Analyst Forecast Accuracy and Earnings Management

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ABSTRACT

This paper investigates the reciprocal or endogenous relationship between earnings management and analyst forecast accuracy. Earnings number is one of the most referred information especially in relation to investment decision-making. Financial analysts use earnings number and its trend in coming up with their forecast. The quality of earnings reported hence may affect the accuracy of forecast made by analysts. Quality of reported earnings is often indicated by earnings management. One of the motivations to manage earnings is to meet or beat analyst forecasts. If analysts failed to account for earnings management, it is possible that earnings manipulation in the previous year may mislead analysts and affect forecast accuracy for current and/or future years. Thus, relationship between earnings management and forecast accuracy could be endogenous or reciprocal, where managers react upon analysts' forecasts and analysts use reported earnings to make forecast. Previous research on this area assume earnings management and forecast accuracy as exogenous variables. This study on the other hand incorporates the reciprocal relationship between analyst forecast accuracy and earnings management in examining whether analysts can detect earnings management. The relationship between earnings management and analyst forecast accuracy of 110 firms listed on Main board of Bursa Malaysia from 2007 to 2012 is analyzed using dynamic panel system Generalized Method of Moments (GMM) estimator. The year 2007 to 2012 is chosen because this represents the period of convergence from MASB to MFRS. Result indicates that meeting or beating the forecast is one of the incentives for earnings management although not a strong incentive. On the other hand, earnings management significantly influence forecast accuracy, indicating that somehow, analysts trust the reported earnings. This study adds to the literature by addressing the possible endogenous and dynamic relationship between earnings management and analyst forecast accuracy.

Keywords: Earnings management; forecast accuracy; endogenous; dynamic relationships; Bursa Malaysia

INTRODUCTION

The quality of financial reporting especially earnings numbers is among the topics of interest among academia. The reason being that the information provided is highly referred to by the stakeholders especially in the capital market. Among the users of financial information are financial analysts. Financial analysts are professionals that evaluate investment opportunities by providing analysis on performance of companies. The analysts' forecasts on companies' earnings and earnings per share for example are highly referred to. The analysts forecast may be seen as more credible by investors as compared to forecast by the management because analyst is considered as independent party. A study by Wang, Chen and Wang (2015) however provides evidence that earnings forecast provided by management of the company influences the accuracy of financial analysts forecast. This indicates that financial analysts use information provided by companies in forming their forecast of the company's performance in general and earnings per share in specific.

In forming forecast of company's performance, financial analysts use financial information provided by the company. Kim, Kim, Ahn and Choi (2017) provide evidence that information asymmetry or disparity of information does contributes towards forecast errors. In other words, lack of information disclosed by company affect the accuracy of forecast made by analysts. The choice of accounting method may also affect earnings reported by the company. Fair value accounting for example may affect earnings number as some of the items such as profit or losses from the valuation will go through income statement (Ayres, Huang & Myring 2017). Prior studies therefore provide evidence that analysts partly rely on financial information including earnings reported by companies in forming their forecasts.

Reported earnings however may not be the true earnings as there may exist earnings manipulation that is done within the scope of the standards. The true earnings may be obscured by earnings manipulation by management or what is known as earnings management. Earnings management is measured from discretionary accruals as it has been shown that managers primarily use accounting accruals as tools for managing earnings. There are several motivations for earnings management and literature shows that one of the factors is managers' intent to meet or beat analyst forecasts (Brown & Caylor 2005; Chen, Lin, Wang & Wu 2010). This could be motivated by the markets' increasing expectations on reported earnings numbers to meet analysts' forecasts (Kasznik & McNichols 2002). Increases in the number of analysts and increase media

attention to the forecasts are other motivating factors for managers to manage earnings. Analyst forecasts error is eliminated when managers manage earnings to meet analyst forecast and this leads to higher accuracy. On the other hand, previous studies on accuracy of analyst forecast show that one of the most important factors contributing to accuracy of analyst forecast is quality of reported earnings (Barker & Imam 2008; Shukor, Nor & Keliwon 2011). The information value of discretionary accruals as part of reported earnings depends critically on managerial incentives for discretionary accounting choices. Managers may use discretionary accrual for opportunistic earnings management or to signal a firm's future prospects to the market.

The accuracy of analysts' earnings forecast is therefore expected to be associated with earnings management. Prior studies indicate that financial analysts use reported earnings in coming up with their forecasts but at the same time the reported earnings may have been managed to meet the analysts forecast. This indicates a two-way or reciprocal relationships between forecast accuracy and earnings management which has yet to be studied. Prior studies on this issue have treated the relationship between earnings management and forecast accuracy as a one-way relationship. This study however incorporate the endogeneity or reciprocal relationship between forecast accuracy and earnings management in answering the question whether analysts are able to detect earnings management in forming their forecasts. As discussed, past studies show that the ability of analysts to detect earnings management is somehow limited. It is therefore predicted that when analysts use reported earnings that have been manipulated for the purpose of meeting the forecast, forecast accuracy will be higher.

