CHAPTER 4

Research Design

This chapter presents the (*i*) data source, (*ii*) sample selection, (*iii*) measurement of study (i.e., accounting conservatism, management earnings forecast bias, operational uncertainty, corporate governance, information asymmetry and stock market reaction), and (*iv*) data analysis method (i.e., the cross-sectional regression analyses and control variables of regression model).

4.1 Data source

The sample in this study comprises of listed firms in the Stock Exchange of Thailand (SET) that issued management earnings forecasts during the testing period of 2005-2012. Accounting and financial data were obtained from the Thomson Financial DATASTREAM database and the SET Market Analysis and Reporting Tool (SETSMART) on-line services. [9] Corporate governance structure and corporate management data were collected from the listed companies' annual registration statements (Form 56-1), annual reports (Form 56-2) and official websites. The management earnings forecast data for each fiscal year were obtained from the NEWSCENTER database. Other new events related to listed companies were obtained from the SETSMART database.

In Thailand, aside from the channels made available by the Stock Exchange of Thailand (e.g., the SETSMART database and SET website), another way to collect the public management forecast disclosures data is from the NEWSCENTER database. [10]

[9] The DATASTREAM database and the SETSMART database can be accessed from the Financial Lab, Faculty of Business Administration, Chiang Mai University.

[10] A list of information sources available on the NEWSCENTER database is in Appendix B.

This is because most firms release their forecasts through business press, newspapers and business journals.

4.2 Sample selection

The sample in the study comprised of the listed firms in the SET that issued the annual management earnings forecasts during the testing period of 2005-2012. Firms in the financial and banking industry were excluded from this study since the nature of operations of these firms are subjected to specific rules and regulations. Management earnings forecast disclosures were manually collected from the SETSMART database and the NEWSCENTER database. The NEWCENTER[11] database is a real-time on-line news and information service. It contains newspapers, magazines and reference articles from research firms, securities brokers, financial institutions, government agencies and regulatory bodies published in Thailand.

In the sample selection process, only point and range forecasts were included in the study because, in comparison to other types of forecasts (such as open-ended and qualitative forms), quantitative earnings forecast information are the most well-defined (Jarutakanont and Supattarakul 2012; Rogers and Stocken 2005). The collection method in this study followed that of Jarutakanont and Supattarakul (2012, 2013) and Gong, Li, and Xie (2009). The key criteria used in collecting management earnings forecast issued data were:

1. The earnings forecast must contain various keywords including "expected earnings," "estimates earnings," "predicted earnings," etc. This criteria is based on those by Jarutakanont and Supattarakul (2012, 2013). The first criterion ensures that the news article discloses the management earnings forecasts, not the actual performance of companies.

[11] Another available source used to acquire management forecast information, in addition to press releases, is through analyst interviews. The difference between the two sources is press releases are available to the public while the accessibility of analyst interviews is limited to a group of people. Since the focus of this study was based on publicly disclosed management forecasts, the discussion of analyst interviews as a source of forecast information is beyond the scope of this study.

2. The earnings forecast must be based on the company's news. The purpose of the second criterion is to ensure that company forecasts found in chosen articles are estimated by the firm's management, and not by news reporters or financial analysts as suggested by Jarutakanont and Supattarakul (2012, 2013).

3. Earnings forecast data are limited to the initial, or first management forecasts. Rogers and Stocken (2005) suggested that initial annual forecasts have a longer timeline between the day forecasts are first released and the day when actual earnings are publicly announced. This longer period allows the manager to take advantage of issuing deceptive forecasts which results in investors having to judge the plausibility of the issued forecasts. In addition, the initial management forecasts reflect the manager's knowledge of the firm's annual accounting earnings (Gong, Li, and Xie 2009). Hence, an initial or the first earnings forecast captures managements' expectations and true beliefs about the firm's future prospects. Therefore, this study took into account the initial annual earnings forecasts instead of forecasts that have been updated or earnings pre-announcements.

4. The earnings forecast of each company must be found in at least two different data sources. The fourth criterion confirms that the numbers retrieved from the management earnings forecasts are valid and can be used in the analysis.

Based on the criteria above, the method of obtaining the final sample firms used to study the first main research objective, which was aimed to examine the relationship between management earnings forecast bias and accounting conservatism, is as follows. An initial number of 1,267 firm-years were retrieved from the databases. These data included annual earnings forecasts disclosed during the fiscal years 2005-2012 and met the specified selection criteria. Next, earnings forecasts that were either disclosed prior to the previous year's earnings announcement date (i.e., before April 1 of current year) or after the year's earnings announcement data (i.e., after March 31 of the subsequent year) were eliminated from the list. [12] For example, in collecting data of sample firms from the year 2005 (forecasted period is between April 1, 2005 to March 31, 2006), forecasts that were released on February 20, 2005 or June 15, 2006 were excluded. Therefore, 178 firm-

[12] See the time frame for collecting management earnings forecast data in Figure 1.

years were removed from the study. Consequently, 73 firm-years with insufficient financial data (during 2000-2012) to calculate the conservatism measure and all control variables in the regression model were later removed. A final sample of 1,016 firm-years (235 distinct firms) were included in this study.

	Firm-years
Annual management earnings forecasts for fiscal years 2005-2012:	
Point and range annual management earnings forecasts	1,267
Less: Earnings forecasts that were disclosed prior to last year's earnings announcement date (before April 1 of current year) or after the year's earnings announcement date (after March 31 of the subsequent year)	(178)
Management earnings forecasts issued after year *t* earnings announcement but before year *t*+1 earnings announcement	1,089
Less: Disclosure firms that did not have sufficient data (during 2000-2012) to calculate conservatism measure and all control variables in regression model	(73)
Final Sample	1,016

The second and third main research objectives of this study were to investigate the effects of accounting conservatism on the stock market reactions (stock returns) to management earnings forecast disclosures. Based on the sample selection under the first main research objective (as described above), the sample employed in examining the effects of accounting conservatism on the stock market reactions to management earnings forecasts disclosure is as follows. Based on this study's first objective in sample selection, 1,089 annual management forecasts during the period 2005-2012 were initially acquired. Then, 146 firm-years were removed from the total sample after filtering out samples that had other news events occurring three days prior to and three days after the management forecasts were released. This process was used to correct the problem of confounding effect of other events. In addition, 20 firm-years were removed due to insufficient data regarding stock returns and other financial data in the DATASTREAM database. As a

result, a total of 923 firm-years (233 distinct firms) of Thai listed companies were included in the study.

	Firm-years
Management earnings forecasts issued at or after year *t* earnings announcement but before year *t*+1 earnings announcement	1,089
Less: Management earnings forecasts with other events around disclosure date (three days before and three days after)	(146)
Less: Disclosure firms without sufficient data (during 2000-2012) to calculate conservatism measure and all control variables in regression model	(20)
Final annual management earnings forecasts for fiscal years 2005-2012	923

As described above, to control for confounding effects from other events, this study excluded management earnings forecasts that had other news events during the 7 days (-3 to +3) surrounding the management forecast release date. "Other news events" included: *i*) earnings announcements, both yearly and quarterly; *ii*) dividend announcements; *iii*) new stock issuance announcements; and *iv*) share repurchase announcements. The news related to other events were identified from annual reports (Form 56-2) and Form 56-1, company and securities information in the SET website, the SEC website and the SETSMART database.

