

Underinvestment and Value Relevance of Earnings Management

(*Terkurang Pelaburan dan Kerelevanan Nilai Pengurusan Perolehan*)

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ABSTRACT

The aim of this study is to examine whether earnings management among underinvestment firms is positively related to share price. Firms are said to have high growth opportunity but is unable to fund investment projects due to liquidity constraints because of the information asymmetry between the firm and the investors. As a result, firms have to provide high quality accounting information (i.e. value relevant information) to reduce information asymmetry and hence be free from liquidity constraints. One type of accounting information that can be provided is discretionary accrual (proxy for earnings management). The sample of this study is firms listed on the Main Board of Bursa Malaysia from year 2001 to 2007. We use Ohlson's model to examine the value relevance of earnings management. We separate earnings into managed and unmanaged earnings. Panel data regression analyses were performed to examine the role of underinvestment on the relationship between earnings management and share price. We also examine the value relevance of earnings management using the return model. The results from the panel data regression analysis indicate that earnings management increases the value relevance of accounting information. Further, underinvestment moderates the relationship between earnings management and share price. Nevertheless, the results suggest that earnings management among firms can decrease the value relevance of accounting information. In general, it is concluded that underinvestment weakens the relationship between earnings management and share price/return, hence it motivates managers to convey opportunistic earnings management.

Keywords: Informational earnings management; value relevance; information asymmetry; underinvestment

ABSTRAK

Tujuan kajian ini adalah untuk menguji sama ada pengurusan perolehan terutamanya bagi firma terkurang pelaburan mempunyai hubungan yang positif dengan nilai saham. Firma yang terkurang pelaburan dikatakan mempunyai peluang pertumbuhan yang tinggi namun tidak dapat membiayai projek pelaburan disebabkan kekangan kecairan yang disebabkan oleh jurang maklumat antara firma dan para pelabur. Ini menyebabkan firma yang terkurang pelaburan perlu menyediakan maklumat perakaunan yang berkualiti tinggi (i.e. maklumat yang mempunyai kerelevanan nilai) bagi mengurangkan jurang maklumat dan seterusnya bebas dari kekangan kecairan. Satu cara yang boleh dilakukan oleh firma adalah menerusi pengurusan perolehan yang bermaklumat. Ini berbeza dengan kajian lepas yang menunjukkan pengurus biasanya melakukan pengurusan maklumat secara oportunistik. Sampel bagi kajian ini terdiri daripada firma yang tersenarai di Papan Utama Bursa Malaysia dari tahun 2001 hingga 2007. Kami menggunakan Model Ohlson bagi menentukan kerelevanan nilai pengurusan perolehan. Kami telah mengasingkan perolehan kepada perolehan tidak boleh diurus dan perolehan boleh urus (pengurusan perolehan). Analisis regresi data panel telah digunakan untuk menguji peranan terkurang pelaburan ke atas hubungan antara pengurusan perolehan dan harga saham. Kami juga menggunakan model pulangan untuk menguji kerelevanan nilai pengurusan perolehan. Dapatan dari analisis regresi data panel menunjukkan pengurusan perolehan meningkatkan kerelevanan nilai maklumat perakaunan. Selanjutnya terkurang pelaburan memoderatkan hubungan antara pengurusan perolehan dan harga saham. Walau bagaimanapun dapatan juga mencadangkan pengurusan perolehan di kalangan firma terkurang pelaburan mengurangkan kerelevanan angka perakaunan. Secara umumnya, dapat disimpulkan bahawa terkurang pelaburan melemahkan hubungan antara pengurusan perolehan dan harga saham dan pulangan, seterusnya memotivasi pengurus untuk menyampaikan pengurusan perolehan secara oportunistik.

Kata kunci: Pengurusan perolehan bermaklumat; kerelevanan nilai; jurang maklumat; terkurang pelaburan

INTRODUCTION

Although earnings management has always been associated with financial manipulation, managers are allowed by the generally accepted accounting principles to use their discretion in selecting accounting methods to communicate private information to the public (Jiraporn, Miller, Yoon & Kim 2008). As such, earnings management is informative and not always harmful to users (Fields, Lys & Vincent 2001; Jiraporn et al. 2008). However, research has been focusing on the opportunistic perspective of earnings management (for example, Mohd Saleh, Mohd Iskandar & Rahmat 2005, 2007; Abdul Rahman & Mohamed Ali 2006; Johl, Jubb & Houghton 2007; McNichols & Stubben 2008; Shan 2015). Limited studies (Gul, Leung & Srinidhi 2003; Krishnan 2003; Jiraporn et al. 2008; Siregar & Utama 2008; Rahman, Hassan, Mohd-Saleh & Abdul Shukor 2013) have investigated earnings management from the informational perspective. We believed that investors may value managed earnings as value-relevant information since it has been found by Rahman et al. (2013) that earnings management could also be informative.

Prior studies provided inconsistent results concerning the relationship between earnings management and the value relevance of accounting information. Dechow and Skinner (2000), Whelan and McNamara (2004), and Habib (2004) reported that earnings management lowers the value relevance of accounting information. These results are obtained because earnings management has been used in an opportunistic way. However, Subramanyam (1996) and Arya, Glover and Sunder (2003) provided a contradictory result and concluded that earnings management is informational. These findings support Fields et al. (2001) who indicated that earnings management is motivated by certain conditions. Underinvestment might be the one as Rahman et al. (2013) provided evidence that the negative relationship between earnings management and information asymmetry becomes stronger in underinvestment firms. However, studies that examine earnings management in underinvestment and non-underinvestment firms are limited, which provides an avenue for research. While Kanagaretnam and Sarkar (2011) suggested revising managerial compensation packages to mitigate underinvestment problem; the current study provides an alternative view from the financial reporting perspective for underinvestment firms to finance their profitable projects. The new perspective is expected to shed some light on the issue of earnings management and the value relevance of accounting information within the scope of underinvestment firms. We believed that if underinvestment is one of the conditions for informational earnings management, it will strengthen the relationship between earnings management and share price. Otherwise, if underinvestment relates to opportunistic behaviour, value relevance of earnings management may be reduced.

This study is motivated by the studies of Abdul Rahim, Yaacob, Alias and Mat Nor (2010) and Rahman

et al. (2013) which indicated that Malaysian firms might experience underinvestment. Underinvestment might motivate these firms to convey informational earnings management in order to gain financial support from external sources (Diamond & Verrecchia 1991; Kim & Verrecchia 1994). Nevertheless, underinvestment may also be related to opportunistic behaviour. Further, Malaysian data is unique as the legal system and capital market is well developed (Mohamad, Hassan & Ariff 2007) and good quality accounting standards are in place (Wan Ismail, Kamarudin, van Zijl & Dustan 2013); however, the information environment is not rich (Ball, Robin & Wu 2003). This is contradictory to the developed countries whereby information asymmetry between the management and investors is minimized. Hence, signalling information through earnings management by firms in these countries may not have much impact on investors' decisions as they can acquire other information provided in the annual report or any other formal or informal information channels in the market (Rahman et al. 2013). Therefore, the effect of underinvestment on the relationship between earnings management and share price may not be clearly seen.