Financial analysts play an important role within the financial sector. Among the roles played by a financial analyst is doing researches on the company fundamentals for the purpose of investment recommendations. Basically their advice revolves around buying, selling or hold certain stocks and shares. Analysts play an important role as information intermediaries between firms and investors. Prior studies provide evidence that security prices move in line with analysts' forecasts and recommendations (Kirk 2011). The association between price and analyst forecast indicates that analysts can influence investors' expectations through their forecasts. Previous studies also indicate that analyst coverage and accuracy of analyst forecast is positively related to firm value (Lang, Lins, & Miller 2003). Therefore, the analyst's ability to forecast earnings accurately is an important issue in achieving efficient capital market.

Financial analysts are trained professionals and equipped with knowledge on financial matters and economic environment. Their main function is to evaluate financial data and study economic trends in predicting market conditions and performance of companies. This information is provided to clients to assist them in deciding and creating their investment portfolios. Hence, it is part of the responsibility of the analysts to come up with the most accurate forecasts. Research on the quality of forecasts have been conducted widely, for example by Karamanou (2012), Ramnath, Rock and Shane (2008) and Espahbodi, Espahbodi and Espahbodi (2015). Ciccone (2005) and Karamanou (2012) show that analyst forecast accuracy increase with time in both developed and emerging markets. Findings by Peek (2005) on the other hand indicates that forecast accuracy and forecasting advantage are influenced by changes in accounting procedures. Espahbodi et al. (2015) conclude that the forecast accuracy is related to the quality of financial reports. In coming up with the forecast, analysts use multiple sources, and one of the important sources referred by analysts is financial statements of companies and the most used figure is the earnings numbers. In other words, the reported financial information including earnings number partly influence the accuracy of analysts' earnings forecasts. The quality of financial information especially earning numbers is therefore very important as it can influence the accuracy of analysts' earnings forecast.

To summarize, the relationship of analysts and managers can be seen as a two-way relationship where managers react to analysts' forecasts and analysts forecasts on the other hand is a function of reported earnings quality. Prior studies on the association between earnings management and analyst forecast accuracy however treat the two variables as exogenous (Beyer 2008; Beyer, Cohen, Lys & Walther 2010). This study on the other hand will address the endogeneity and dynamic relationship of the two variables. As noted by Abdallah, Goergen and O'Sullivan (2015), failure to address the endogeneity issue will lead to wrong inferences being made. Endogeneity is caused by the dependent variable being influenced by one or several explanatory variables, which in turn are influenced by the dependent variable. According to Abdallah et al. (2015) endogeneity is a major methodological concern for many areas of business and management research that rely on regression analysis. To address this methodological issue, the relationships between analysts forecast accuracy and earnings management is revisited taking into account the possible two-way relationships between the two variables using the dynamic panel system Generalized Methods of Moments (GMM). The dynamic panel (GMM) estimator developed by (Arellano & Bond 1991) and uses lagged levels of the explanatory and dependent values as instruments to control for both dynamic and endogeneity. In particular, this study investigates whether earnings management is a determinant of analyst forecast accuracy on earnings per share (EPS), taking into account that meeting the forecast may be a reason for earnings management. Taking into account the endogeneity and the dynamicity of the relationship between analyst forecasts accuracy and earnings management will hopefully lead to a better conclusion being made.

This study applies a panel dynamic GMM estimator to a data set of 110 firms listed on Main Board of Bursa Malaysia from 2007 to 2012. Companies listed on Bursa

Malaysia are chosen as sample because according to Tuyon and Ahmad (2016), investors in Malaysian stock market are boundedly rational, and the stock market is bounded and adaptively efficient. Efficient market indicates the value of information to investors and imply that the analysts' forecasts are among the information utilized by investors. The studied period represents the convergence period to Malaysia Financial Reporting Standards (MFRS) from Malaysian Accounting Standards (MAS). This period is chosen instead of post-MFRS to avoid the confounding effect of new standards that may affect earnings number such as standard on revenue recognition (MFRS 15) that comes into effect in stages. The analyst forecasts data are taken from the I/B/E/S database and earnings managements are proxied by performance matched discretionary accruals developed by Kothari, Leone and Wasley (2005). We find evidence that analysts do not see through the reported earnings and use them in forming their forecasts. It shows that when the issue of endogeneity is taken into account, the association between earnings management and analyst forecast accuracy exists, and earnings management strongly affect analyst forecast accuracy.

This study contributes to the existing knowledge by addressing the possibility of endogeneity and dynamicity of the relationship between earnings management and analyst forecast accuracy. Findings of this study should be of interest to capital market participants that use analyst forecasts to estimate current and predict future firm performance. Therefore, the ability of analysts to provide the most accurate estimate is of importance to capital market participants. Findings of this study show that forecasts accuracy is positively related to earnings management. In other words, analyst ability to detect earnings management is somehow limited and they rely on reported earnings in forming their forecast. This indicates that investors need to be cautious on the recommendations by analysts and supplement the information with their own research on the potential companies to invest in. The paper proceeds as follows: Section 2 discusses related literature and develops our hypothesis. In Section 3, we discuss the theoretical basis for endogeneity and dynamic relation between accuracy of analyst forecast and earnings management, as well as explanation on panel dynamic system GMM method. Description of the data, sample selection and variables are presented in Section 4, followed by analysis and discussion of the results in Section 5. The conclusion is presented in Section 6.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