4.3 Measurement of study

4.3.1 Measurement of accounting conservatism

To test the research hypotheses, this study needs a firm-year specific conservatism measurement that reflects the earnings' tendency to recognize bad news as losses more quickly than to recognize good new as gains. This study used Khan and Watts's (2009) model, *C_SCORE*, to measure the degree of accounting conservatism (by calculating Equation (3)).

Khan and Watts (2009) established a firm-year measurement of conservatism (*C_SCORE*) and applied it to study the events involving a change in accounting conservatism. They show, for example, that conservatism increases in response to the rise of information asymmetry, idiosyncratic uncertainty, and the likelihood of litigation. *C_SCORE* has been used in recent studies on conservatism, such as Chi, Liu, and Wang (2009), DeFond, Lim, and Zang (2010), and Chen, Chen, and Wang (2010).

Khan and Watts' (2009) *C_SCORE* measure is an extension of Basu's (1997) measure in which accounting conservatism is defined as the degree to which reported earnings incorporate the firms expected losses in a more timely fashion than expected gains. This definition of conservatism implies the conditional conservatism is measured by the asymmetric timelines of earnings (Watts 2003; Roychowdhury and Watts 2007; Wang, Hogartaigh, and Zijl 2009; Artiach and Clarkson 2011; Hui, Klasa, and Yeung 2012; Ball, Kothari, and Nikolaev 2013).

To obtain the *C_SCORE* measure, Khan and Watts' (2009) approach begin with the Basu' s (1997) model, which is developed to capture the asymmetric timeliness of earnings in recognizing bad news versus good news. Specifically, the Basu's model can be written to allow coefficients to vary across firms and over time as follows:

$$X_i = \beta_0 + \beta_1 DR_i + \beta_2 RET_i + \beta_3 DR_i \, x \, RET_i + \varepsilon_i \quad (1)$$

where; X_i represents earnings divided by fiscal year market value of equity of the firm *i*, RET_i is a proxy for the news about firms' performance (positive returns reflect "good news", while negative returns reflect "bad news") which calculate from the cumulative stock returns of firm *i* over the 12 months beginning ten months prior to the end of fiscal year, DR_i is indicator variable that takes the value of one if returns (RET_i) are negative, and zero otherwise.

The coefficient on RET_i measures the timeliness of earnings with respect to positive return (i.e., good news). The coefficient on DR_i x RET_i measures the incremental timeliness of earnings with respect to negative returns (i.e., bad news) and indicates the difference in sensitivity of earnings to good news and bad news, that is, the asymmetric timeliness of earnings.

The firm-year specific coefficients, β_2 (timeliness of good news, *G_SCORE*) and β_3 (the extent of conservatism, *C_SCORE*) are then expressed by linear functions of firm-year specific characteristics that are correlated with timeliness of good news and conservatism:

$$G\_SCORE_i = \beta_2 = \mu_1 + \mu_2 SIZE_i + \mu_3 MB_i + \mu_4 LEV_i \quad (2.1)$$

$$C\_SCORE_i = \beta_3 = \lambda_1 + \lambda_2 SIZE_i + \lambda_3 MB_i + \lambda_4 LEV_i \quad (2.2)$$

The above explanations show how the concept of conservatism is operationalized using Basu's (1997) definition. Khan and Watts (2009), further, expand Basu's (1997) model to include firms' characteristics in Basu's model. Khan and Watts propose that size of firm, market-to-book ratio and financial leverage (which are proxies for information asymmetry, idiosyncratic uncertainty, and the likelihood of litigation, respectively) should be factors determined conservative level.

Based on Khan and Watts' conservatism measure or *C_SCORE* is measured by the following equation.

$$C\_SCORE_i = \lambda_1 + \lambda_2 SIZE_i + \lambda_3 MB_i + \lambda_4 LEV_i \quad (3)$$

where; $SIZE_i$ is the natural logarithm of market value of common equity of firm *i*; MB_i, the market-to-book ratio, is defined as the market value of common equity divided by the book value of common equity at the end of the year; and LEV_i is leverage ratio measured by sum of long-term debt and short-term debt deflated by market value of common equity at the end of the year.

Khan and Watts employ the following regression model (Equation (4)) to estimate coefficients λ_1, λ_2, λ_3, and λ_4 and use these parameters to relate with conservative's determinants. Parameters of λ_1, to λ_4 are derived by the adjusting model of Basu' model as follow:

$$\begin{aligned} X_i = {} & \beta_0 + \beta_1 DR_i + RET_i (\mu_1 + \mu_2 SIZE_i + \mu_3 MB_i + \mu_4 LEV_i) \\ & + DR_i \, RET_i (\lambda_1 + \lambda_2 SIZE_i + \lambda_3 MB_i + \lambda_4 LEV_i) \\ & + (\delta_1 SIZE_i + \delta_2 MB_i + \delta_3 LEV_i + \delta_4 DR_i SIZE_i + \delta_5 DR_i MB_i + \delta_6 DR_i LEV_i) + \varepsilon_i \end{aligned} \quad (4)$$

where; X_i represents earnings divided by fiscal year market value of equity at the beginning of year of the firm *i*, RET_i is a proxy for the news about firms' performance which calculate from the cumulating monthly stock returns of firm over the 12 months beginning ten months prior to the end of fiscal year to two months after the end of fiscal year, DR_i is indicator variable that takes the value of one if returns (RET_i) are negative, and zero otherwise. $SIZE_i$ is the natural logarithm of market value of common equity. MB_i is the market-to-book ratio. LEV_i is leverage ratio.

To calculate conservatism level, this study follows Khan and Watts' approach by estimating Equation (4) cross-sectional regression for each year of the sample period. For each firm-year observation, a firm-year specific measure of conservatism, *C_SCORE*, is computed using Equation (3) with the estimated coefficients λ_1, λ_2, λ_3, and λ_4 are derived from Equation (4).

Equation (3): $$C\_SCORE_i = \lambda_1 + \lambda_2 SIZE_i + \lambda_3 MB_i + \lambda_4 LEV_i$$

The estimated coefficients λ_1, λ_2, λ_3, and λ_4 are constant across firms, but vary over time. C_SCORE_i varies across firms through cross-sectional variations in the firm characteristics (*SIZE, MB* and *LEV*) related to earnings conservatism, and over time through inter-temporal variations in λ and firm characteristics.

The firms with a higher *C_SCORE* are considered more conservative, imply that degree of conservatism is increasing in *C_SCORE.* To assess the impact of outliners and estimation error for *C_SCORE* on the empirical results, this study uses both the actual *C_SCORE,* and its percentile rank in the empirical analyses.

In addition to the *C_SCORE*, this study also uses the scaled decile rank of *C_SCORE* (*C_SCORErank*) as measures of accounting conservatism to support the test.

4.3.2 Additional measurement of accounting conservatism

To enhance the validity of the research results, this study employs the following alternative measure of accounting conservatism.

The second measure of conservatism, non-operating accruals (Givoly and Hayn 2000), is the average non-operating accruals scaled by total assets over the preceding five

years centered on the year of interest. This measure captures degree of firm-year accounting conservatism (Ahmed and Duellman 2007, 2011, 2013; Beatty, Weber, and Yu 2008; Garcia Lara, Osma, and Penalva 2009).