In a situation where the information environment is not rich, signalling through earnings management becomes important. In addition, Bhattacharya, Daouk & Welker (2003) also found that earnings aggressiveness is high in Malaysia, which could be affected by the opportunistic earnings management or informational earnings management. Based on the above arguments and findings by Rahman et al. (2013), we believed that the latter incentive would be dominant in an underinvestment setting. Our study will provide evidence from a new perspective concerning the effect of underinvestment on the relationship between earnings management and share price within this unique setting.

LITERATURE REVIEW AND HYPOTHESES
DEVELOPMENT

Signalling theory and agency theory are normally used to explain the relationship between earnings management and the value relevance of accounting information. According to signalling theory, earnings management can be used to signal firm performance (Morris 1987). This implies that earnings management can be used to communicate private information that will enhance the information content of the accounting information (Jiraporn et al. 2008; Siregar & Utama 2008; Arya et al. 2003).

Within the framework of agency theory, prior studies found that managers are likely to manage earnings in an opportunistic way. This behaviour will cause stakeholders to question the value relevance of accounting information (Dechow & Skinner 2000) since the financial statements do not reflect the true and fair view information. Therefore, this information cannot be relied upon in assessing firm performance and value; as earnings management has been

proven to lower value relevance of accounting information (Whelan & McNamara 2004; Habib 2004).

According to Barth, Beaver and Landsman (2001), the accounting information is relevant if it relates to and can predict the market value of the firm. Consistent with Barth et al. (2001), Francis and Schipper (1999) also explained that the relevance of accounting information is if the information could affect stock prices or returns. If the accounting information can explain the variations in share prices, it means that accounting information is useful in decision-making. Thus, if the statistical relationship between accounting information and the stock prices is significant, then the information is said to be value relevant.

Collins, Maydew and Weiss (1997) and Francis and Schipper (1999) provided evidence that accounting earnings have information content that affects stock returns. However, these studies indicate that the value relevance of accounting information has decreased over time. The decline is due to increase in total revenue (transitory earnings/one-time items), increase in frequency of negative earnings, involvement of average firm size and increase in the intensity of intangible assets (Collins et al. 1997). Balachandran and Mohanram (2011) extended the above studies and provided evidence that the decline in value relevance of accounting information is observed in steady conservatism firms, instead of in increasing conservatism firms. They concluded that the increasing conservatism might mitigate decline in value relevance. Meanwhile, Lev (1989) argued that the decline in the value relevance of accounting information is due to the low quality of accounting information. Earnings management is one of the indicators (Chan, Chan, Jegadeesh & Lakonishok 2006), which may reduce or improve the quality of information if it is used opportunistically or informatively.

EARNINGS MANAGEMENT AND VALUE RELEVANCE OF ACCOUNTING INFORMATION

The effect of earnings management on the value relevance of accounting information has received much attention in previous studies. The first group investigates the direct effect of earnings management on the value relevance of accounting information (Arya et al. 2003; Habib 2004; Whelan & McNamara 2004; Shan 2015). Meanwhile, the second group investigates the conditions that motivate the relationship between earnings management and the value relevance of earnings and book value (Gul, Leung & Srinidhi 2000; Defond & Park 2001; Marquardt & Wiedman 2004; Bugshan 2005; Rahman & Mohd-Saleh 2008).

Subramanyam (1996) investigated the role of discretionary accruals (a proxy for earnings management) to explain stock return variations. The study concluded that earnings management can improve the value relevance of accounting information. Arya et al. (2003) supported the view as managers may use their discretion

in preparing the financial report to influence investors in their decision-making. The above studies were extended to Indonesia by Siregar and Utama (2008). They reported that earnings management is informative since it can be used to predict future profitability. This is consistent with Subramanyam (1996) who found that earnings management is considered by the equity market. Based on the above studies we believe earnings management can increase the value relevance of accounting information.

However, prior studies also reported that earnings management impairs the value relevance of accounting information. Whelan and McNamara (2004) and Habib (2004) indicated that earnings management reduces the value relevance of earnings. A most recent study by Shan (2015) provides evidence that earnings management does affect the value relevance of accounting numbers. The study indicates that in comparing to companies without earnings management, the impact of earnings management on the value relevance of earnings in Chinese companies is greater. These observations may be due to the belief that earnings management is an indicator for the low reliability of earnings (Whelan & McNamara 2004).

The above discussion indicates that there is a strong justification that earnings management is related to value relevance of accounting information. However, the direction is not consistent depending on the theory used, i.e. signalling theory or agency theory. If informational earnings management is dominant, earnings management is expected to increase value relevance of accounting information. Conversely, if earnings management is opportunistic, the value relevance of accounting information is expected to be impaired. Therefore, our hypothesis 1 is:

H₁ Earnings management affects the value relevance of accounting information.

THE ROLE OF UNDERINVESTMENT IN THE RELATIONSHIP BETWEEN EARNINGS MANAGEMENT AND THE VALUE RELEVANCE OF ACCOUNTING INFORMATION

Prior studies examined the role of debt level and growth (Gul et al. 2000), earnings surprise (Defond & Park 2001), the announcement of equity offerings (Marquardt & Wiedman 2004), high growth (Gul et al. 2003), good corporate governance (Bugshan 2005) and free cash flow (Rahman & Mohd-Saleh 2008) as conditions that motivate managers to manage earnings. However, these findings are not conclusive. Gul et al. (2000) reported that the value relevance of earnings management increases in high growth firms and decreases in firms with high debt. This is because the high growth firms will manage their earnings for the purpose of providing internal information (informational earnings management) on the actual performance. However, firms with high debt will hide their actual performance through opportunistic earnings management.

Marquardt and Wiedman (2004) examined secondary equity offering as a condition to manage earnings, which may impair the value relevance of accounting information. They provided the evidence that earnings management reduces the value relevance of earnings for a sample in which managers participate in secondary equity issues. The study indicated that secondary equity offering is a condition that motivates managers to undertake opportunistic earnings management. This condition leads to a decrease in the value relevance of the net income.

The above findings indicate that the effect of earnings management on the value relevance of accounting information depends on the conditions that motivate managers to perform earnings management. Investors will lose (gain) confidence in the quality of accounting information if managers are motivated to undertake opportunistic (informative) earnings management for opportunistic (informational) purposes. This will lead to less (more) use of accounting information in decision-making; hence, the value relevance of accounting information will decline (increase) and could be reflected in the share price of the firm.

Underinvestment is also one of the conditions that can motivate managers to conduct informational earnings management. Underinvestment occurs when shareholders choose to forego a net present value investment (Mayers & Smith 1987) at the cost of the debt holders. The forgone investment is usually low risk which would provide a steady stream of cash flow to pay off debt holders without excess return to the shareholders. These firms are high growth opportunity firms that face liquidity constraints (Degryse & De Jong 2006; Morgado & Pindado 2003). Liquidity constraints exist when firms incur high cost of capital for external financing and low free cash flow. Therefore, these firms are motivated to disclose high quality accounting information to reduce their cost of capital (Botosan 1997; Clarkson, Guedes & Thompson 1996). This can be done through informational earnings management. A recent study by Rahman et al. (2013) indicates that earnings management has been used for informative purposes in underinvestment firms. They believe managers of underinvestment firms may use their discretion to increase the quality of accounting information and reduce information asymmetry. This will enhance the value relevance of accounting information, which, eventually, will lead to low cost of capital.

