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THE EXTENT TO WHICH EARNINGS ARE MANIPULATED IN THE CONSTRUCTION SECTOR OF THE STOCK EXCHANGE OF THAILAND AND ITS EXOGENOUS MACROECONOMIC FACTORS

Abstract:

This study aims to investigate the earnings manipulation phenomena in the construction sector of the Stock Exchange of Thailand. Our examination is divided into two stages. In the first stage, we use the M-score model developed by Beneish (1999) to calculate the extent to which earnings are manipulated by Thai construction companies listed in the SET during the past ten years. This will allow us to ascertain the level of earnings management engaged by these firms during several critical periods, e.g., the period before the US subprime mortgage crisis arose, during the crisis period, and the post-crisis period, and in addition, the period before the political crisis leading to an establishment of the military government and the period after. The second stage of our examination deals with potential macroeconomic factors that affect the probability of earnings manipulation revealed by construction companies. These variables include cement materials price index, steel material price index, fixed capital formation, gross domestic product. Our control variables include total accruals to total assets ratio, debt to equity ratio, market capitalization, and return on assets. Our preliminary results reveal that reveals that the level of earnings management in the construction sector of the SET exceeds the benchmark M-score value of -2.22 in the second and third quarters of 2009 (during the subprime crisis). This phenomenon is encouraging especially for the Securities and Exchange Commission (SEC) of Thailand. It implies that the SEC's strict reporting regulations have resulted in the level of earnings manipulation in the construction sector of Thailand being low recently. Nevertheless, Thai construction firms have shown an incentive to conduct earnings manipulation activities during the global financial crisis period. Further analysis shows that debt to equity ratio, market capitalization, and steel materials price index are negatively related to the manipulation index at the 95% confidence level. Only the total accruals to total assets ratio is positively related to the manipulation index at the 95% confidence level. On the other hand, return on assets, cement materials price index, gross domestic product, gross domestic fixed capital formation, and the SET index are found to exert no significant influence over the manipulation index.

Keywords:

earnings manipulation, M-score model, construction sector of the Stock Exchange of Thailand

1 Introduction

The objective of this study is to use the Beneish M-score model, developed by Beineish (1999), to detect financial fraud. Our investigation emphasizes on the construction sector of the Stock Exchange of Thailand (SET). Construction firms are considered as one of the most natural earnings manipulators among Thai business players, with high level of uncollected income often recorded during the end of the year to inflate end-of-quarter sales. Construction companies do this by offering significant discounts and other promotional methods to customers to finalize sales of their developed properties during the last minute of their accounting period. However, cash payments are usually postponed to the next accounting period. In addition, the construction business requires high working capital, incentivising the companies to use earnings management technique to inflate their earnings during the construction phase when great amount of expenditure is present. Different profit margins are collected by these companies throughout the life of their developed project. Properties built during the first and the last few phases are associated with lower margin than those constructed in the middle of the project. This encourages firms to use different earnings manipulation techniques to smooth their income to avoid a bad financial performance that will escalate dipping in their stock price.

All listed companies in Thailand are administered by the Securities and Exchange Commission (SEC) under the Securities and Exchange Act B.E. 2535 (SEC Act). The SEC Act established both the SEC and the SET; the latter of which is the only institution authorized to operate a securities exchange in Thailand. Thailand is known to have a successful financial system that is protected by stringent securities laws governing the management of institutions listed on the SET. One may say that firms in the construction sector are subjected to a set of strict regulations designed to create market transparency between these institutions and the individuals and corporations with whom they conduct business. Thus, the chance of them performing a financial statement fraud, e.g., fictitious revenues, too low expense report, and so forth, should be low. However, several studies on earnings manipulation (e.g., Morgan, 2002; Shen and Chih, 2005; Charoenwong and Jiraporn, 2009) argue that even highly-regulated firms still have an incentive to adopt earnings management in order to avoid violating regulations or to keep customers & shareholders from losing confidence in them. The rapid development of Thailand’s property market, the (recently) heavy infrastructure investment by the Thai government, the sluggish bidding processes in Thai government projects, and the subsequent aregulatory changes provide an excellent research and experimental setting in which to examine the relationship between macroeconomic factors and corporate earnings management behaviour in an emerging market.

Our examination is divided into two stages. In the first stage, we use the M-score model developed by Beneish (1999) to calculate the extent to which earnings are manipulated by Thai construction companies listed in the SET during the past ten

years. The second stage of our examination deals with macroeconomic factors that affect the probability of earnings manipulation revealed by construction companies.

The remainder of this paper is organized as follows. Section 2 discusses related literature that motivates the paper. Section 3 explains research methodology employed and data sources. Section 4 provides empirical results and discussions, while Section 5 concludes the study.