Non-operating accruals for each year is measured as the different between total accruals and operating accruals following Givoly and Hayn (2000). The firms with have greater negative non-operating accruals mean they adopt highly report conservatism. Thus, for regression analysis and interpretation, the non-operating accruals are multiplied by -1 (Francis, Hasan, and Wu 2013). As a result, larger value of non-operating accruals (*CONSV_Accrual*) indicates greater degree of accounting conservatism.

Non-operating accruals in each year is measured as:
= {Total accruals (before depreciation) – Operating accruals}/lagged total assets
= {[(Net Income + Depreciation) - Cash flow from operations] - (ΔAccounts receivable + ΔInventories + ΔPrepaid expenses - ΔAccounts payable - ΔTaxes payable)}/lagged total assets;

The third measure of conservatism is the average rank the above two measures as the one of measure of conservatism, *CONSV_AvgRank*. For each of the conservatism measures, this study uses its corresponding decile ranking (rescaled to range from 0 to 1) to facilitate the interpretation of the regression coefficients.

Because different measures of conservatism contain different amounts of measurement errors, this study draws the inferences based on the tenor of the results across the three conservatism measures.

4.3.3 Measurement of management earnings forecast bias

To examine the effects of accounting conservatism on the biases in management earnings forecasts, this study intended to measure the direction and magnitude of management forecast bias. Management earnings forecast bias is measured as the difference between the actual earnings per share of year $t+1$ and the management earnings forecast per share of year $t+1$, divided by the closing share price at the end of year t (Karamanou and Vafeas 2005; Gong, Li, and Xie 2009). This study measured management forecast bias using the following equation.

$$MEF\_Bias_{t+1} = \frac{(\text{actual earnings per share of year } t+1) - (\text{earnings forecast per share of year } t+1)}{\text{closing share price at the end of year } t}$$

The management earnings forecast bias is considered as "pessimistic" forecast bias when actual earnings is greater than forecasted earnings (positive value of *MEF_Bias* when actual earnings > forecasted earning). On the contrary, it is considered to be an "optimistic" forecast bias when actual earnings is less than forecasted earnings (negative value of *MEF_Bias* when actual earnings < forecasted earning).

The magnitude of management earnings forecast bias is measured as the absolute value of the difference between actual earnings per share of year t+1 and management earnings forecast per share of year t+1, divided by the closing share price at the end of year t.

$$MEF\_AbsBias_{t+1} = \left|\frac{(\text{actual earnings per share of year } t+1) - (\text{earnings forecast per share of year } t+1)}{\text{closing share price at the end of year } t}\right|$$

Management earnings forecast bias is considered as having greater magnitude when the absolute value of management earnings forecast bias is larger.

4.3.4 Measurement of operational uncertainty

Hypothesis H1a tested the effects of the operational environment of firms. Prior studies suggested that an uncertainty in the business environment induces inaccuracies in the manager's future prospects of the firm to be forecasted (Hirshleifer 2001; Zhang 2007). In this study, corporate's operational uncertainty was measured with the use of three alternative proxies: cash flow volatility, sales growth volatility and operating cycle (Gong, Li, and Xie 2009); each of the chosen proxies were used to capture the multiple aspects of uncertainty. Specifically, cash flow volatility, which results from unstable market conditions, affects the firm's ability to generate cash flows. Sales growth volatility is influenced by the temporary changes in customer demands, while the length of operating cycle varies according to the firm's production function and business model. All in all, these three factors are simple measures used to capture uncertainty in business environment and were assigned as the indicator variables in this study.

Cash flow volatility (*CFOVOL*) was an indicator variable and was assigned a "1" for firms that had an above-median cash flow volatility in year *t*, and "0" if otherwise. Cash flow volatility is measured as the standard deviation of operating cash flows divided by lagged total assets during the past five years, scaled by the magnitude of average operating cash flow (divided by lagged total assets) over the same period.

Sales growth volatility (*SALEVOL*) was an indicator variable and was assigned a "1" for firms that had an above-median sales volatility in year *t*, and "0" if otherwise. Sales volatility is measured as the standard deviation of sales growth during the past five years scaled by the magnitude of average sales growth over the same period.

Finally, this study calculated operating cycle, measured as the average accounts receivable divided by sales plus average inventory, divided by cost of goods sold then multiplied by 356, measured in the year prior to the management forecast disclosure. The operating cycle (*OPERCY*) was an indicator variable and was assigned a "1" if the firms had an above-median operating cycle value in year *t*, and "0" if otherwise.

4.3.5 Measurement of corporate governance

The measure of corporate governance used in this study was the structure of the firm's board of directors. The board of directors is a governance mechanism that plays a significant role in increasing the effectiveness of the firm's internal control system when dealing with both motivational and monitoring problems that are likely to result from the separation of ownership and management. These problems can make an impact on the firm's performance and, subsequently, the firm's financial reports and disclosure decisions.

One of the main responsibilities of a firm's board of directors is to monitor the firm's managers which requires the board and management to be independent of each other. In order to meet this requirement, the agency theory states that the board of directors should comprise of more external rather than internal directors, the chairman of the board and the chief executive officer (CEO) should be distinct individuals, and the size of the board should be large enough to keep specific parties from controlling the board.

Based on the suggestions made by the agency theory as mentioned above, the number of external directors, the distinct positions of CEO and board chairman, and the size of the board of directors were expected to be negatively associated with overestimated earnings forecasts.

To test hypothesis H1b, the measures of board of director's structure were defined as following:

1. Outside director (or non-executive director) is a member of a company's board of directors who is not an employee or stakeholder in the company (Ajinkya, Bhojraj, and Sengupta 2005). Outside directors is measured as the percentage of outside directors on the board of director. *OUTDIR* is defined as higher percentage of outside directors and valued as "1" for firms that had an above-median percentage of outside directors, and "0" if otherwise.

2. CEO/chairman separation *(NONDUAL)* is an indicator variable coded "1" if the CEO was not the chairman of the board, and "0" if otherwise.

3. Board size is the number of directors on the board at the year-end. *BRDSIZE* is defined as higher board size and was valued as "1" for firms that had an above-median number of directors on board, and "0" if otherwise.

4.3.6 Measurement of abnormal return

To test the effect of accounting conservatism on the stock market's reactions (returns) to management earnings forecasts disclosures (hypothesis H2), this study used the cumulative market-model abnormal returns around event date. In calculating daily abnormal return (or excess return), the event date (event date = 0) is the date in which management earnings forecast is released in public news media, i.e., newspaper, news release and news-website.

The stock market reaction can be defined as the cumulative market-model abnormal returns around management forecast disclosure date (event date, $t = 0$). For a given event period, daily excess return is calculated as a firm's equity return minus an expected or estimated return of the security in date around forecast disclosure. This study

used market adjust model approach to estimate the daily excess return. In an additional test, this study used the market and risk adjusted return by using the security market line (SML) equation.