EARNINGS MANAGEMENT AND FORECAST ACCURACY

This study relates to two primary streams of literature. The first stream focuses on the reporting objectives and earnings management strategies of managers. Healy and Wahlen (1999) categorize earnings management incentives into three large groups: (1) capital market motivation, (2) contracting motivation, and (3) regulatory motivation. One of the capital market incentives is to achieve a set of pre-determined threshold earnings such as positive earnings; positive earnings relative to last years' earning and to meet or beat analyst forecast (Burgstahler & Dichev 1997; Degeorge, Patel & Zeckhauser 1999). Previous research suggests that meeting or beating analyst forecasts become the most significant benchmark for managers (Brown & Caylor 2005; Chen et al., 2010). Doyle, Jennings and Soliman (2013) conclude that managers opportunistically define non-GAAP earnings with intention to beat analyst forecasts. Similar conclusion is made by Huang, Pereira and Wang (2017) in their research on analyst coverage and the likelihood of meeting or beating analysts' earnings forecast. Their findings indicate that managers' tendency to meet analysts' forecast is higher when there is more coverage from the analysts. Prior studies identify three tools that managers use to meet or beat analyst forecasts. These are accrual manipulation (Burgstahler & Eames 2006; Habib & Hossain 2008), expectations management (Kasznik & Lev 1995; Matsumoto 2002) and real activities manipulation (Gunny 2010). Managers reduce the gap between reported earnings and the analyst's forecast by manipulating reported earnings upward or downwards to match the forecast made by analysts. Therefore, accuracy of analyst forecast may be an artifact of management's intentional activities for the purpose of meeting or beating the forecasts.

A second stream of accounting literature focuses on analyst forecast accuracy and its determinants. Empirical evidences suggest that forecast accuracy is associated with analyst characteristics (Bolliger 2004; Jacob, Lys & Neale 1999) as well as firm-level characteristics (Rogers & Stocken 2005). Analyst characteristics such as forecasting experience, forecast frequency, forecast portfolio, reputation, earnings forecast issuance, forecast boldness, and analysts' prior performance in forecasting revenues and earnings are found to determine revenue forecast accuracy (Lorenz & Homburg 2018). Firm-level characteristics that have been found to be associated with forecast accuracy are the effectiveness of firm-level governance mechanisms (Abernathy, Hermann, Kang & Krishnan 2013) and quality of the firm's information environment including disclosure and earnings quality (Beyer et al. 2010; Jiao, Koning, Mertens & Roosenboom 2012). Hutira (2016) highlights that firm-level characteristics such as size of the firm, the analyst coverage, the type of earnings and the change in earnings are still found to be significant determinants of forecasts accuracy despite regulatory and economic changes. Barker and Imam (2008) provide evidence that reported earnings is one of the most important items used by analysts. Salerno (2014) concludes that higher earnings quality is associated with improved forecast accuracy. Thus, the accuracy of analysts' earnings forecast is expected to be dependent on the quality of earnings information reported by the firm.

Managers sometimes use accruals to hide the real underlying economic performance of the firm to enhance

their welfare at the expense of investors and this is defined as earnings management (Hribar & Jenkins 2004). The opportunistic earnings management decreases informativeness of earnings number (Dechow & Schrand 2004; Francis, LaFond, Olsson & Schipper 2005). Earnings manipulation may mislead analysts into believing that the reported earnings are the "real" earnings. Past studies provide conflicting evidence on whether analysts recognize earnings management and hence take account of earnings management when preparing their forecasts. Some researchers show that analyst do not fully recognize the effect of earnings management (Elgers, Lo & Pfeiffer 2003; Shane & Stock 2006). On the other hand, Ettredge, Shane and Smith (1995) found that analysts use alternative information to effectively adjust their forecasts for the effect of the earnings management. These results indicate analysts' ability to see through the number (Burgstahler & Eames 2003; Liu 2005).

Prior studies on meeting or beating analyst forecast in which managers manage earnings to meet analysts forecast mainly treat the two variables as exogenous (Ayres et al. 2017; Salerno 2014; Beyer 2008; Beyer et al. 2010). In other words, in investigating whether earnings management is related to analyst forecast, previous studies ignore the possibility that forecast may also be influenced by earnings management. Whilst analysts are trained in finance and possess substantial industry background knowledge, they still rely on earning numbers provided by managers (Kim et al. 2015). Analysts may also be motivated to disclose earnings forecast that accurately predict reported earnings, especially when their compensation or reputation depends on forecasting precision (Jackson 2005). As suggested by Beyer et al. (2010), more research on the association of analyst forecast accuracy and earnings management are needed to understand the relationship between managers' discretion in reporting process and analysts forecasting behavior.

THE INFLUENCE OF ANALYST FORECAST ACCURACY ON EARNINGS MANAGEMENT

Previous research found that managers sell more and achieve higher stock return after just meeting or beating analyst forecast (Cheng & Warfield 2005; Kasznik & McNichols 2002). Consistent with this, other studies investigate whether firms manage earnings to meet or slightly beat analyst forecast. Recent findings provided by Huang et al. (2017) indicate that the tendency to manage earnings to beat analysts' forecasts is higher when the company received high coverage from the analysts, supporting earlier findings (Burgstahler & Eames 2006; Dechow & Skinner 2000; Matsumoto 2002). However, Habib and Hossain (2008) do not find any significant evidence of earnings management to meet or beat analyst forecast in Australia.