However, underinvestment itself can also become a condition for opportunistic earnings management to occur. Discussion in prior literature was always related to underinvestment with moral hazard. Suboptimal investments could be made by managers who are pursuing their personal welfares rather than maximizing the shareholders' wealth (Jensen & Meckling 1976). Such inefficiency in investment is likely to happen when information asymmetry occurs between firms and suppliers of capital (Biddle, Hilary & Verdi 2009). Therefore, the underinvestment condition itself is a result of information asymmetry. Managers wishing to pursue this strategy may

use earnings management to conceal information and retain information advantage over their capital providers. Therefore, underinvestment may reduce value relevance of accounting information; i.e. underinvestment moderates the relationship between earnings management and share price/return.

Most of the above studies are conducted on developed countries, and limited studies examining these issues within the context of developing countries had been reported. This is especially so for a country like Malaysia where firms tend to rely on external financing (Driffield & Pal 2001), are generally financially constrained (Ismail, Ibrahim, Yusoff & Zainal 2010), and where financing is not expected to be obtained through arm's length transactions, as in other Asian countries (Biddle & Hillary 2006). Further, Abdul Rahim et al. (2010), in their study on the effect of firm valuation on investment expenditures (2002- 2007), indicated that Malaysian non-financial firms have shown a symptom of underinvestment. Hence, providing informational earnings management could better reflect high quality accounting information in these firms (Jiraporn et al. 2008). This is because when earnings management is undertaken for informational purposes, the reported accounting information could actually reflect the firms' potential expected future cash in-flows. Nevertheless, we also noted on the conventional prediction that underinvestment may reduce value relevance of accounting information. Therefore, our second hypothesis is:

H₂ The relationship between earnings management and the value relevance of accounting information is moderated in underinvestment firms.

RESEARCH METHOD

SAMPLE

The sample for this study is consisted of firms listed on the Main Board of Bursa Malaysia between 2001 and 2007. There are three reasons of choosing this duration. First, this period is more stable in explaining the role of underinvestment on the value relevance of earnings management. Further, the period is in line with the sample period of Abdul Rahim et al. (2010) which indicated a symptom of underinvestment among Malaysian firms. Hence, our study extended the above as we provided empirical evidence on the behaviour of these firms from the accounting and finance perspectives. Second, this period is also relevant since we are able to control future growth and firm risk that might influence the relationship between earnings management, value relevance and underinvestment. Hence, our findings are more reliable since the period has not been influenced by economic factors. Third, this period is also free from any regulatory effects such as convergence to the International Financial Reporting Standards (IFRS). Malaysian firms are subjected to full compliance to the

IFRS effective January 2012. Therefore, excluding the convergence period prevents other issues such as fair value or comprehensive income that may influence our findings.

Table 1 presents the total observations with 2,163 firm-years having completed data. We excluded 131 firm-year data obtained from the mining, hotel, and finance industries. Mining industry was excluded due to small number and unlikely to affect our analysis (Rahman et al. 2013). Meanwhile, the hotel and finance industries are subjected to different and additional regulations (Rahman & Mohd-Saleh 2008) and show different discretionary accrual (*DACC*) behaviour compared to the majority of firms in other industries (Peasnell, Pope & Young 2000). We also excluded 112 firm-years with extreme data from the analysis. Therefore, our final sample is 1,920 firm-years data.

MEASUREMENT

EARNINGS MANAGEMENT

We measured earnings management using *DACCs* that employs a procedure suggested by Kothari, Leone and Wasley (2005). The *DACC* is determined through several steps. The procedure had also been used in the studies of Rahman et al. (2013), Ahmad-Zaluki, Campbell and Goodacre (2011) and Leuz, Nanda and Wysocki (2003). First, total accrual (*TACC*) is calculated using a cash flow approach, as shown in Equation (a):

$$TACC_{it} = EBX_{it} - OCF_{it} \quad (a)$$

Where:

$TACC_{it}$ = Total accrual for firm *i* at the end of year *t*

EBX_{it} = Earnings before extraordinary items for firm *I* at the end of year *t*

OCF_{it} = Operating cash flow for firm *i* at the end of year *t*

Next, we determine the non-*DACC* (*NDACC*) by initially estimating α_1 , α_2 , α_3 , and α_4 using Equation (b):

$$TACC_{it}/TA_{it-1} = \alpha_1(1/TA_{it-1}) + \alpha_2(\Delta REV_{it} - \Delta REC_{it})/TA_{it-1} + \alpha_3(PPE_{it}/TA_{it-1}) + \alpha_4 ROA_{it-1} + \varepsilon_{it} \quad (b)$$

Where:

TA_{it-1} = total assets for firm *i* at the end of year *t-1*

ΔREV_{it} = the change in revenue for firm *i* between years *t* and *t-1*

ΔREC_{it} = the change in receivables for firm *i* between years *t* and *t-1*

PPE_{it} = gross property, plant and equipment for firm *i* at the end of year *t*

ROA_{it-1} = return on assets for firm *i* at the end of year *t-1*

Other variables are as defined previously.

We then, calculate *NDACC* based on Equation (c), where we incorporate α_1 , α_2 , α_3 , and α_4 from regression Equation (b).

$$NDACC_{it} = \hat{\alpha}_1(1/TA_{it-1}) + \hat{\alpha}_2(\Delta REV_{it} - \Delta REC_{it})/TA_{it-1} + \hat{\alpha}_3(PPE_{it}/TA_{it-1}) + \hat{\alpha}_4 ROA_{it-1} \quad (c)$$

Where:

$NDACC_{it}$ = nondiscretionary accrual for firm *i* at the end of year *t*

Other variables are as defined previously.

Finally, we determine the *DACC* using Equation (d):

$$DACC_{it} = TACC_{it} - NDACC_{it} \quad (d)$$

UNDERINVESTMENT

We used the dummy variable 1 to represent underinvestment firm (*U*), and 0 otherwise. This firm should possess two characteristics: (1) sensitivity to internal cash flow with regard to investment (which reflects the liquidity constraint) and (2) high growth opportunity (Degryse & De Jong 2006; Morgado & Pindado 2003). High information asymmetry firms are sensitive to internal cash flow with regard to investment as they need to use internal cash flow more for investment purposes since they could not easily obtain external financing (Fazzari, Hubbard & Petersen 1988). Prior to allocating the variables, first, we identified the cash flow-investment sensitivity (CFIS) in order to separate firms into firms with and without cash flow-investment sensitivity. This separation is based on Equation (e), which was developed by Hovakimian and Hovakimian (2009):

TABLE 1. Sample of the study

Year	2001	2002	2003	2004	2005	2006	2007	Total
Initial observations	290	318	305	308	311	311	320	2,163
Less:								
Firms in finance, hotel and mining industries	17	22	13	15	19	24	21	131
Firms which have extreme observation	13	14	18	18	14	15	20	112
Final observation	260	282	274	275	278	272	279	1,920

$$CFIS = \sum_{t=1}^n \left(\frac{I_{it} \times CF_{it}}{\sum_{t=1}^n CF_{it}} \right) - \frac{1}{n} \sum_{t=1}^n I_{it} \quad (e)$$

Where, *CFIS* is cash flow-investment sensitivity, *n* is the total observation years for firm *i*, *t* is the observation period, *CF* is cash flow and *I* is investment. The *CFIS* value should be higher for firms that tend to invest more in years with relatively high cash flow and less in years with relatively low cash flow (Biddle & Hilary 2006). Firms with *CFIS* higher (lower) than the average *CFIS* from the sample are classified as having (not having) *CFIS*.