The market-adjusted return approach

The market-adjusted return approach assumes that expected returns are the same for all securities. For this approach, daily abnormal return (or excess return) is measured as the buy-and-hold stock returns of the security *i* over the event period *t* ($r_{i,t}$) less daily market return or change in the SET index at time *t* ($r_{m,t}$). This study uses a market-adjusted model to estimate the expected returns because management forecast disclosures in Thailand are dispersed, unclear window period and estimation period are difficult to identify.

$$AR_{i,t} = r_{i,t} - r_{m,t} \quad (5.1)$$

$$r_{i,t} = \frac{P_{i,t} + Div_{i,t} - P_{i,t-1}}{P_{i,t-1}} \quad (5.2)$$

$$r_{m,t} = \frac{SET_{m,t} + Div_{m,t} - SET_{m,t-1}}{SET_{m,t-1}} \quad (5.3)$$

where; $AR_{i,t}$ is abnormal return (or excess return) of firm *i* at time day *t*;

$r_{i,t}$ is return of firm *i* at time day *t*;

$r_{m,t}$ is market return or change in the SET index at time day *t*;

$P_{i,t}$ is the stock price of firm *i* at time day *t*;

$P_{i,t-1}$ is the stock price of firm *i* at time day *t*-1;

$SET_{m,t}$ is the SET index at time day *t*;

$SET_{m,t-1}$ is the SET index at time day *t*-1;

$Div_{i,t}$ is the dividend yield of firm *i* at time day *t*;

$Div_{m,t}$ is the dividend yield of equity market (SET) at time day *t*.

The market and risk adjusted return

The market and risk adjusted return approach is estimated by using single index model or traditional market model posited by Sharpe (1964). The expected return of the security *i* in the estimation period is calculated as:

$$E(R_{i,t}) = \alpha + \beta R_{m,t} \quad (6.1)$$

where; $E(R_{i,t})$ is the expected returns of the security *i* time *t*;

$R_{m,t}$ is market return at time day *t;*

α is intercept of the security market line (SML);

β is systematic risk, slop of the security market line (SML).

This study regressed a firm's returns on the market returns during a 100-day estimation period prior to each event date (from day *t*-107 to day *t*-8), to estimate the market model parameters, the market risk (beta, β) and α (Jurutakanont and Supatarakul 2013). Then, the abnormal return (or excess return) is measured as the return of firm *i* at time *t* less expected return derived from single index model:

$$AR_{i,t} = r_{i,t} - E(R_{i,t}) \quad (6.2)$$

where; $AR_{i,t}$ is abnormal return (or excess return) of firm *i* at time day *t*;

$r_{i,t}$ is return of firm *i* at time day *t*;

$E(R_{i,t})$ is the expected returns of the security *i* time day *t*;

For the next step, this study calculated the cumulative abnormal returns by compounding daily abnormal returns for the selected event window:

$$CAR_{i,t} = \prod_{t=1}^{n}(1 + AR_{i,t}) - 1 = ((1 + AR_{i,t-1}) \text{ x} \ldots\ldots \text{x } (1 + AR_{i,t+1})) - 1 \quad (7)$$

where $CAR_{i,t}$ is cumulative abnormal returns of firm *i* day *t* = 1 to *n*, and $AR_{i,t}$ is abnormal returns for period *t* of returns on security *i*.

The study on stock market reaction assumes that the information content of management earnings forecast of period *t* is reflected in returns around management forecasts disclosure date. Following prior studies on management forecast disclosure (Baginski and Hassell 1990, 1997; Atiase et al. 2005; Anilowski, Feng, and Skinner

2007), this study employed a three-day window (day *t*-1 to day *t*+1) to capture market reaction around the management forecast released date (the event date, day *t* = 0).

4.3.7 Measurement of information asymmetry

Prior literature documents that capital markets show negative reactions to information asymmetry. It is found that information asymmetry is greater when managers possess firm-specific information that they choose not to disclose to the public. The information asymmetry measure used in this study is the idiosyncratic return volatility, which is based on the work of Dierkens (1991).

According to Dierkens (1991), managers possess information advantage which leads to information asymmetry between managers and external investors. This gap in information between the two parties is captured by the idiosyncratic return volatility of the firm's stock returns.

A proxy for information asymmetry, *STD_XRET*, is indicator variable, defined as one if firms have an above 0.5 of decile ranking (rescaled to range from 0 to 1) of idiosyncratic return volatility, zero otherwise. An idiosyncratic return volatility, calculated as the standard deviation of daily excess returns based on the market model (Kim and Park 2005; Moeller, Schlingemann, and Stulz 2007; Officer, Poulsen, and Stegemoller 2009) over 60 trading days prior to the management forecast disclosure date.

The daily excess return is measured as:

$$\text{Daily excess returns} = AR_{i,t} = r_{i,t} - r_{m,t}$$

where; $AR_{i,t}$ is abnormal return (or excess return) of firm *i* at time day *t*;

$r_{i,t}$ is return of firm *i* at time day *t*;

$r_{m,t}$ is market return or change in the SET index at time day *t*;

4.4 Data analysis method

4.4.1 Cross-sectional regression of management earnings forecast biases on accounting conservatism

To test hypothesis H1, this study regressed management forecast biases on accounting conservatism and previously identified determinants of management forecast biases using the ordinary least squares regression with standard errors adjusted for heteroscedasticity. This study estimated the following regression:

Regression model for testing hypothesis H1:

$$MEF\_Bias_{i,t+1} = \alpha_0 + \alpha_1 CONSV_{i,t} + \alpha_2 ROA_{i,t} + \alpha_3 UE_{i,t} + \alpha_4 SIZE_{i,t} + \alpha_5 BM_{i,t} + \alpha_6 EXFIN_{i,t} + \alpha_7 INDCON_{i,t} + \alpha_8 TIME_{i,t} + \alpha_9 RETURN_{i,t} + \alpha_{10} FOUNDER_{i,t} + \alpha_{11} GENDER_{i,t} + \alpha_{12} TENR_{i,t} + \alpha_{13} INST_{i,t} + \alpha_j \Sigma_j IND_{i,t} + \varepsilon_t \quad (8)$$

The dependent variable, *MEF_Bias*, is a measure of management earnings forecast bias. *MEF_Bias* is measured as the difference between the actual earnings per share of year *t+1* and the management earnings forecast per share of year *t+1*, divided by the closing share price at the end of year *t*. The management earnings forecast bias is considered as "pessimistic" forecast bias when actual earnings is greater than forecasted earnings. On the contrary, it is considered to be an "optimistic" forecast bias when actual earnings is less than forecasted earnings.

The variable of interest is conservatism (*CONSV). CONSV* captures the degree of accounting conservatism; *C_SCORE* is the conservatism score, and estimated by following the approach of Khan and Watts' (2009) firm-year specific conservatism; *C_SCORErank* is scaled decile rank of *C_SCORE*; *CONSV_Accrual* is the average non-operating accruals scaled by total assets over the preceding five years, multiplied by -1.

In hypothesis H1, the relationship between management earnings forecast biases and accounting conservatism was expected to be positive, which is coefficient α_1 is greater than zero and statistically significant.

The control variable including *ROA*, is measured as earnings before extraordinary items divided by lagged total assets. *UE* is defined as the difference

between the current earnings and the previous earnings, scaled by stock prices. *SIZE* is equals to the natural logarithm of the market value of equity. *BM* is book value of equity divided by the market value of equity. *EXFIN* is equals to net equity financing plus net debt financing scaled by lagged total assets. *INDCON* is equals to the sum of the market shares of the firms' sales within each industry. *TIME* is the number of calendar days from the management forecast date to the fiscal ending date of the year being forecasted. *FOUNDER* was defined as "1" for founder CEOs, and "0" otherwise. *GENDER* is an indicator variable and assigned "1" if CEO is male, and "0" otherwise. *TENR* is measured as decile ranking number of years of service a person works as the CEO. *INST* is the percentage of the total number of total common shares held by institutional investors divided by the total common shares outstanding. $\Sigma_j IND_{i,t}$, is the dummy variable which was equals to "1"("0") if firm *i* was (was not) in industry *j* in year *t*, based on the SET categorization.