There are at least three sources of managers' motivation to meet or beat analyst forecast; (1) the presence of independent board directors who stress price performance,

(2) market pressure that removes managers of undervalued firms, and (3) equity-based executive compensation contracts (Brown & Higgins, 2001). Research on meeting or beating analyst forecast in the USA has been based on stock option-based executive compensation schemes as the main managerial incentives to meet or beat analyst forecasts (Cheng & Warfield 2005). Executive compensation is used as managerial entrenchment mechanisms in firms with separation of owner and control (Kuhnen & Zwiebel 2008). Bergstresser and Philippon (2006) show that executive directors engage in opportunistic earnings management to improve earnings and stock prices. East Asian economies, including Malaysia have a high ownership concentration of family firm and founders who are executive directors in the firm, which open up to the possibility of opportunistic earnings management. Studies on this matter for Malaysia is somehow limited.

Managers in the environment with diffuse-ownership such as USA may engage in opportunistic behavior to meet or slightly beat analyst forecast to maximize their equity-based compensation or to facilitate entrenchment. Managers in the concentrated-ownership environment like Malaysia may also attempt to meet analyst forecast to decrease scrutiny of their private rent seeking activities or to facilitate entrenchment of family members in management positions. Therefore, there is a possibility of incentive to manipulate reported earnings to meet or slightly beat analyst forecast in Malaysia. Analyst forecasts error is eliminated when managers manage earnings to meet analyst forecast and this leads to higher forecast accuracy. Hence, it is expected that when managers manage earnings to meet analyst forecast, the forecast accuracy will be higher. In other words, the relationship between forecast accuracy and earnings management is positive in nature.

THE INFLUENCE OF EARNINGS MANAGEMENT ON ANALYST FORECAST ACCURACY

Analysts as information intermediaries collect and process publicly available and private information. Previous studies provide evidence that reported earnings is one of the most important items used by analysts (Barker & Imam 2008; Shukor et al. 2011). As a result, it is likely that analyst's ability to forecast earnings accurately depends on the quality of reported earnings. High quality earnings number is considered as good predictor of future operating performance (Dechow & Schrand 2004). Earnings number consists of two parts, cash flows and accruals. Accruals are more subjective and associated with future estimates while cash flows are objective to realize. Therefore, managers primarily use accounting accruals as a way for managing earnings.

Prior literature shows that managers may use discretion in accruals to convey their private information regarding earnings for informative reasons. On the other hands, managers may also use discretionary accrual to distort the reported earnings for opportunistic reasons, which

reduce the predictive ability of earnings. Whether earnings management is done for the purpose of informativeness or opportunistic reasons, the quality of reported earnings is compromised. Financial analysts are trained professionals with knowledge on financial matters and are expected to use various resources in coming up with their forecasts. The analysts are therefore expected to see through earnings number. In other words, they are expected to be able to detect earnings management and incorporate this in their forecasts. However, prior research indicates that this is not the case. For example, Wang et al. (2015) show that analysts forecast is influenced by forecasts made by the management. Kim et al. (2015) provide evidence that analysts rely on information provided by companies in forming their forecasts. Ayres et al. (2017) show that the use of alternative accounting method does affect the accuracy of analyst forecasts. These findings lead us to conclude that analysts' ability to detect earnings management is somehow limited. Hence we hypothesize that given earnings are managed to meet the analysts' forecast, the forecast accuracy is higher given higher earnings management. In other words, the relationship between earnings management and forecast accuracy is positive in nature and can be stated as follows:

H$_1$: Analyst forecast accuracy is positively associated with earnings management.

The discussions leading to this hypothesis show that the relationship between earnings management and forecast accuracy as a reciprocal or endogenous relationship. In other words, earnings may be managed to meet analysts' forecast and at the same time analysts use reported earnings in forming their forecasts. Hence, the forecast accuracy and earnings management are positively related. Only one hypothesis is stated because the statistical test employed will incorporate the endogeneity issue in the analysis. Previous studies have approached the relationships between these two variables as two separate relationships, meaning one hypothesis testing the influence of earnings management on forecast accuracy and another hypothesis investigates the influence of analysts forecast on earnings management. This study incorporate the endogeneity issue by using GMM in testing the relationship between forecast accuracy and earnings management. Discussion on endogeneity issue is presented next.

ENDOGENEITY BIAS IN THE RELATIONSHIP BETWEEN EARNINGS MANAGEMENT AND ANALYST FORECAST ACCURACY

Potential sources of endogeneity are unobservable heterogeneity, simultaneity and the possibility that the current values of the explanatory variables are a function of past dependent variables, which is called dynamic endogeneity (Wintoki, Link & Netter 2012). Endogeneity leads to biased and inconsistent parameter estimates (Roberts 2011). There are several endogeneity issues in

the relationship between forecast accuracy and earnings management.