2 Related literature

Earnings manipulation is usually referred to an effort made by firm managers or executives to manipulate earning figures in financial reporting via several accounting practices such as recognizing one-time non-recurring items, deferring or accelerating expense or revenue transactions, or using other methods designed to influence short-term earnings (Aker et al., 2007). These accounting practices may be motivated from managerial opportunism in terms of taking advantage of compensation plans, e.g., overstating the reported profit in order to demonstrate the firm's performance and obtain incentive payments (Healy, 1985; Baker et al., 2003; Bregstresser and Philipon, 2006; Kuang, 2008) and understating the reported earnings in order to reduce the current market price of the common stock, leading to the lower exercise price of stock options that allows managers to receive more benefits from the employee stock ownership plan (Baker et al., 2003). Earnings manipulation is a hot topic that has attracted the interest of academics, regulators, and practitioners worldwide since it negatively reflects the quality of earnings information, which is an important tool that help investors make decisions in common stock investment (Chansarn and Chansarn, 2016).

The literature on earnings management specifies a number of ways to quantify the level of financial reporting fraud. Most measurement tools are based on accruals of companies, especially the aggregated accruals Jones model (Jones, 1991) and the Modified Jones model (Dechow et al., 1995). A weakness of these popular models is that they do not specify a threshold that indicates the existence of earnings management. M-score model is built by Beneish (1999) using interrelations between balance sheets, income statements and statement of cash flow to calculate the probability of accounting fraud. This means that the model does not require a subjective threshold to indicate the existence of fraud. Thus, several researchers (e.g., Warshavsky, 2012; Beneish et al., 2013; Paolone and Magazzino, 2014) believe that the M-score is a reliable tool to detect accounting fraud or to support editors and investment professionals. This is why the model has been applied to different listed companies worldwide in order to detect the existence of earnings management. Some recent examples of M-score studies include Beneish (1999) and Beneish et al. (2013) in the US, Paolone and Magazzino (2014) in Italy, and Anh and Linh (2016) in Vietnam.

The body of literature on earnings manipulation is large and can be broadly categorized into two groups. The first literature network emphasises the effects of income fraud on a number of variables. Several researchers examine the influence of

earnings management on dividend policy of listed companies. Contrasting results have been reported. For example, Morghri and Galogah (2013) and Chansarn and Chansarn (2016) argue that earnings management positively influences dividend policy of listed companies, while Savov (2006) find a negative impact of income manipulation on dividend payments.

Different opinions have been reported regarding whether or not earnings management is beneficial to the firm value. Magrath and Weld (2002), Yaping (2006), and Jiraporn et al. (2008) find that earnings management benefits the firm. The rationale behind this notion is that earnings management reduces the volatility of earnings, which in turn, will lower the level of firm perceived risks by investors and increase the value of the firm. On the other hand, Beneish et al. (2013) provide empirical evidence that companies with a higher probability of accounting fraud earn lower returns on every decile portfolio sorted by size, book-to-market, momentum, accruals, and short interest. The reason is that that fraudulent financial reporting imposes huge costs on financial markets. These accounting misrepresentations increase transaction costs by eroding investor confidence in the integrity of the capital markets.

Another research camp of earnings management investigates different factors affecting the level of accounting fraud. Several researchers, e.g., Beasley (1996), Xie et al. (2003) Peasnell et al. (2005), Ahmed et al. (2006), Shen and Chih (2007), Wang et al. (2011), Hazarika et al. (2012), and Mohamad et al. (2012), attempt to find the influence of corporate governance on earnings management. The general conclusion is that corporate governance has provided the important role to reduce managerial opportunism. Good corporate governance elements such as board members from financial institution or institutional shareholders, board members with financial backgrounds, and frequent board meetings can effectively help to restrain the earnings management activities.

Similarly, several previous studies, e.g., Shen and Chih (2005), Defond et al. (2007), and Leuz et al. (2013), reveal that investor protection also plays the important role in restricting earnings management behavior. In particular, countries or industries with strong investor protection in either outside investor rights or legal tend to have a lower level of aggregate earnings management measures.

There are also several recent studies that investigate the impact of exogenous macroeconomic factors on earnings management behavior, such as human and economic development, economic freedom (Riahi-Belkaoui, 2004); legal system, including the rules and their enforcement (Leuz et al., 2003); cultural values (Han et al., 2010) and; audit quality (Tendeloo and Vanstraelen, 2008). Other recent studies attempt to document the interplay between the sentiment of market participants, especially during economic or financial crises, and financial reporting choices of management (e.g., Han and Wang, 1998; Gassen and Markarian, 2009; Choi et al., 2011; Silva et al., 2014). Results generally imply that in high-fear periods, managers tend to exhibit earnings management behaviors. The motivation for such fraudulent

practices is, for example, to adjust earnings in order to avoid negative impact of higher political costs (Han and Wang, 1998; Chen et al., 2011).