This study tested the effects of accounting conservatism on the magnitude of management earnings forecast biases by using the following regression model.

$$\begin{aligned} MEF\_AbsBias_{i,t+1} = {} & \alpha_0 + \alpha_1 CONSV_{i,t} + \alpha_2 ROA_{i,t} + \alpha_3 UE_{i,t} + \alpha_4 SIZE_{i,t} + \alpha_5 BM_{i,t} \\ & + \alpha_6 EXFIN_{i,t} + \alpha_7 INDCON_{i,t} + \alpha_8 TIME_{i,t} + \alpha_9 RETURN_{i,t} \\ & + \alpha_{10} FOUNDER_{i,t} + \alpha_{11} GENDER_{i,t} + \alpha_{12} TENR_{i,t} + \alpha_{13} INST_{i,t} \\ & + \alpha_j \Sigma_j IND_{i,t} + \varepsilon_t \end{aligned} \quad (8.1)$$

In Equation (8.1), the dependent variable, *MEF_AbsBias*, is the measure of the magnitude of management earnings forecast bias. *MEF_AbsBias* is measured as the absolute value of the difference between the actual earnings per share of year *t*+1 and the management earnings forecast per share of year *t*+1, divided by the closing share price at the end of year *t*.

The variable of interest is *CONSV*. The study expected that firms with greater degree of accounting conservatism would exhibit smaller magnitude of forecast bias, which is coefficient α_1 is greater than zero.

4.4.2 The effects of operational uncertainty on the relationship between accounting conservatism and management earnings forecast biases

This study tested hypothesis H1a, which was concerned with the effects of operational uncertainty on the relationship between accounting conservatism and management earnings forecast bias. Using the moderator regression analysis, this study estimated the following regression model, including conservatism, interaction term and a set of control variables that are known to determine the management forecast biases.

Regression model with interaction term *CONSV x Uncertainty:*

$$\begin{aligned} MEF\_Bias_{i,t+1} = {} & \gamma_0 + \gamma_1 C\_SCORE_{i,t} + \gamma_2 Uncertainty_{i,t} + \gamma_3 C\_SCORE_{i,t} \, x \, Uncertainty_{i,t} \\ & + \gamma_4 ROA_{i,t} + \gamma_5 UE_{i,t} + \gamma_6 SIZE_{i,t} + \gamma_7 BM_{i,t} + \gamma_8 EXFIN_{i,t} \\ & + \gamma_9 INDCON_{i,t} + \gamma_{10} TIME_{i,t} + \gamma_{11} RETURN_{i,t} + \gamma_{12} FOUNDER_{i,t} \\ & + \gamma_{13} GENDER_{i,t} + \gamma_{14} TENR_{i,t} + \gamma_{15} INST_{i,t} + \gamma_j \Sigma_j IND_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (9)$$

In Equation (9), the dependent variable, *MEF_Bias*, is the measure of management earnings forecast bias. *C_SCORE* is the conservatism score and is estimated following the approach of Khan and Watts (2009). *Uncertainty* is the measure of business uncertainty.

4.4.3 The effects of corporate governance on the relationship between accounting conservatism and management earnings forecast biases

This study tested hypothesis H1b, which was concerned with the effects of corporate governance on the relationship between accounting conservatism and management earnings forecast bias. This study estimated the following regression model, including accounting conservatism, interaction term and a set of control variables that are known to determine the management forecast biases.

Regression model with interaction term *CONSV x Governance:*

$$\begin{aligned} MEF\_Bias_{i,t+1} = {} & \delta_0 + \delta_1 C\_SCORE_{i,t} + \delta_2 Governance_{i,t} + \delta_3 C\_SCORE_{i,t} \, x \, Governance_{i,t} \\ & + \delta_4 ROA_{i,t} + \delta_5 UE_{i,t} + \delta_6 SIZE_{i,t} + \delta_7 BM_{i,t} + \delta_8 EXFIN_{i,t} \\ & + \delta_9 INDCON_{i,t} + \delta_{10} TIME_{i,t} + \delta_{11} RETURN_{i,t} + \delta_{12} FOUNDER_{i,t} \\ & + \delta_{13} GENDER_{i,t} + \delta_{14} TENR_{i,t} + \delta_{15} INST_{i,t} + \delta_j \Sigma_j IND_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (10)$$

In Equation (10), the dependent variable, *MEF_Bias*, is the measure of management earnings forecast bias. *C_SCORE* is the conservatism score and estimated following the approach of Khan and Watts (2009). *Governance* is the measure of corporate governance. All control variables are descript in Section 4.4.4.

4.4.4 Control variables of regression models for testing hypothesis H1, hypothesis H1a and hypothesis H1b

Prior studies suggested that several forecast environment and forecaster characteristics influence a firm's forecast disclosure informative on both forecast errors and biases (Hirst, Koonce, and Venkataraman 2008). This study included two broad categories of explanations for the presence of bias in management earnings forecasts, i.e., firm characteristics and CEO characteristics as control variables. Firm characteristic factors are the firm's operating performance, firm earnings, firm size, firm growth, external finance, industry concentration, forecast horizon, stock returns and institutional holders. The measures of CEO characteristics are founder CEO, CEO's gender and CEO's tenure. This study added industry dummy variable to control for industry effects.

The link between the control variables and management earnings forecast bias, definitions, and measurements of variable are described below.

(1) Firm performance

Return on assets is used to capture the potential impacts of firm operating performance and distress risk on managers' forecast errors. Prior research suggested that managers of poorly performing firms or financially distressed firms have greater incentives to provide optimistic earnings forecasts to support market earnings expectations (Koch 2002; Rogers and Stocken 2005; Rogers and Buskirk 2008). Return on assets (*ROA*) is measured as the earnings before extraordinary items divided by lagged total assets of firm *i* in year *t*.

(2) Unexpected earnings

Unexpected earnings (*UE*) is the proxy of firm earnings. Unexpected earnings is measured as the difference between actual earnings and expected earnings (Baginski,

Conrad, and Hassell 1993). In reference to previous research in Thailand, Srisawadi (1996) examined returns-earnings relationship over a one-year window. She applied a random walk model as her earnings expectation model and found the returns-earnings relationship in the Thai capital market (during 1986-1990). This study assumed that earnings follows the random walk model and thus calculated the unexpected earnings as the difference between the current earnings and the previous earnings. Thus, unexpected earnings is measured as: $UE_{i,t} = RE_{i,t} - E(RE_{i,t})$; where $RE_{i,t}$ is earnings of firm *i* year *t*; $E(RE_{i,t})$ is expected earnings of firm *i* year *t* which is earnings of firm *i* year *t*-1. Then, $UE_{i,t}$ is divided by stock prices at the end of year *t*.

(3) Firm size

Firm size is a controlled variable since larger firms generally face greater public scrutiny and thus have greater incentives to avoid excessive errors in management earnings forecasts (Baginski, Hassell, and Kimbrough 2002). The natural logarithm of market value of equity (*SIZE*) is the measure for firm size. *SIZE* measured as the natural logarithm of the market value of equity (share price x number of outstanding shares).

(4) Firm growth

This study also controlled firm growth since the valuation of high-growth firms largely hinges on expected future cash flows (rather than the value of assets in place), which increases the market demand and public scrutiny for forward-looking information disclosures (Healy and Palepu 2001; Hirst, Koonce, and Venkataraman 2008). In this case, managers might have the incentives to forecast optimistically. Firm growth (*BM*), a book-to-market ratio, is measured as the book value of equity divided by market value of equity.