Second, we determined the market to book value ratio to measure the growth opportunity. A higher ratio predicts high growth opportunity for firms (Holthausen & Larcker 1992). Finally we categorized the firms as underinvestment if their values of *CFIS* and market to book value ratio are higher than the sample mean.

MULTIPLE REGRESSION MODEL

THE VALUE RELEVANCE OF ACCOUNTING INFORMATION

We used Ohlson's (1995) model (Equation 1) to measure the value relevance of accounting information. To examine the value relevance of earnings (*E*), earnings management and book value (*BV*), we classified *E* into managed earnings (*EM*), which is proxied by *DACC*, and unmanaged earnings (*UME*) (which consists of cash flow from operation (*CFO*) and *NDACC*). This is shown in Equation 2. We also incorporated Equation 3 to examine the value relevance of *UME* and *BV*. To do so, we examined the incremental explanatory power of earnings management (*EM*) beyond *BV* and *UME* by comparing the adjusted *R*² for Equation 2 with the adjusted *R*² for Equation 3. This approach had been used in Collins et al. (1997), Graham and King (2000), Ho, Liu and Sohn (2001) and Hassan, Percy and Stewart (2006).

$$P_{it} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 E_{it} + \varepsilon_{it} \quad (1)$$

where:

P_{it} = market value of firms' common equity measured three months following the financial year end for firm *i* at time *t*

BV_{it} = book value of equity for firm *i* at year end of time *t*

E_{it} = earnings for the year available to firm's common shareholders for firm *i* at time *t*

ε_{it} = error term

$$P_{it} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 UME_{it} + \alpha_3 EM_{it} + \varepsilon_{it} \quad (2)$$

where:

EM_{it} = managed earnings for the year available to firm's common shareholders for firm *i* at time *t*

UME_{it} = unmanaged earnings for the year available to firm's common shareholders for firm *i* at time *t*

The rest are as defined above.

$$P_{it} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 UME_{it} + \varepsilon_{it} \quad (3)$$

We believed that future growth and firm risk may affect the above relationships. Therefore, we included these variables as control variables, in Equations 2 and 3 as to determine whether our results are sensitive to the variables. We included size (*LogSize*) to represent future firm growth; and leverage (*Lev*) as a proxy for firm risk as it would increase the uncertainty on firm performance (Boot & Thakor 1993). Previous studies indicated that highly leveraged firms in some Asian countries have to pay a greater premium on external financing (Agung 2000; Driffield & Pal 2001). This reduces funds for investment, which reduces the ability of the firms to raise external financing (Agung 2000). These relationships are shown below:

$$P_{it} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 UME_{it} + \alpha_3 LogSize_{it} + \alpha_4 Lev_{it} + \varepsilon_{it} \quad (4)$$

$$P_{it} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 UME_{it} + \alpha_3 EM + \alpha_4 LogSize_{it} + \alpha_5 Lev_{it} + \varepsilon_{it} \quad (5)$$

where:

$LogSize_{it}$ = natural logarithm of total assets to firm's common shareholders for firm *i* at time *t*

Lev_{it} = leverage, total debt/total equity to firm's common shareholders for firm *i* at time *t*

The rest are as defined above.

To examine the roles of underinvestment (*UI*) in the value relevance of earnings management (*H*₂), an interaction variable is included in Equations 2 and 5. The interaction variable (*UI*EM*) is introduced to reflect the underinvestment as condition for informational (or otherwise opportunistic) earnings management. This relationship is shown below.

$$P_{it} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 UME_{it} + \alpha_3 EM_{it} + \alpha_4 UI * EM_{it} + \varepsilon_{it} \quad (6)$$

$$P_{it} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 UME_{it} + \alpha_3 EM + \alpha_4 LogSize_{it} + \alpha_5 Lev_{it} + \alpha_6 UI * EM_{it} + \varepsilon_{it} \quad (7)$$

where:

UI_{it} = dummy variable 1 for underinvestment and 0 otherwise for firm *i* at time *t*.

$UI*EM_{it}$ = interaction between underinvestment firm and earnings management for firm *i* at time *t*.

The rest are as defined above.

The above equations are also extended to include the interaction between *UI* and the other variables. This is shown in Equations 8 and 9.

$$P_{it} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 UME_{it} + \alpha_3 EM_{it} + \alpha_4 UI_{it} + \alpha_5 UI * BV_{it} + \alpha_6 UI * UME_{it} + \alpha_7 UI * EM_{it} + \varepsilon_{it} \quad (8)$$

$$P_{it} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 UME_{it} + \alpha_3 EM_{it} + \alpha_4 UI_{it} * BV_{it} + \alpha_5 UI_{it} * UME_{it} + \alpha_6 UI_{it} * EM_{it} + \alpha_7 LogSize_{it} + \alpha_8 Lev_{it} + \varepsilon_{it} \quad (9)$$

where:

$UI * BV_{it}$ = interaction between *UI* and *BV* of equity to firm's common shareholders for firm *i* at time *t*

$UI * UME_{it}$ = interaction between *UI* and *UME* to firm's common shareholders for firm *i* at time *t*

$UI * EM_{it}$ = interaction between *UI* and *EM* to firm's common shareholders for firm *i* at time *t*

The rest are as defined above.

RESULTS

DESCRIPTIVE RESULTS

Table 2 presents a pool sample of the underinvestment and non-underinvestment firms. There are 143 firms categorized as *UI* and 1,777 firms as non-underinvestment. These figures indicate that the sample is not balanced between both forms of companies, in that *UI* only represent 7% of the sample.

DESCRIPTIVE STATISTICS

Panel A of Table 3 indicates that the mean for market value per share is 0.8445 with a standard deviation of 0.4642. The minimum and maximum values of market value per share (*P*) are 0.0600 and 2.5500, respectively. Panel A also reports the mean, standard deviation and minimum and maximum values of *UME* and *BV* for our sample. The means, standard deviation, minimum

value and maximum value for both variables are 0.0694 (*UME*) and 1.6049 (*BV*), 0.2761 (*UME*) and 1.0082 (*BV*), -0.7910 (*UME*) and -1.0560 (*BV*) and 0.9347 (*UME*) and 4.7220 (*BV*), respectively. The mean of *EM* is 0.0309, which indicates that firms tend to increase earnings through *EM*. The standard deviation for *EM* is 0.2662, while the minimum and maximum values are -0.8200 and 0.8532, respectively.

