the precision of the information increases stock price response. Teoh and Wong (1993) further modified this concept, where perceived credibility of the earnings information impact investors' response to earnings accordingly. In addition, Ohlson (1995) introduced a model to detect value relevance of earnings information. The Ohlson model is adopted to investigate the relation between equity market value with financial reporting variables, i.e. the equity book value per share (represents statement of financial positions) and earnings per share (represents statement of comprehensive income statement). If the difference of coefficients is negative (positive), it implies less (high) value relevance. Following Kargin (2013); Shah, Liang and Akbar (2013), the model is measured as follow:

$$MVPS_{it} = \alpha_0 + \beta_1 BVPS_{it} + \beta_2 EPS_{it} + \varepsilon_{it} \qquad \text{Value relevance}$$

Where; $MVPS_{it}$ is the firm i market value per share at time t; $BVPS_{it}$ is the firm i book value of equity per share at year t; and EPS_{it} is the firm i earnings at the fiscal year ended at time t.

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