(5) External finance

This study controlled for external financing since external financing has been proposed as an important factor that might induce managerial optimism in forecasting earnings (Frankel, McNichols, and Wilson 1995; Lang and Lundholm 2000). External financing (*EXFIN*) is measured as net equity financing plus net debt financing scaled by lagged total assets. Net equity financing is equals to the book value of common and

preferred stocks minus cash payments for the purchase of common and preferred stock minus cash payments for dividends. Whereas net debt issuance equals to book value of long-term debt minus cash payments for long-term debt reductions minus the net changes in current debt.

(6) Industry concentration

Industry competition could motivate managers to conceal firm profitability, made possible through pessimistic earnings forecasts (Newman and Sansing 1993; Gong, Li, and Xie 2009). Consequently, this study controlled for the industry concentration ratio for this effect. Industry concentration (*INDCON*) is measured by the Herfindahl–Hirschman Index, which is calculated as the sum of squares of the firm's market share in each industry (Li 2010). Industry is classified by the Stock Exchange of Thailand (SET). The SET categorizes listed firms into eight industries composed of agro and food industry, consumer products, financials services, industrials, services, property and construction, resources energy and utilities, and technology. However, this study excluded financials and banking industry from the sample. Therefore, the number of industries included in this study totaled seven industries.

(7) Forecast horizon

This study added forecast horizon (*TIME*), defined as the natural logarithm of the number of calendar days from the forecast date to the fiscal ending date of the year being forecasted, as a control variable. The regression model includes the forecast horizon variable because prior study showed that management forecasts are less optimistic when they are released closer to the end of the forecast period (Johnson, Kasznik, and Nelson 2001; Hirst, Koonce, and Venkataraman 2008).

(8) Stock return

Prior literature found that the relationship between management forecast errors and past stock returns is significantly negative, implying that management earnings forecasts are not an accurate reflection of information in past stock prices (McNichols 1989; Gong, Li, and Xie 2009). As a result, past stock returns (*RETURN*) is a control

variable in the regression model of this study. *RETURN* is measured as the buy-and-hold 12-month market-adjusted stock returns.

(9) Founder CEO

Managerial overconfidence, as the characteristic of top executive management, influences the implication of conservative reports (Ahmed and Duellman 2013) and attributes of management forecasts (Hribar and Yang 2011) which is explained by the overestimation in future returns made by overconfident managers on their firm's investment projects. Prior research found that, in addition to showing more tendency in issuing earnings forecasts, overconfident CEOs issue earnings forecasts that are overly optimistic (Libby and Rennekamp 2012; Hribar and Yang 2011).

Literature defines overconfidence as the tendency for managers to overestimate the probability of a project's success (Heaton 2002; Ahmed and Dullman 2013). Founder CEOs were found to possess high managerial overconfidence or optimism (Fahlenbrach 2009; Lee, Hwang, and Chen 2015). As was shown in a study by Lee, Hwang, and Chen (2015), founder CEOs of large S&P 1500 companies show more overconfidence compared to professional CEOs. Because managerial overconfidence is an important characteristic of founder CEOs, it was therefore expected that the founder CEO would have an effect on the management earnings forecast biases.

Founder CEOs have an entrepreneurial characteristic and are still found to be overconfident even when their startup companies have become large publicly traded firms. The overconfidence in founder CEOs can be explained by their inherent disposition (Hmieleski and Baron 2009; Lowe and Ziedonis 2006). It is understandable for founder CEOs to have more in-depth knowledge about their own firm's daily operations due to their level of exposure to their business when compared to professional CEOs (Villalonga and Amit 2006, 2010). Empirical findings showed that founder CEOs have greater tendencies to issue exceedingly high and overly optimistic earnings forecasts. In addition, in comparison to professional CEOs, founder CEOs use less negative wordings when tweeting about business-related information or when engaged in earnings-related conference calls (Lee, Hwang, and Chen 2015).

According to empirical studies, founder CEOs were found to provide overestimated values of their company's future earnings. Since, overconfident managers are more likely to assess high earnings, it is also more probable that founder CEOs would disclose higher earnings forecasts. Thus, this led to the expectation that founder CEO negatively associated with management earnings forecast bias. In this study, the founder CEO *(FOUNDER)* is set as the indicator variable. A "1" was assigned to the variable if the CEO is the founder or co-founder of the listed company, and a "0" if the CEO was an external hire, also referred to as a professional CEO, and is not a member of the founding family.

(10) Gender of CEO

This study expected that the gender of CEOs would affect management earnings forecast biases. The upper-echelon perspective suggests that the gender of the top executive plays an important influence in the development of the firm's strategies and firm performance (Hambrick and Mason 1984; Barker and Mueller 2002) because gender is known to influence an individual's cognition and information processing. In addition, personality is another individual difference that influences the way a person interprets a situation, hence affecting the preferred strategy of the executive (Hambrick 2007).

The CEO's gender is an individual trait that influences differences in managerial overconfidence because male and female managers tend to have different levels of sensitivity towards ambiguous situations (Fietze, Holst, and Tobsch 2009). Past studies suggested that the difference in risk-averseness between the two genders can be explained by the level of tolerance one has towards uncertainty (Hudgens and Fatkin 1985; Fietze, Holst, and Tobsch 2009); that is, women possess greater tendency to be more sensitive about ambiguous situations (Fietze, Holst, and Tobsch 2011). According to Rost and Osterloh (2010), women show superior abilities in processing information during uncertain situations compared to their male counterparts. In addition, male managers are found to have more tendencies of underestimating the probable occurrence of negative events compared to assessments made by women (Schubert et al. 1999).

Thus, male CEOs tend to overestimate the chances of favorable firm performance and underestimate unfavorable firm performances than female CEOs. Based on this rationale, firms with male CEOs were expected to have forecast earnings that are higher than realized earnings when compared to firms with female CEOs. In this study, the CEO's gender (*GENDER*) is an indicator variable and was assigned a "1" if the CEO was male, and "0" otherwise.

(11) Tenure of CEO

This study expected that CEO tenure would affect management earnings forecast biases. According to the agency theory, the tenure of the CEO gives the CEO the incentive to maximize the value of the company. Longer tenures create greater reputation for the CEO which, in turn, motivates the CEO to be more committed to the firm. The upper-echelon perspective states that a manager tends to develop relevant skills and abilities during his or her years of service in a firm (Finkelstein and Hambrick 1990). In other words, CEOs with longer tenure are more exposed to the firm and go through a more extensive process of learning. This leads CEOs to have more control and confidence when making firm-related decisions.

Financial literature argues that CEOs with long tenures tend to be overconfident (Hirshleifer, Low, and Teoh 2010). On average, an overconfident CEO has been the firm's chief executive for almost ten years compared to a little over seven years for rational CEOs. Another group of researchers found a negative relationship between the experience of managers and the manager's willingness to take risks; that is, managers with greater experience show less preference towards taking risks (Barker and Mueller 2002). Similarly, managers with long tenures in a firm prefer to maintain the status quo and avoid taking risks (Bantel and Jackson 1989). In contrast, managers with less years of service in a firm might be motivated to prove their capabilities by being less rule-abiding and take more risks (Kor 2006).