Analysts predict earnings for firm *i* based on reported earnings in time *t-1* to achieve a particular level of accuracy at time *t*. Besides current reported earnings, analysts also seek and process other publicly available information such as past earnings and prices to predict future earnings (Barker & Imam 2008). Analysts consistently point to the quality of firm's reported earnings as an important factor in analyst forecast accuracy (Barker & Imam 2008). As a result, it is likely that analyst's ability to forecast earnings accurately depends on the quality of reported earnings. One way of measuring earnings quality is earnings management. Hence earnings management may dynamically affect forecast accuracy.

Another source of endogeneity is unobservable heterogeneity which occurs when a variable that affects both the outcome and explanatory variables is not included in the regression model (Wintoki et al. 2012). Several factors might simultaneously influence analyst forecast accuracy and earnings management, potentially making an omitted variable bias. For example, the quality of a firm's accounting policy influence analyst forecast accuracy and also determines the leeway that managers have in reporting income. Similarly, the corporate governance of the firm might impact forecast accuracy as well as the potential and incentives for earnings management. To account for this possible bias, it is necessary to control for unobservable heterogeneity across observations.

Other source of endogeneity is simultaneity which happens when the outcome and explanatory variables are simultaneously determined. Based on accounting literature, simultaneity can exist in the earnings management and analyst forecast accuracy relationship. Managers may manage earnings to meet or beat analyst forecast (Brown & Caylor 2005; Chen et al. 2010) and hence, forecasts error is eliminated when managers manage earnings to meet analyst forecast and this leads to higher accuracy. At the same time, analyst may make their forecast for any period with a view that managers manage earnings in that period and consider some adjustment in their forecast (Burgstahler & Eames 2003; Ettredge et al. 1995; Liu 2005). Thus, while earnings may be managed to meet or beat analyst forecast which lead to higher forecast accuracy, the reverse will also be true, earnings management may also be affected by forecast accuracy. In this case, earnings management and forecast accuracy are simultaneously determined.

Ordinary least square (OLS) regression assumes that the right-hand side variables should be independent of error terms. However, if there is a bi-directional causation between the dependent (left-hand side) variables and the explanatory (right-hand side) variables, this condition is not satisfied and the estimated coefficients produced by OLS regression are biased and inconsistent. However fixed-effects improve OLS as they reduce endogenous effect resulted from unobservable heterogeneity by using the firm as the panel unit (Jeffrey 2002). A fixed-effect regression would be consistent only if current values of

the explanatory variables are completely independent of past realizations of the dependent variable. This means that the presence of lagged value of dependent variable would bias fixed-effects estimates.

Using the panel dynamic GMM, we can reduce these endogeneity problems. Dynamic GMM is said to be better than OLS or traditional fixed-effects estimates in three aspects (Wintoki et al. 2012). First, unlike OLS estimation, it can include firm-fixed effects to consider for fixed unobservable heterogeneity. Second, unlike traditional fixed-effect estimates, it allows current value of independent variable to be related to past value of dependent variable. Third, unlike either OLS or traditional fixed effects estimates, a key aspect of dynamic panel GMM estimator is that if there is endogeneity issue in the relationship between dependent and independent variable, it employs a set of internal instruments included within the panel itself. For example, lagged values of earnings management and analyst forecast accuracy can be used as instruments for current realizations of them.

There are two methods to solve the endogeneity issues namely Dynamic Panel Difference GMM and Dynamic Panel System GMM. Areliano and Bover (1995) argued that Difference GMM provide weak instruments in small samples and larger variance asymptotically which lead to biased parameter estimates. This study applies the System GMM estimator proposed by Blundell and Bond (1998) as the System GMM estimator has better asymptotic and finite sample properties than Difference GMM.

METHODOLOGY

DATA AND SAMPLE SELECTION

Sample consists of firms listed on the Main Board of Bursa Malaysia. Sample selection consists of Malaysian firms with six-year period data on analyst forecast from 2007 to 2012. As the research design of this study is longitudinal, firms must exist throughout study period. A total of 720 firms were excluded due to unavailability of data on analyst forecast throughout the period. The sample selection is detailed out in Table 1.

As depicted in Table 1, from a total of 151 companies with complete information, a total of 27 firms from financial and REITs industry are excluded from the sample because REITs is a highly regulated industry and subjected to different rules and regulations. A further 5 firms are excluded due to lack of observations needed to measure earnings management. Unavailability of data for measuring control variables leads to a further 9 firms to be excluded from analysis. The final sample consists of 110 firms with six years data, resulting in 660 firms-year observations. The data are extracted from DataStream including (I/B/E/S) database.

Operationalization of Variables This study hypothesizes that although analysts are trained professional, their ability to see through the reported earnings is somehow limited. Since managers may manage earnings to meet the forecasts, the forecast accuracy may be higher because analysts use these managed earnings in forming their forecasts. The relationship between forecast accuracy and earnings management is therefore reciprocal and positive in nature. By using dynamic simultaneous equations model, the relationship between forecast accuracy and earnings management where forecast accuracy is the dependent variable and earnings management is the independent variable is tested taking into account the influence of earnings management on forecast accuracy.