In order to examine H_2 , we grouped our sample into underinvestment (*UI*) and non-underinvestment firms. This will help us to identify whether *UI* affects the relationship between *EM* and the value relevance of accounting information. The mean of *UI* firm is 0.0745 and standard deviation is 0.2626. The mean of *CFIS* for this study is 0.00713 and the mean for the market to book ratio is 1.1654. We also examined the descriptive statistics for both sample firms. Table 3 presents the descriptive statistics for the variables.

When panels B and C were compared, it reveals that *UI* firms (Panel B) performed better than non-underinvestment firms (Panel C). This can be seen from the log market value (*P*) and earnings per share. The mean *P* for *UI* is 1.5507, which is larger than the *P* of non-underinvestment firms (0.7876). The mean of *UME* for *UI* firms is higher (0.1748) than non-underinvestment firms (0.0610). Both groups reported a positive value for the mean of *EM*. However, in contrast to the above, *EM* mean for *UI* firms is lower (0.0100) than the non-underinvestment firms (0.0325). This indicates that non-underinvestment firms are aggressively managing their earnings compared to *UI* firms. Meanwhile, the standard deviation of *UME* per share for non-underinvestment firms is lower (0.2709) than the *UI* firms (0.3169). This might be because non-underinvestment firms are more aggressive in smoothing their income through *EM*. The mean of *BV* for *UI* firms is lower (1.3994) than the mean of *BV* per share for non-underinvestment firms (1.6215).

Table 4 presents results for the Pearson correlation matrix. It indicates that the highest correlation is at -0.6511, i.e. between *UME* and *EM*. According to Gujarati (2003) multicollinearity is not an issue since the correlation is lower than 0.80.

TABLE 2. Sample of underinvestment and non-underinvestment firms

	2001	2002	Year 2003	2004	2005	2006	2007	Total
Underinvestment firms	19	29	18	23	21	12	21	143
Non Underinvestment firms	241	253	256	252	257	260	258	1,777
Total	260	282	274	275	278	272	279	1,920

TABLE 3. Descriptive statistics

Panel A: Pool sample (n = 1,920)				
	Mean	Standard Deviation	Minimum	Maximum
<i>P</i>	0.8445	0.4642	0.0600	2.5500
<i>UME</i>	0.0694	0.2761	-0.7910	0.9347
<i>BV</i>	1.6049	1.0082	-1.0560	4.7220
<i>EM</i>	0.0309	0.2662	-0.8200	0.8532
<i>UI</i>	0.0745	0.2626	0.0000	1.0000
<i>LogSize</i>	12.5437	1.2248	9.5800	17.2600
<i>Lev</i>	25.5437	22.4118	0.0000	192.4400
<i>R</i>	0.1060	0.6519	-0.9259	14.5000
ΔUME	-0.5669	26.4259	-829.0063	546.6727
ΔEM	0.2110	61.4543	-1043.034	1785.289
Panel B: Underinvestment firms (n = 143)				
<i>P</i>	1.5507	0.3544	0.5700	2.4100
<i>UME</i>	0.1748	0.3169	-0.7910	0.9347
<i>BV</i>	1.3994	0.8912	0.0600	4.0010
<i>EM</i>	0.0100	0.2862	-0.8200	0.8532
<i>UI</i>	1.0000	1.0000	1.0000	1.0000
<i>LogSize</i>	13.2816	1.3335	10.9900	16.0800
<i>Lev</i>	30.7559	23.5894	0.0000	87.9500
<i>R</i>	0.5693	1.9463	-0.6196	14.5000
ΔUME	0.6643	9.3399	-64.4952	39.0437
ΔEM	-0.3177	19.2251	-175.6596	110.5643
Panel C: Non-underinvestment firms (n = 1,777)				
<i>P</i>	0.7876	0.4235	0.0600	2.5500
<i>UME</i>	0.0610	0.2709	-0.7910	0.9347
<i>BV</i>	1.6215	1.0155	-1.0560	4.7220
<i>EM</i>	0.0325	0.2645	-0.8200	0.8532
<i>UI</i>	0.0000	0.0000	0.0000	0.0000
<i>LogSize</i>	12.2702	1.1843	9.5800	17.2600
<i>Lev</i>	25.1242	22.2683	0.0000	192.4400
<i>R</i>	0.0687	0.3710	0.9259	5.6000
ΔUME	-0.6660	27.3400	-829.0063	546.6727
ΔEM	0.2535	63.6486	-1043.034	1785.289

Notes: *P* = market value of firms' common equity measured three months following the financial year; *UME* = unmanaged earnings for year available to firm's common shareholders (*OCF* and *NDACC*); *BV* = book value of equity for year available to firm's common shareholders *EM* = earnings management (*DACC*). *UI* = underinvestment firms. *LogSize* = Natural logarithm of total assets; *Lev* = Leverage, total debt divided by total equity. *R* = annual share return for firm *i* between the current year and last year; ΔUME = change of annual unmanaged earnings for year available to firm's common shareholders; ΔEM = change of annual managed earnings for year available to firm's common shareholders.

TABLE 4. Pearson correlation matrix

	<i>EM</i>	ΔEM	ΔUME	<i>P</i>	<i>LEV</i>	<i>LogSize</i>	<i>BV</i>	<i>UME</i>	<i>R</i>	<i>UI</i>
<i>EM</i>	1.0000									
ΔEM	0.0431	1.0000								
ΔUME	0.0017	-0.0172	1.0000							
<i>P</i>	0.0745 ***	0.0170	0.0010	1.0000						
<i>LEV</i>	-0.0374	-0.0338	-0.0262	-0.2510 ***	1.0000					
<i>LogSize</i>	0.0437	0.0062	-0.0006	0.5830 ***	-0.1375 ***	1.0000				
<i>BV</i>	0.1397 ***	-0.0072	0.0063	0.5681 ***	-0.2762 ***	0.3188 ***	1.0000			
<i>UME</i>	-0.6511 ***	-0.0398	0.0153	0.3537 ***	-0.1592 ***	0.2346 ***	0.2317 ***	1.0000		
<i>R</i>	0.0082	0.0462 **	0.0130	0.1833 ***	0.0492 **	0.0869 ***	-0.0195	0.0329	1.0000	
<i>UI</i>	-0.0222	-0.0024	0.0132	0.4317 ***	0.0660 ***	0.2169 ***	-0.0578 **	0.1083 ***	0.2017 ***	1.0000

Notes: *** Significant at $p < 0.01$, ** significant at $p < 0.05$ (two tails)

RESULTS OF REGRESSION ANALYSIS

VALUE RELEVANCE OF EARNINGS MANAGEMENT

Table 5 reports the results of H_1 which examine whether earnings management (managed earnings) affects the value relevance of unmanaged earnings and book value. Column 3 presents the results for Equation 3, and Column 2 presents the results for Equation 2. We examined H_1 based on the fixed effect since the p values of the Hausman test for both models are significant at 0.00 (Gujarati 2003). The chi square is 15.8139 for Equation 2 and 10.2550 for Equation 3.

The focus of this test is on coefficients α_1 , α_2 and α_3 , which show the relationships between BV , UME and EM , and the share price of the firms. Column 3 indicates that the coefficient of UME is positive and significant (0.3393, $p < 0.01$). Similar results are also found for BV (0.2381, $p < 0.01$). Our findings indicate that accounting information (UME and BV) is value relevant. The adjusted R^2 for this model is 0.4388. Column 2 indicates that α_2 is positive and significant (0.6887, $p < 0.01$). The coefficient of BV (α_1) is also significant (0.1988, $p < 0.01$). Our results also indicate that α_3 is positive and significant (0.4915, $p < 0.01$). These findings indicate that UME , BV and EM are value relevant. The adjusted R^2 for the model is 0.4746.