In Thailand, there are several studies conducted on earnings manipulation. Recent examples include Charoenwong and Jiraporn (2009) that conduct the t-like statistic test to seek evidence of earnings management to report zero or positive profits in financial institutions and non-financial companies, Kiatapiwat (2010) that investigates the association of controlling shareholders & audit committee effectiveness and earnings quality in non-financial firms, Tangjitprom (2012) who examines the role of investor protection and corporate governance on reducing the level of earnings management, Likitwongkajon and Sutthachai (2015) that explore whether the adoption of International Financial Reporting Standards mitigate accrual earnings management, and Chansarn and Chansarn (2016) that scrutinize how earnings management affects dividend policy of small and medium enterprises. By going through the literature on Thai studies of earning managements, it has been found that there are too few studies which focus on the influence of external macroeconomic factors on firms' earnings management. Most Thai studies also employ the Jones model and the Modified Jones model to calculate the level of earnings manipulation. These popular measurement frameworks, however, do not allow researchers to verify the statistical significance earnings manipulation. Furthermore, there have never been genuine attempts to determine the behavior of earnings management in Thailand during a period of the latest subprime mortgage crisis; a global phenomenon that chiefly affected construction companies worldwide. We make an effort to fill these literal gaps.

3 Research design

In this section, we present the methodological procedures for the development of the research. Initially, we present the operational definition of the variables, followed by the regression models used to analyze the data, and sample selection.

3.1 Variable definitions

In order to develop our regression models and establish the sample selection criteria, we first defined the operational variables in three groups: dependent variable, independent variables or variables of interest and control variables.

3.1.1 Dependent variable

To test our hypotheses, we use the manipulation score (M-score) as our dependent variable. M-score is calculated by using the following (unweighted) probit model, as in Beneish (1999).

$$\textit{M-score} = -4.84 + 0.920(DSR) + 0.528(GMI) + 0.404(AQI) + 0.892(SGI) + 0.115(DEPI) - 0.172(SGAI) + 4.679(\textit{Accruals}) - 0.327(LEVI) \quad (1)$$

The model features eight accounting-based variables, each of which is constructed so that higher values are associated with a greater chance of earnings manipulation. A description of the variables and the rationale for their inclusion are provided in Table

1. If the *M-score* is greater than the benchmark value of -2.22, the company should be flagged as the earnings manipulator.

The probability of earnings manipulation for a particular M-score can be computed using the following formula:

$$Prob(Earnings\ Manipulation|M\text{-}score) = \Phi(M\text{-}score) \quad (2)$$

where Φ is the cumulative distribution function of the standard normal distribution. For example, $\Phi(-1.96)$ is 0.025, indicating a 2.5% chance that the company is fraudulently reporting.

Table 1. Description of variables used to compute the M-score and rationale for inclusion.

Variable	Description	Rationale
DSR	$\frac{\left[Receivable_t / Sales_{t-1}\right]}{\left[Receivable_{t-1} / Sales_{t-1}\right]}$	An increase in *DSR* can be a result of revenue inflation.
GMI	$\text{Gross margin}_{t-1} / \text{Gross margin}_t$ where Gross margin = 1 – costs of goods sold/sales.	If *GMI* > 1, the company has deteriorating margins, which induce managers to manipulate its revenue.

Table 1 (continued). Description of variables used to compute the M-score and rationale for inclusion.

Variable	Description	Rationale
AQI	$\frac{\left[1 - PPE_t + CA_t / TA_t\right]}{\left[1 - PPE_{t-1} + CA_{t-1} / TA_{t-1}\right]}$ where *PPE* is net plant, property and equipment, *CA* is current assets, and *TA* is total assets.	If *AQI* > 1, the company has a tendency of avoiding expenses by capitalizing and deferring costs to preserve profitability.
SGI	$Sales_t / Sales_{t-1}$	If *SGI* > 1, the company has a positive growth, which induces managers to manipulate sales and earnings in order to preserve the perception of continuing growth.
DEPI	$Depreciation\ rate_{t-1} / Depreciation\ rate_t$ where *Depreciation rate* equals *Depreciation / (Depreciation + PPE)*.	If *DEPI* > 1, the company has declining depreciation rates, which is a sign of income-increasing manipulation.

SGAI	$\frac{\left[{}^{SGA_t}/_{Sales_t}\right]}{\left[{}^{SGA_{t-1}}/_{Sales_{t-1}}\right]}$ where *SGA* equals sales, general and administrative expense.	If *SGAI* > 1, the company has decreasing administrative and marketing efficiency, which induces managers to manipulate earnings.
Accruals	$\left(\begin{matrix}\textit{Income before extraordinary items -}\\ \textit{Cash from operations}\end{matrix}\right)\Big/_{TA_t}$	*Accruals* capture the degree to which accounting profits are not supported by cash profits
LEVI	${}^{Leverage_t}/_{Leverage_{t-1}}$ where *Leverage* is calculated as total debts to total assets.	If *LEVI* > 1, the company has increasing leverage, which induces managers to manipulate earnings in order to loosen debt constraints.