Control variables consists of size of the firm, analysts followings, loss and surprise are included in the model for these have been found to influence analysts' forecasts accuracy. Studies in the earnings management literature have shown that firm size is inversely related with earnings management as larger firms are more likely to manage earnings upward as an effort to maintain investor's perception and maintaining firm's reputation (Watts & Zimmerman, 1990). Thus, we include the logarithm of the total asset at the end of year t as a proxy for firm size as control variable. Analyst following is calculated as the number of analysts who issue at least one forecast for the fiscal year. Firms followed by more analysts manage their earnings less (Degeorge, Ding, Jeanjean & Stolowy 2012; Yu 2008). Thus, the influence of analyst following on earnings management could be negative. At the same time, Alford and Berger (1999) argued that increasing the number of analysts following a firm causes an increase in competitiveness between analysts and finally leads to an

TABLE 1. Sample Selection

Firms	Number
Total number of firms listed on the Main Board of Bursa Malaysia	871
Firms with missing data on analyst forecast	(720)
Firms belonging to financial industry and REITs	(27)
Firms with missing industry-specific requirement for earnings management measurement	(5)
Firms with missing actual earnings number and data needed to measure earnings management	(9)
Final number of firms	110
Final sample (110 * 6 years)	660 firm years

improvement in forecast accuracy. Overall, these studies expects positive association between analyst forecast accuracy and analyst following. Loss and surprise are also included as control variable because previous studies find that type of earnings (profits or losses) and the variation of earnings (growth or fall or also termed as surprise) as two main determinants of forecast accuracy in the emerging market and developed countries (Coën, Desfleurs & L'Her 2009). Loss is dummy variable given as 1 if firm has a negative earnings and zero otherwise. Surprise is measured from the difference between current year and last year's earnings.

This study uses one-year lagged forecast accuracy in the second equation to control for the serial correlation. The analyst's ability to make accurate forecast can also change over time or with experience. Analysts are found to become better forecasters as their experience increase (Mikhail, Walther & Willis 1997; Mohanram & Sunder 2006). Basu and Markov (2004) however document that analysts' forecasts are inefficient with respect to their most recent forecast error. In other words, they show that the forecast error (as opposed to forecast accuracy) for current annual earnings is correlated with the previous annual forecast error, hence the lagged forecast accuracy is also included in the model. The dynamic models for this study are as follows:

Regression Model:

$$ACCY_{it} = \beta_0 + \beta_1 EM_{it-1} + \beta_2 ACCY_{it-1} + \beta_3 EM_{it} + \beta_3 FOLL_{it} + \beta_4 SIZE_{it-1} + \beta_5 LOSS_{it} + \beta_6 SURPRISE_{it} + \delta_{it}$$

Where:

ACCY	=	forecasts accuracy
EM	=	earnings management
FOLL	=	analysts followings
SIZE	=	firm size
LOSS	=	firms with losses (dichotomy variable given 1 if firm has a negative earnings and zero otherwise)
SURPRISE	=	the difference between current year and last year's earnings.

Earnings management is measured by discretionary accrual as it has been shown that managers primarily use accounting accruals as tools for managing earnings due to less awareness, less costs, and easiness to manipulate (Jones 1991). There is a possibility of serial correlation where if accruals adjustments is reversed in the next accounting period, lagged accruals is negatively related to current accruals (Dechow, Hutton, Kim & Sloan 2012). This suggests that the nature of earnings management is dynamic and related to previous earnings management, hence included in the model as well. This study chose performance matching on return on assets which was

introduced by (Kothari et al. 2005). It is a modified Jones model (1991) that controls for the effect of performance on calculated discretionary accruals, as follows:

$$TAcc_{it} = \alpha_{1t} + \alpha_{2t}\Delta REV_{it} + \alpha_{3t}PPE_{it} + \alpha_{4t}ROA_{it} + \epsilon_{it}$$

Where:

TAcc	=	Total accrual and equals net income before extraordinary items minus cash flow from operation
ΔREV	=	Changes in the sales revenue
PPE	=	Gross property, plant and equipment
ROA	=	Return on asset
i	=	Firm
t	=	Time

All variables except ROA are scaled by lagged total assets. Residuals from the estimation of the above model are discretionary accruals. Positive discretionary accruals mean income increasing manipulation, while negative discretionary accruals show income-decreasing manipulation. Earnings can be managed upward or downward. Since this study is not interested in the direction of the earnings management, but rather whether earnings management exist or not, we take the absolute value as is commonly done in studies on earnings management.

Following Lang and Lundholm (1996), accuracy of analyst forecast is estimated by the negative of the absolute value of the difference between consensus earnings forecast and actual earnings, scaled by the stock price at one year before the forecasted year. The following formula describes the accuracy of analyst forecast:

$$ACCY_{it} = \frac{\left| \text{consensus forecast}_{it} - \text{Actual EPS}_{it} \right|}{P_{it-1}}$$

Where:

Consensus Forecast	=	the mean I/B/E/S consensus forecast of period t (the period starting three months before the year)
EPS	=	actual earnings per share
P	=	the stock price at the end of period t-1.