Graham and King (2000), Ho et al. (2001) and Hassan et al. (2006) examined the value relevance of accounting information in a form of explanatory power of variables. They compared the adjusted R^2 of the equation with and without certain variables. Following their studies, we compared the adjusted R^2 of Equation 3 with the adjusted R^2 Equation 2. This procedure assesses whether EM is value relevant and provides incremental

explanatory power beyond the BV and UME (Hassan et al. 2006). Column 2 indicates that EM provides incremental explanatory power beyond BV and UME ($\text{Adj } R^2_{EM/UME}$) with incremental value 0.0358. Based on the above, we therefore believed that H_1 is supported, i.e. EM is value relevant and it affects the value relevance of accounting information. Our findings are consistent with the present of firms size (LogSize) and leverage (Lev) (Equation 4 and 5). Columns 4 and 5 of Table 5 indicate that EM provides incremental explanatory power beyond BV and UME ($\text{Adj } R^2_{EM/UME}$) with incremental value of 0.0636.

The above results indicate that EM increases the value relevance of accounting information. The increase in the adjusted R^2 after EM is included in Equation 2 and Equation 5, which indicates that earnings management is used for informative purposes; and, hence, it is used by investors in investment decision-making. These findings support the signalling theory in which firms use EM to convey private information to market participants to indicate their good performance (Arya et al. 2003). Thus, informational EM influences the confidence level of investors about firm performance. As a consequence, the market will react positively; which is reflected by an increase in share price. These findings are consistent with Arya et al. (2003), Krishnan (2003) and Siregar and Utama (2008). These studies indicate that managers managed their earnings to convey private information in order to increase the quality and value relevance of the accounting information. Hence, our evidence refutes prior understanding that earnings management leads to negative implication, such as distorting information which lead to over-investment (McNichols & Stubben 2008) or inefficiency in investment (Biddle et al. 2009).

TABLE 5. Earnings management and the value relevance of accounting information (Fixed effect)

Variables	Equation 2	Equation 3	Equation 4	Equation 5
$BV(\alpha_1)$	0.1988 (42.3144) ***	0.2381 (25.8520) ***	0.1759 (22.1999) ***	0.1547 (17.4416) ***
$UME(\alpha_2)$	0.6887 (16.7254) ***	0.3393 (10.5049) ***	0.2486 (9.1607) ***	0.4673 (11.3471) ***
$EM(\alpha_3)$	0.4915 (12.6312) ***	-	-	0.3346 (8.1708) ***
LogSize	-	-	0.1561 (24.6466) ***	0.1434 (20.9793) ***
Lev	-	-	-0.0014 (-4.0430) ***	-0.0012 (-3.3003) ***
F-Stat	7.1029	6.2690	531.0334	10.5959
(Prob)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Adj R^2	0.4746 (B)	0.4388 (A)	0.5249 (C)	0.5885 (D)
Adj $R^2_{EM/UME}$	0.0358 (B-A)	-	-	0.0636 (D-C)
Hausman test	15.8139	10.2550	13.5020	17.7728
chi square	(0.0012)	(0.0059)	(0.0091)	(0.0032)
(p value)				

Notes: Figure in () is standard deviation, *** Significant at $p < 0.01$, ** significant at $p < 0.05$ (two tails), (n=1,920)

UNDERINVESTMENT AND VALUE RELEVANCE OF
EARNINGS MANAGEMENT

Table 6 presents results for H_2 concerning the role of underinvestment toward the value relevance of earnings management. Column 2 presents results for Equations 6 which extended Equation 2. Equation 6 indicates that earnings management, and the other variables, i.e. *UME* and *BV* are value relevant. However, the value relevance of earnings management within the underinvestment firms (*UI*EM*) has been reduced ($\alpha_4 = -0.7667$, $p < 0.0000$). The result is consistent even where the interactions between *UI* and *BV*, *EM* and *UME* (Equation 8) and the control variables (Equation 9) are considered. A negative relationship has also been reported for *UME* ($\alpha_5 = -0.8677$, $p < 0.0000$). This indicates that earnings management within underinvestment firms could have been used in an opportunistic way. These findings are consistent with Dechow and Skinner (2000), Whelan and McNamara (2004) and Habib (2004). However, a positive relationship is reported for the interaction between *UI* and *BV* (Equations 8 and 9).

Findings from Equation 6 in Table 6 versus Equation 2 in Table 5 as well as from Equation 8 in Table 6 versus Equation 4 in Table 5 are consistent in that all *EMs* are positive and significantly associated with firms' market values (*P*). However, the negative coefficient for only *UI*EM* suggests that in our sample,

among the underinvestment firms, there is a tendency among the investors to actually perceive that managers provide opportunistic earnings management rather than informative earnings management. In terms of H_2 , we believed our findings do support H_2 in that the value relevance of *EM* is moderated among underinvestment firms in our sample.

We further believed that the structure of the underinvestment and non-underinvestment firms might be different. Therefore, we re-estimated Equation 2 to Equation 5 (Table 5) for both sample firms. These analyses are reported in Table 7; Panel A for underinvestment firms and Panel B for non-underinvestment firms. Column 3 Panel A indicates that the coefficient of *UME* is positive and significant ($\alpha_2 = 0.3830$, $p < 0.01$). Similar results are also found for *BV* ($\alpha_1 = 0.1586$, $p < 0.01$). Our findings indicate that accounting information (*UME* and *BV*) is value relevant among underinvestment firms. The adjusted R^2 for Equation 3 is 0.4512.

Column 2 Panel A indicates that the coefficient of *UME* (α_2) is positive and significant ($\alpha_2 = 0.3236$, $p < 0.01$). The coefficient of *BV* is also significant ($\alpha_1 = 0.1358$, $p < 0.01$). Our results also indicate that the coefficient of *EM* is positive and significant ($\alpha_3 = 0.2644$, $p < 0.01$). These findings indicate that *UME*, *BV* and *EM* are value relevant among underinvestment firms. The adjusted R^2 for Equation 2 is 0.4784.