Empirical accounting research show findings concerning CEOs' incentives when they manage firm earnings during their tenure in a firm. There is a tendency for CEOs to overstate their firm's earnings during his or her earlier years as compared to their

subsequent years working for the same firm (Ali and Zhang 2015). Similarly, as a means of proving themselves and to be viewed positively by the public, CEOs who are new to the firm are found to overstate the firm's earnings. On the other hand, Ali and Zhang (2015) also found that, in addition to earlier years of service, CEOs also tend to overstate firm earnings during their final years of service with the firm. This result was yielded after earnings overstatement in CEO early years were controlled for.

In sum, the relationship between the CEO's tenure and the level of overestimation in the firm's future earnings was found to vary throughout a CEO's years of service in a firm. There is currently no clear agreement as to the influence of CEO tenure on the estimation of firms' future earnings. However, it was expected that the assessment of a firm's future earnings would be affected by a CEO's years of service at a firm. Since it was found that longer CEO tenure increases CEO incentives and enables more in-depth understanding of the firm's operations, this study expected that CEOs who were still new to a firm were more likely to issue earnings forecasts that were exceedingly high.

In this study, CEO tenure (*TENR*) is the number of years starting from when an individual is assigned as the firm's CEO (Zhang 2009; Dikolli, Mayew, and Nanda 2014). In other words, CEO tenure is the number of years of service a person works as the CEO of a firm. Because tenure is consecutive, decile ranking is used in the analysis part of this study.

(12) Institutional holdings

Prior empirical studies suggested that firms with greater number of institutional investors tend to display more accuracy, face less forecast errors (Karamanou and Vafeas 2005), and have less optimistically biased forecasts (Ajinkya, Bhojraj, and Sengupta 2005). This study used the institutional holdings as a control mechanism. Institutional shareholdings (*INST*) is measured as the percentage of total common shares held by institutional investors divided by the total outstanding common shares. Institutional shareholdings are measured in the year prior to the management forecast disclosure.

Summarized definition of control variables are as follows:

Variable	**Definition**	**Prior study**	**Hypothesis**	**Source**
ROA	return on asset, measured as earnings before extraordinary items divided by lagged total assets	Koch (2002); Rogers and Stocken (2005); Rogers and Buskirk (2008)	H1, H1a, H1b	DataStream and SetSmart database
UE	unexpected earnings, measured as the difference between the current earnings and the previous earnings, scaled by stock prices	Srisawadi (1996); Narktabtee (2000)	H1, H1a, H1b	DataStream and SetSmart database
SIZE	firm size, measured as the natural logarithm of the market value of equity	Baginski, Hassell, and Kimbrough (2002); Kim, Li, Pan, and Zuo (2013)	H1, H1a, H1b	DataStream and SetSmart database
BM	book value of equity divided by the market value of equity	Hirst, Koonce, and Venkataraman (2008)	H1, H1a, H1b	DataStream
EXFIN	external financing, measured as net equity financing plus net debt financing scaled by lagged total assets	Frankel, McNichols, and Wilson (1995); Lang and Lundholm (2000)	H1, H1a, H1b	DataStream and SetSmart database

Variable	Definition	Prior study	Hypothesis	Source
INDCON	industry concentration, measured as the sum of the market shares of the firms' sales within each industry	Newman and Sansing (1993); Gong, Li, and Xie (2009); Li (2010)	H1, H1a, H1b	DataStream and SetSmart database
TIME	forecast horizon, measured as the number of calendar days from the management forecast to the fiscal ending date of the year being forecasted	Johnson, Kasznik, and Nelson (2001); Hirst, Koonce, and Venkataraman (2008)	H1, H1a, H1b	NewsCenter database
FOUNDER	founder CEO, indicator variable defined as 1 if the CEO is founder, and 0 otherwise	Chen, Chen, and Cheng (2014); Lee, Hwang, and Chen (2015)	H1, H1a, H1b	Form 56-1, Annual report
GENDER	CEO gender, indicator variable assigned 1 if CEO is male, and 0 otherwise	Rost and Osterloh (2010)	H1, H1a, H1b	Form 56-1, Annual report
TENR	CEO tenure, measured as decile ranking number of years of service a person works as the CEO	Zhang (2009); Dikolli, Mayew, and Nanda (2014)	H1, H1a, H1b	Form 56-1, Annual report
INST	institutional holdings, measured as the percentage of firms shares held by institutional investors	Karamanou and Vafeas (2005); Ajinkya, Bhojraj, and Sengupta (2005)	H1, H1a, H1b	Form 56-1, Annual report

All of the above independent variables were measured in the year prior to the management forecast disclosure, except *TIME* which was measured in accordance with the year that the management earnings forecast was disclosed.

(13) Industry control variable

This study included industry dummy variables in the regression model. As found in previous studies (Hui, Matsunaga, and Morse 2009; Gong, Li, and Xie 2009), the dummy or indicator variables included in the regression model were those that reflected industry codes (based on the SET categorization). These variables were used to account for industry-specific variations in management earnings forecasts of the firm.

Listed companies included in the study were categorized into eight industries based on the specifications of the SET. The categories comprised of agro and food, consumer products, financials services, industrials, services, property and construction, resources energy and utilities, and technology industries. This study excluded financials services industry from the sample, leaving a total of seven industries used in the analysis. Based on SET categorization, the industry control variable ($\Sigma_j IND_{i,t}$) is the indicator variable. The variable was assigned a "1" if firm *i* was in industry *j* in year *t*, and a "0" if it was not.

CONSUMER	indicator variable with the value of "1" if firm is in consumer products industry, "0"otherwise.
INDUSTRIAL	indicator variable with the value of "1" if firm is in industrial industry, "0"otherwise.
PROPERTY	indicator variable with the value of "1" if firm is in property and construction industry, "0"otherwise.
RESOURCE	indicator variable with the value of "1" if firm is in resource, energy and utilities industry, "0"otherwise.
SERVICE	indicator variable with the value of "1" if firm is in services industry, "0"otherwise.
TECHNOLOGY	indicator variable with the value of "1" if firm is in technology, "0"otherwise.

4.4.5 Cross-sectional regression of stock market reactions to management earnings forecast on accounting conservatism

The second objective of this study was to investigate the effects of accounting conservatism on the stock market's reactions to management earnings forecasts disclosures. This study tested hypothesis H2, by estimating the following regression model, including accounting conservatism measure, earnings forecasted news measure, and a set of control variables that are known to determine the abnormal returns:

$$MEFCAR_{i,t+1} = \beta_0 + \beta_1 CONSV_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 MTB_{i,t} + \beta_5 EPS_{i,t} + \beta_6 BV_{i,t} + \beta_7 NEWS_{i,t} + \beta_j \Sigma_j IND_{i,t} + \varepsilon_{i,t} \quad (11)$$

The dependent variable, *MEFCAR*, is the three-day accumulated adjusted abnormal returns around the management earnings forecast disclosure date. *CONSV* captures the degree of accounting conservatism, i.e., *C_SCORE*, *Consv_Accrual* and *Consv_AvgRank*. As descripted below:

C_SCORE	conservatism score, estimated following the approach of Khan and Watts (2009) in the year prior to the management forecast disclosure;
Consv_Accrual	average non-operating accruals scaled by total assets over the preceding five years (Givoly and Hayn 2000; Ahmed and Duellman 2007, 2011, 2013; Beatty, Weber, and Yu 2008), multiplied by -1, measured in the year prior to the management forecast disclosure;
Consv_AvgRank	average rank the above two measures of conservatism, decile ranking (rescaled to range from 0 to 1).