EMPIRICAL RESULTS

DESCRIPTIVE ANALYSIS

Table 2 shows the descriptive statistics of the variables in this study. Panel B of Table 2 reports descriptive statistics for continuous variables after outlier treatment (replacement of univariate outliers). The descriptive on original data (not shown) indicates that data on accuracy (ACCY), earnings management (EM), Leverage (LEV) and SURPRISE have high skewness and kurtosis values indicating non-normality of the data. The z-score test

TABLE 2. Descriptive Analysis

Panel A: Dichotomous variables

Variable	Category	Frequency	Percent
LOSS	1	591	89.545
	0	69	10.455

Panel B: Continuous Variables

Variable	Mean	Median	Std. Deviation	Min	Max
EM	0.077	0.048	0.086	0.000	0.427
ACCY	-0.051	-0.023	0.073	-0.376	0.000
FOLL	6.700	4.000	6.487	1.000	28.000
LEV	0.234	0.219	0.217	0.000	1.147
SIZE	14.070	13.939	1.445	7.947	18.298
SURPRISE	0.004	0.090	0.210	-0.887	2.197

EM= Earnings Management; ACCY= Forecast Accuracy; FOLL= Analyst Following Lev= Leverage; SIZE= Size; SURPRISE= Surprise; LOSS= companies with negative earnings

is performed to identify outliers and the results indicate there are 34 cases of univariate outliers. Windsorization is performed to replace the extreme values to tackle the outlier's problem. The descriptive analysis is repeated on this new set of data and the results are summarized in Table 2.

On average, the absolute value of earnings management is 0.077, which is of similar magnitude as found by previous research in Malaysia and Hong Kong (Jaggi et al. 2009; Saleh, Iskandar & Rahmat 2005). Mean and median of accuracy is negative as expected given that the absolute value of the forecast error is multiplied by -1, so greater value shows greater accuracy. Mean forecast accuracy (ACCY) is -0.051. Black and Carnes (2006) reported that on average accuracy of analyst forecast are -0.095 in Malaysia in the period 1989 until 2002. This result indicates that forecast accuracy in Malaysia has relatively improved.

Results of Pearson correlation analysis is summarized in Table 3. The correlation matrix shows the univariate relationships between variables. Besides indicating bivariate correlation between variables, the correlation matrix is also used as an early indicator of multi-collinearity problem. Overall, as shown in the Table 3, correlations between independent variables used in the model are relatively small and do not exceed 0.8, indicating no multi-collinearity issues among variables (Gujarati 2004).

The correlation coefficient between earnings management (EM) and forecast accuracy (ACCY) is negative albeit weakly at 0.1 level. The negative relationship suggests forecast accuracy is higher for firms with low earnings management. The correlation analysis however do not take into account the possibility of reciprocal relationship between earnings management and forecast accuracy. This is further explored in hypotheses testing.

HYPOTHESES TESTING

Tables 4 shows the results of the proposed model explained in the methodology. The hypothesis predicts forecast accuracy to be positively related to earnings management considering that earnings management at the same time may be influenced by analysts' forecasts. In using dynamic GMM estimator, some requirements need to be fulfilled. This includes no serial correlation of the second order error terms and exogeneity of the instrumental variables. Serial correlation and the Hansen test are conducted to test these requirements (Roodman 2006). The significant second-serial correlation AR(2) means the estimated coefficients are biased.

In general, the results in Table 4 show that most variables are significantly correlated to dependent variable, analysts' forecasts accuracy. The value of AR(2) is not

TABLE 3. Result of Pearson correlation

	EM	ACCY	FOLL	LEV	LOSS	SIZE	SURPRISE
EM	1.000						
ACCY	-0.14*	1.000					
FOLL	-0.001	0.186***	1.000				
LEV	0.19***	-0.001	0.19**	1.000			
LOSS	0.013	-0.35***	0.62**	0.172***	1.00		
SIZE	-0.038	0.047	-0.089**	0.18**	-0.06	1.000	
SURPRISE	0.125**	-0.099**	-.089**	-0.017	0.09**	-0.15**	1.000

*** Significant at 0.01 level (2-tailed) ** significant at 0.05 level (2-tailed) * significant at 0.1 level (2-tailed)

significant indicating that there is no serial correlation problem. The Hansen and over-identification tests are also not significant which indicate that our instruments are exogenous and the estimates are reliable. The estimated regressions in Table 4 pass both specification tests. These findings suggest that the equations are adequately-specified and the instruments employed in the analysis are valid.

Results in Table 4 show that the coefficient of one-year lagged analyst forecast accuracy is positive and statistically significant at 1% level, consistent with Markov and Tamayo (2006). They argued that a rational learning-based explanation can be used for the serial correlation in analysts' earnings forecast errors (as opposed to forecast accuracy) as analysts are uncertain about the underlying parameters of the earnings generating process and learn rationally about these parameters over time (Clarke & Subramanian 2006; Mikhail et al. 1997). These findings suggest that past values of analyst forecast accuracy should be considered as an important variable to control for the dynamic nature of the analyst forecast accuracy in the relationship between earnings management and analyst forecast accuracy.