TABLE 6. Underinvestment and the value relevance of earnings management, unmanaged earnings and book value (Fixed effect)

Variables	Equation 6	Equation 7	Equation 8	Equation 9
<i>BV</i>	0.1902 (19.7757) ***	0.1525 (17.1614) ***	0.1910 (21.8162) ***	0.1586 (19.6164) ***
<i>UME</i>	0.8344 (16.4842) ***	0.5357 (11.2100) ***	0.7779 (15.2704) ***	0.4470 (9.1214) ***
<i>EM</i>	0.6589 (12.4618) ***	0.4106 (8.3741) ***	0.6248 (12.2412) ***	0.3470 (7.1950) ***
<i>LogSize</i>	-	0.1402 (20.2511) ***	-	0.1225 (19.1798) ***
<i>Lev</i>	-	-0.0011 (-2.9405) ***	-	-0.0017 (-5.0512) ***
<i>UI*Bv</i>	-	-	0.4637 (18.6748) ***	0.3808 (16.7362) ***
<i>UI*UME</i>	-	-	-0.8677 (-6.9403) ***	-0.4396 (-3.8442) ***
<i>UI*EM</i>	-0.7667 (-6.0069) ***	-0.3267 (-2.8044) ***	-0.9277 (-7.9992) ***	-0.5374 (-5.0627) ***
F-Stat (Prob)	7.3564 (0.0000)	10.6307 (0.0000)	10.4547 (0.0000)	14.2355 (0.0000)
Adj R ²	0.4856	0.59022	0.5858	0.6659
Hausman test chi square (p value)	15.3642 (0.0040) ***	19.3373 (0.0036) ***	18.3275 (0.0055) ***	19.3765 (0.0130) **

Notes: Figure in () is standard deviation. *** and ** Significant at $p < 0.01$ and at $p < 0.05$ (two tails) respectively. *UI* = underinvestment firm, which represented by a dummy variable 1 for underinvestment and 0 otherwise. *UI*Bv* = interaction between underinvestment firm and book value of equity; *UI*UME* = interaction between underinvestment firm and unmanaged earnings; *UI*EM* = interaction between underinvestment firm and managed earnings. Other variables are as define in Table 5.
(n = 1,920)

Table 7 Panel B reports the results for non-underinvestment firms. We examined H_2 for non-underinvestment firms based on the fixed effect. The chi squares for Equations 2 to 5 are between 10.1067 and 17.9333. Column 3 Panel B reports that the *UME* and *BV* are value relevant among our non-underinvestment firms. The coefficients for *UME* and *BV* are 0.2580 and 0.2671, respectively. Both are significant at $p = 0.01$. The adjusted R^2 for this model (Equation 3) is 0.5304. Column 2 Panel B indicates that the coefficient of *UME* (α_2) is 0.7480 and significant at $p < 0.01$. The coefficient of *BV* (α_1) is 0.2231 and significant at $p < 0.01$. Our results

also indicate that the coefficient of *EM* is significant ($\alpha_3 = 0.5956$, $p < 0.01$). These findings indicate that *UME*, *BV* and *EM* are value relevant among our non-underinvestment firms. The adjusted R^2 for Equation 2 is 0.5743. Column 2 Panel B indicates that *EM* provides incremental explanatory power beyond *BV* and *UME* with an incremental value of 0.0439 among our non-underinvestment firms.

H_2 examines the role of underinvestment on the value relevance of earnings management and other accounting information (i.e. unmanaged earnings and book value). To assess this, we compared the Adj

TABLE 7. Underinvestment and the value relevance of earnings management, unmanaged earnings and book value

Variables	Equation 2	Equation 3	Equation 4	Equation 5
<i>Panel A: Underinvestment (n = 143) (Random Effect)</i>				
<i>BV</i>	0.1358 (4.0790) ***	0.1589 (4.7121) ***	0.1586 (4.6442) ***	0.1358 (4.0391) ***
<i>UME</i>	0.3236 (3.4745) ***	0.3393 (4.0489) ***	0.3830 (3.9933) ***	0.3215 (3.4210) ***
<i>EM</i>	0.2544 (2.9266) ***	-	-	0.2560 (2.9195) ***
<i>LogSize</i>	-	-	-0.0079 (-0.4639)	-0.0079 (-0.4785)
<i>Lev</i>	-	-	-0.0004 (-0.3633) ***	-0.0004 (-0.4813)
F-Stat (Prob)	44.4200 (0.0000)	59.3812 (0.0000)	29.4397 (0.0000)	26.4106 (0.0000)
Adj R ²	0.4784 (B)	0.4512 (A)	0.4448 (C)	0.4722 (D)
Adj R ² _{EM/UME}	0.0272 (B - A)	-	-	0.0274 (D - C)
Hausman test chi square (p value)	1.2478 (0.7416)	0.3666 (0.8325)	1.2683 (0.8667)	2.6234 (0.7578)
Variables	Equation 2	Equation 3	Equation 4	Equation 5
<i>Panel B: Non-underinvestment (n = 1,777) (Fixed Effect)</i>				
<i>BV</i>	0.2231 (26.5927) ***	0.2671 (33.4355) ***	0.2002 (26.4163) ***	0.1845 (23.6705) ***
<i>UME</i>	0.7480 (15.6501) ***	0.2580 (9.0462) ***	0.1451 (5.7702) ***	0.4176 (9.0387) ***
<i>EM</i>	0.5956 (12.4576) ***	-	-	0.3165 (6.9852) ***
<i>LogSize</i>	-	-	0.1327 (21.1395) ***	0.1205 (18.7725) ***
<i>Lev</i>	-	-	-0.0023 (-6.9180) ***	-0.0018 (-5.5086) ***
F-Stat (Prob)	9.4661 (0.0000)	8.1121 (0.0000)	12.6010 (0.0000)	13.1302 (0.0000)
Adj R ²	0.5743 (B)	0.5304 (A)	0.6498 (C)	0.6606 (D)
Adj R ² _{EM/UME}	0.0439 (B - A)	-	-	0.0108 (D - C)
Hausman test chi square (p value)	14.9085 (0.0019)	10.1067 (0.0064)	12.9647 (0.0114)	17.9331 (0.0030)

Notes: Figure in () is standard deviation. *** Significant at $p < 0.01$ (two tails)
All variables are as defined in previous tables.

$R^2_{EM/UME}$ for underinvestment firms (Table 7 Panel A) with the Adj $R^2_{EM/UME}$ for non-underinvestment firms (Table 7 Panel B). Our results indicate that the Adj $R^2_{EM/UME}$ for non-underinvestment firms (0.0439) exceeds the Adj $R^2_{EM/UME}$ for underinvestment firms (0.0272). The positive relationship between EM and firms' market values in underinvestment firms is weaker compared to non-underinvestment firms (t-statistic of EM in Panel A for underinvestment firms is at 2.9266 versus t-statistic of EM in Panel B for non-underinvestment firms is at 12.4576). Thus, we believed that H2 is supported in that underinvestment firms moderate the value relevance of EM . This finding is consistent with our finding in Table 6 for Equations 6 to 9 with regard to the negative coefficient of variable $UI*EM$.

The above findings do not support our expectation that underinvestment firms provide high quality accounting information. We expect high quality disclosure to increase the liquidity and demand for shares (Diamond & Verrecchia 1991), reduce the cost of capital (Clarkson et al. 1996; Botosan 1997), and reduce information asymmetry (Kim & Verrecchia 1994; Brown, Stephen & Lo 2004). We expect underinvestment firms to be motivated to provide high quality information through informational earnings management in order to reduce information asymmetry and liquidity constraints. However, our finding indicates that underinvestment has become a condition perceived by investors for managers to undertake opportunistic earnings management among Malaysian firms. Managers are perceived by investors to pursue their personal welfares rather than maximising shareholders' wealth (Jensen & Meckling 1976).