The variable of interest in Equation (11) is *CONSV*; based on hypothesis H2, this study expected its coefficient to be positive (coefficient on $\beta_1 > 0$).

4.4.6 The effects of accounting conservatism on relationship between information asymmetry and stock market reactions to management earnings forecast

This study next tested hypothesis H3, which concerns the mechanism through which accounting conservatism affects cumulative abnormal (or excess) returns around the management earnings forecast date, which is information asymmetry. The regression model includes accounting conservatism, measure of information asymmetry (*STD_XRET*), their interaction, and a set of control variables:

$$MEFCAR_{i,t+1} = \beta_0 + \beta_1 CONSV_{i,t} + \beta_2 STD\_XRET_{i,t} + \beta_3 CONSV_{i,t} x\ STD\_XRET_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 LEV_{i,t} + \beta_6 MTB_{i,t} + \beta_7 EPS_{i,t} + \beta_8 BV_{i,t} + \beta_9 NEWS_{i,t} + \beta_j \Sigma_j IND_{i,t} + \varepsilon_{i,t} \quad (12)$$

The dependent variable, *MEFCAR*, is a three-day accumulated adjusted abnormal returns around the management earnings forecast disclosure date. *CONSV* captures the degree of accounting conservatism, i.e., *C_SCORE*, *Consv_Accrual* and *Consv_AvgRank*. *STD_XRET* is a proxy for information asymmetry.

In Equation (12), the variable of interest is the interaction term *CONSV x STD_XRET*, in which it was expected that the coefficient of this parameter estimate would be positive and statistically significant. It was also expected that the coefficient of *STD_XRET* of the equation would be negative because the asymmetric information between manager and shareholders would cause adverse selection problems.

4.4.7 Control variables of regression model for testing hypothesis H2 and hypothesis H3

To test hypothesis H2 and hypothesis H3, the control variables included a set of firm and other characteristics that have been found to be associated with disclosure returns, i.e. firm size, financial leverage, and market-to-book ratio. This study followed Khan and Watts' (2009) suggestion that empirical research employing *C_SCORE* also controls for firm size, financial leverage, and market-to-book ratio. This study also controlled for factors related to the property of management forecasts, i.e., news forecast (Hirst, Koonce, and Venkataraman 2008). Importantly, this study controlled for factors

that accounting literature suggests would associate with stock prices, i.e., earnings per share and book value of equity per share.

(1) Firm size

Prior studies suggested that stock returns are associated with firm size. Bamber (1986, 1987) found that large firms have smaller abnormal trading volume than small firms around the announcement date. The argument that large firms have smaller abnormal stock reactions is made based on the notion that the information environment of larger firms are richer and have many sources of available information.[13] Therefore, the market reactions for large firms were expected to be smaller than small firms. However, studies on seasoned equity offerings (SEO), for instance, Lee and Masulis (2009) and Kim, Li, Pan, and Zuo (2013) found that large firms have greater SEO announcement returns. This could imply that news announcement from big firms have greater impact on stock returns. In sum, this study expected that cumulative abnormal returns would be positively associated with firm size. Firm size (*SIZE*) is defined as the natural logarithm of book value of total assets in the year prior to the management forecast disclosure.

(2) Financial leverage

Prior studies provided evidence that stock returns are negatively related to leverage (Kim and Pevzner 2010). Debt ratio, *DEBT*, is defined as the ratio of the book value of short-term and long-term debt over the book value of total assets in the year prior to the management forecast disclosure.

(3) Market-to-book ratio

This study controlled for the market-to-book ratio (*MTB*), calculated as the market value of equity divided by the book value of equity in the year prior to the

[13] In a rich information environment, equity investors can access to many alternative sources of information and use this information to evaluate the corporate's future security prices (Collins, Kothari, and Rayburn 1987).

management forecast disclosure. This study expected that stock price reactions would be related to the firm's growth potential (Kim and Pevzner 2010).

(4) Earnings per share

Accounting literature suggests that earnings information, i.e., earnings per share, is associated with a firm's stock prices (Collins, Maydew, and Weiss 1997; Francis and Schipper 1999). Earnings per share (EPS) is calculated as earnings before extraordinary items deflated by the number of outstanding common shares.

(5) Book value of equity

Book value of equity is another factor that explains the changes in stock prices (Kothari 2001). Quality of financial reporting affects both book value of equity and market value of equity, and thus, book value of equity should similar to (equal to) market value of equity. The book value of equity, *BV*, is measured as the total assets less total liabilities, then deflated by the number of outstanding common shares.

(6) News forecast

The reactions of the stock market toward good news forecasts tend to be different from reactions toward bad news forecasts (Kim and Pevzner 2010; Ball, Jayaraman, and Shivakumar 2012). This study referred to the work of Jarutakanont and Supattarakul (2013) in classifying the news of management earnings forecast disclosure. The disclosures are classified as either bad news forecasts or good news forecasts by basing on the signs of the disclosures' cumulative abnormal returns seven days around the disclosure date. According to past studies, management earnings forecasts that are associated with positive cumulative market-adjusted returns are considered to be good news forecasts while negative cumulative market-adjusted returns are seen as bad news forecasts. The same method was applied in this study in which management forecast disclosures with negative cumulative abnormal returns are classified as bad news and were assigned the value of "1". On the other hand, cumulative abnormal returns with a positive sign were considered to be good news and were assigned the "0" value.

Control variables of the regression model are as follows:

Variable	Definition	Prior study	Hypothesis	Expected sign	Source
SIZE	firm size, measured as the natural logarithm of the market value of equity	Lee and Masulis (2009); Kim, Li, Pan, and Zuo (2013)	H2, H3	+	DataStream and SetSmart database
DEBT	the ratio of the book value of short-term and long-term debt over the book value of total assets	Khan and Watts (2009); Kim and Pevzner (2010)	H2, H3	-	DataStream and SetSmart database
MTB	the market value of equity divided by book value of equity	Khan and Watts (2009); Kim, Li, Pan, and Zuo (2013)	H2, H3	+	DataStream and SetSmart database
EPS	earnings per share, calculated as earnings before extraordinary items deflated by number of outstanding of common shares	Collins, Maydew, and Weiss (1997); Francis and Schipper (1999)	H2, H3	+	DataStream and SetSmart database
BV	ratio of the total assets less total liability, then deflated by number of outstanding of common shares	Collins, Maydew, and Weiss (1997); Francis and Schipper (1999)	H2, H3	+	DataStream and SetSmart database

Variable	Definition	Prior study	Hypothesis	Expected sign	Source
NEWS	news forecast, identified as "bad news" which value = 1, if the signs of cumulative excess returns is negative, "good news" which value = 0, if the signs of returns is positive.	Jarutakanont and Supattarakul (2013)	H2, H3	+/-	DataStream database
STD_XRET	information asymmetry, the decile ranking (value from 0 to 1) of idiosyncratic return volatility, calculated as the standard deviation of daily excess returns based on the market model over 60 trading days prior to the forecast disclosure	Moeller, Schlingemann, and Stulz (2007); Officer, Poulsen, and Stegemoller (2009); Kim, Li, Pan, and Zuo (2013)	H3	-	DataStream database

All of the above independent variables were measured in the year prior to the management forecast disclosure, except *NEWS* which was measured in accordance with the year that management earnings forecast was disclosed.