The main interest of this study is to test whether forecast accuracy (ACCY) is influenced by current earnings (EM) and prior year's earnings, EM(t-1). Results presented in Table 4 show that earnings management at times t-1 is positively related to analyst forecast accuracy and significant at 1% level. This result is not consistent with Bradshaw, Richardson and Sloan (2001), Louis (2004) as well as Teoh and Wong (2002) that find positive relationship between earnings management and subsequent earnings forecast errors (opposite of forecast accuracy). In other words, these studies find that forecast accuracy is negatively related to earnings management indicating that analysts may have incorporate the reported earnings and adjust for this. Our finding however is in the

line with Ettredge et al. (1995) which provide evidence that analysts somehow unable to incorporate earnings management in forming their forecasts and hence take the reported earnings on face value. The results provided in the Table 4 also show positive relationship between earnings management and current forecast accuracy. This is in line with a more recent findings by Ayres et al. (2017), which show that the use of different accounting policy is not captured by analysts in forming their forecasts. Research by Kim et al. (2017) as well as Wang et al. (2015) also concludes that analysts somehow are limited in their ability to detect earnings management and rely on reported earnings and information provided by management.

This study finds positive relationship between earnings management and forecast accuracy which shows that analysts forecast is in line with earnings management. These findings imply that analysts either does not anticipate the full impact of earnings management on earnings or do anticipate earnings management but prefer to include it in their forecasts in order to enhance their forecast accuracy, or that the analysts are unwilling to sacrifice forecast accuracy for the sake of giving forecasts that are more representative of the firm's true performance. In short, given that the earnings may be managed to meet analysts forecast, the results of this study show that analysts use the reported earnings in forming their forecasts resulting in higher forecast accuracy.

Additional analysis is carried out to see whether the relationship between analyst forecast accuracy and earnings management changes with alternative measurement of earnings management. We re-examine the relationship between earnings management and forecast accuracy incorporating non-linearity into discretionary accrual models (Ball & Shivakumar, 2006). We find that the results (not shown) are stable and qualitatively similar under both methods. There are slight changes in the t-statistics, but the coefficients remain the same.

TABLE 4. Regression results for hypothesis testing

Dependent variable = forecast accuracy (ACCY)			
Independent Variables	Coef.	t-statistics	p-value
ACCY (t-1)	0.223	3.531	0.001***
EM (t-1)	0.0923	1.700	0.091*
EM (t)	0.0553	1.671	0.098*
FOLL	0.00381	2.055	0.043**
LOSS	-0.0419	-1.951	0.054*
SIZE	-0.0141	-1.641	0.104
SURPRISE	0.01981	0.800	0.428
f (value)		0.000	
AR(1)		0.010	
AR(2)		0.141	
Hansen test of over-identification (p-value)		0.303	
Diff-in-Hansen tests of exogeneity (p-value)		0.417	

***Significant at 0.01 level. ** Significant at 0.05 level. * Significant at 0.1 level.
ACCY (t-1) is prior year's forecast accuracy; EM (t-1) is previous year's earnings management, EM (t) is current year's earnings management; FOLL is analyst' followings; LOSS is firms with negative earnings; SIZE is firm size and SURPRISE is the difference of earnings between last year and current year.

Conclusion

This study investigates the relationship between earnings management and analyst forecast accuracy for a sample of Malaysian firms listed on Bursa Malaysia. This study uses Panel Dynamic System GMM estimator to account for unobservable heterogeneity, simultaneity and dynamic endogeneity issue on the relationship between analyst forecast accuracy and earnings management. The results show that analyst forecast accuracy is positively and significantly related to earnings management taking into account that earnings may be managed to meet the forecasts. The positive and significant relationships between forecasts accuracy with current earnings management and prior year earnings management indicates that financial analysts use reported earnings numbers provided by firms and somehow limited in their ability to detect earnings management. Failure to acknowledge earnings management and use earnings number as reported by firms lead to higher forecast accuracy. Forecast accuracy is measured from the difference between forecasted earnings and actual earnings. Since analysts use the reported earnings and fail to see through the numbers, their forecast will turn out to be close to actual earnings reported by firms, hence higher forecast accuracy Hence, a key point related to earnings management and analyst forecast accuracy is that the accuracy of analyst forecast may partly due to earnings management. Evidence from this study suggests capital market participant to be more cautious when using analysts' forecasts in valuing firm's performance. Since analyst forecast is becoming more important and substantial especially for institutional investor, analysts should be more diligent and treat earnings number reported by firms as only one input and not the only input in forming their forecasts. Therefore, it is important for analysts to be more cautious when they use earnings number in making a forecast and analysts must equip themselves with more knowledge especially on the production of financial information.

The results of this study need to be interpreted with caution due to several limitations. The main limitation of this study is the lack of data on analyst forecast on the I/B/E/S database limiting number of samples. The six-year data in this research may not be long enough to comprehensively explain the dynamic nature of earnings management and forecast accuracy association. This study also excluded firms from ACE Market from the sample since firms in ACE market have different characteristics from firms listed on the Main market. This exclusion may limit the ability to generalize the findings. Future studies can investigate the two-way relationship between earnings management and forecast accuracy in other countries where the incentives for earnings management is different.

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