ADDITIONAL ANALYSES

As the main objective of this study is to examine the value relevance of earnings management and prior studies argued on the drawbacks of the price model (Chen, Chen & Su 2001), hence the returns model was also adopted. This, hopefully, will overcome the scale effects in the price model (Lin & Chen 2005). We expected the utilization of the returns model would support our findings from the price model based on Ohlson (1995). We also expected our findings to be consistent with Chen et al. (2001) and Lin and Chen (2005). The return model used in this study is as follow.

$$R_{it} = \alpha_0 + \alpha_1 UME_{it} + \alpha_2 \Delta UME_{it} + \alpha_3 EM_{it} + \alpha_4 \Delta EM_{it} + \varepsilon_{it} \quad (10)$$

While the returns model incorporating the interaction effect is as follows:

$$R_{it} = \alpha_0 + \alpha_1 UME_{it} + \alpha_2 \Delta UME_{it} + \alpha_3 EM_{it} + \alpha_4 \Delta EM_{it} + \alpha_5 UI_{it} * UME_{it} + \alpha_6 UI_{it} * EM_{it} + \alpha_7 UI_{it} * \Delta UME_{it} + \alpha_8 UI_{it} * \Delta EM_{it} + \varepsilon_{it} \quad (11)$$

Where:

- R_{it} = annual share return for firm i between the current year and prior year
 ΔUME_{it} = change of annual unmanaged earnings for the year available to firm's common shareholders for firm i at time t
 ΔEM_{it} = change of annual managed earnings for year available to firm's common shareholders for firm i at time t
 $UI_{it} * \Delta UME_{it}$ = interaction between underinvestment firm and change in unmanaged earnings for the year available to firm's common shareholders.
 $UI_{it} * \Delta EM_{it}$ = interaction between underinvestment firm and change in managed earnings for the year available to firm's common shareholders.

Other variables are as defined in other tables.

Our analyses indicate that UME (0.2422) and EM (0.2804) for Equation 10 are positively related to change in market value at $p < 0.01$. These findings are consistently significant after the interaction between underinvestment and the four earnings components were examined (Equation 11). However, both ΔEM and ΔUME are not significantly associated with share returns. Our finding also indicates that underinvestment reduces the value relevance of EM . The coefficient for the $UI*EM$ is -0.3287 and significant at $p < 0.05$ with change in market value. This finding is consistent with findings based on the Ohlson model. This indicates that EM is not informative among underinvestment firms. Finding suggests that investors perceived managers to convey opportunistic earnings management among underinvestment firms in Malaysia.

In addition to the above analysis, we believed that capital intensity or type of industry might affect our main findings for hypothesis 2 (Equations, 2, 3, 4 and 5). This is because profitability, growth and capital intensity are important drivers of free cash flow and the value of the firm (Miller & Mathisen 2004). Capital intensity can be associated with type of industry such as airlines, oil production and refining, telecommunication, mining and chemical plants as these firms use a large portion of their capitals to buy fixed assets. In order to perform this analysis, we included a dummy variable to represent seven categories of industry of our sample. These industries are of industrial product which represents 27.66% of our sample, trade services (22.92%), property (15.36%), consumer product (13.49%), construction (8.91%), plantation (7.08%) and technology (4.58%). In view that the number of firms in technological industry is small and to avoid bias in our findings, we included a dummy variable one (1) to represent one industry and zero (0) otherwise. However, industrial product and plantation are excluded from the analyses; whereby the former industry represents the highest number of firm in the sample, while for the latter we found that there is no plantation firm being classified as underinvestment

firms. Therefore, in total, our industry dummy variable to re-estimate Equations 4 and 5 is five (5).

Our other results provide consistent findings as reported in Table 7. We found that *BV*, *UME* and *EM* remain significant for both underinvestment and non-underinvestment categories. *BV* and *UME* are significant at $p < 0.01$ for Equations 2 and 3 for both underinvestment and non-underinvestment categories. Our analyses also indicate that earnings management is significant at $p < 0.05$ and $p < 0.01$ for underinvestment and non-underinvestment, respectively. Consistent with the main analysis, the additional analysis, which incorporates five dummy variables for category of industry, indicates that the Adj $R^2_{EM/UME}$ for non-underinvestment (0.0536) still exceeded the Adj $R^2_{EM/UME}$ for underinvestment firms (0.0221). The positive relationship between EM and firms' market values in underinvestment firms remained weaker (t-statistics 2.5605) compared to non-underinvestment firms. The results are consistent even after we included *LogSize* and *Lev* in Equations 4 and 5.

CONCLUSION

The purpose of this study is to test the relationship between earnings management and firm share price (value relevance of earnings management), and the role of underinvestment on the relationship between earnings management and share price. In the present study, we contribute to the literature in accounting (earnings management and value relevant), as well as finance (underinvestment) by providing additional conditions for the possibility of informational or non-informational earnings management to occur within the Malaysian context. Our condition specifically involved investigation of whether the relationship is moderated by an underinvestment problem.

Our results indicate that unmanaged earnings, book value and earnings management are value relevant to our sample firms. Our study also indicates that earnings management provides incremental value beyond unmanaged earnings and book value. Our results generally support the informational perspective that earnings management contributes to the value relevance of accounting information. However, our results indicate that underinvestment moderates the relationship between earnings management and the value relevance of accounting information. The positive relationship between *EM* and the value relevance of accounting information is weaker among underinvestment firms. Thus, we suggest that underinvestment can reduce the value relevance of accounting information (*EM*, *UME* and *BV*). These findings are unique and can be catalysts for future research in investigating other conditions that motivate managers to perform informational earnings management. This can provide new knowledge on earnings management from the informative perspective, which differs from the current practice that investigates earnings management from the opportunistic perspective only.

The findings from this study may be relevant to the policy makers, practitioners and researchers. Our study indicates that in general, earnings management is informative, in that it increases the value relevance of accounting information. This indicates that regulators and standard setters, while developing or proposing accounting standards, should allow managers to use their discretion to convey internal information for better decisions. This holds true, particularly for underinvestment firms, which may use earnings management to convey internal information (high quality accounting information) and reduce information asymmetry and cost of capital. Hence, this would attract external investors to finance their profitable projects. However, our analysis results suggest that in Malaysia, investors do not generally perceived earnings management among underinvestment firms as pure informative information. As such our study indicates that underinvestment could be one of the conditions that motivates managers to perform informational earnings management to some extent. We believed that these findings contribute to the limited studies that examine the role of underinvestment in motivating managers to perform informational earnings management. However, informational perspective is not conclusive because investors do not always perceived earnings management among underinvestment firms to be informative.

We acknowledged that this study is subjected to several limitations. Firms that are excluded from the sample might influence our results and might raise questions of internal validity. In addition, the sophistication and capital market efficiency in Malaysia is different from other countries. The generalization of our findings to other countries should be undertaken with caution due to diversity in accounting standards and regulations. Even though underinvestment firms tend to reduce information asymmetry through earnings management to some extent, their objective in decreasing the cost of capital is still unknown. Sample period might limit our generalisation to the different economics environment. Therefore, future research might consider multiple economics condition such as global economics crisis and convergence to the IFRS period. Future research may investigate whether earnings management by underinvestment firms reduces the cost of capital. Future research might also want to examine the effect of earnings management on the future profitability of underinvestment firms.

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