3.1.2 Independent variables

The independent variables of interest are exogenous macroeconomic variables that affect the sentiment of market participants and political costs faced by the construction sector. Many previous works in the field of earnings management deal with an expected change in earnings management behavior when market sentiment changes. For example, Han and Wang (1998) and Johl et al. (2003) observe changes in earnings management behaviour in the oil crises of the 90s and the Asian crisis of 1997 respectively. In addition, Gassen and Markarian (2009) find that managers report larger absolute abnormal accruals when market sentiment worsens in order to meet and beat consensus forecasts.

The impact of political costs on earnings management behaviours has long been an important issue in positive accounting research. Several findings embedded in previous research could be testified in the Thai capital market setting. For example:

(1) an observation found by Watts and Zimmerman (1978 and 1986), Zmijewski and Hagerman (1981), and McKee et al. (1984) that larger companies have a greater motivation to hide profits to avoid facing wealth transfer policies instituted by the government if their profits are considered to be derived from monopoly situations;

(2) an observation found by El-Gazzar et al. (1986), Boynton et al. (1992), and Han and Wang (1998) that enterprises have greater motives to reduce their current profits to avoid paying a higher amount of tax payable; and

(3) a remark given by several Chinese scholars, e.g., Wang (2000), Wu et al. (2004), Liu and Jing (2006) and Chen et al. (2011); that in a country like China where higher level of supervision and robust financial system are

inserted on large firms, the incentive to manage their earnings of these firms is, as a result, reduced.

Based on results of these previous studies, the following independent variables are selected.

First, we use the period covering the subprime mortgage crisis as the basis for the dummy variable *Subprime*. In particular, we define *Subprime* as a dummy variable that equals 1 if the quarter is between fourth quarter of 2007 to fourth quarter of 2009, and 0 otherwise. If the companies are more sensitive during fear-periods, the regression coefficient of the dummy *Subprime* will be significantly positive.

Second, we include several exogenous macroeconomic variables that represent political costs to the construction sector. These variables are steel materials price index (*Steel*) and cement materials price index (*Cement*). These two variables are considered political variables since they are heavily influenced by labour wages and government's mega project investment in Thailand. Recently, steel prices have significantly risen due to heavy investment of mega infrastructure projects by the military government and a higher maximum wage established, whereas cement prices have been relatively more stable since cement is a controlled goods. Based on previous research, we expect that greater political costs, signalled by higher *Steel* and higher *Cement*, significantly increases M-scores (or increases the earnings management likelihood) of firms in the construction sector of the SET.

In addition, several exogenous macroeconomic variables are inserted to address the interplay between market sentiment and firm's incentive to manipulate earnings. These sentiment indicators include the gross domestic fixed capital formation (*GFCF*), the country gross domestic product (*GDP*) and the SET index (*Index*) is inserted to address the interplay between market sentiment and firm's incentive to manipulate earnings. Based on previous research, we expect this variable to produce negative regression coefficients. In particular, companies are more likely to manage their earnings results during bad sentiment periods, signalled by lower *GFCF*, lower *GDP*, and lower *Index*.

3.1.3 Control variables

Based on previous research, we control for the following variables:

Company size (*Size*) is the natural logarithm of a company's market capitalization. Many Western researchers use company size as a proxy for political costs to reflect greater transaction costs associated with larger companies that must obey antitrust legislation (Watts and Zimmerman, 1978). However, in the institutional context of Thailand, the law against companies' monopoly power is not as obvious as that in mature Western countries. To ensure that our findings are comparable with previous studies, *Size* is still taken into account in this research.

Return on total assets (*ROA*) measures corporate operating conditions. As pointed out by Chen et al. (2011), a company's choice of accounting policy may be affected by its current economic condition. In good operating and financial conditions, companies are more likely to adopt accounting policies that can reduce current earnings or smooth earnings (Dechow et al., 1995). It is therefore necessary to control for *ROA*, when earnings manipulation is correlated with company performance.

Accruals during the previous period (*Accruals*). Previous research has indicated that the higher the accruals during the previous period, the less possible it is for managers to introduce accounting policies capable of increasing current earnings (Dechow et al., 1995; Sloan, 1996). Thus, we expect this variable to produce a significantly negative coefficient.

The main variables and their definitions are shown in Table 2.

Table 2. The variables.

Variable	Name	Symbols	Definitions
Dependent variable	M-scores	*Mscore*	Calculated by Beneish's (1999) M-score model
Independent variables	Steel materials price index	*Steel*	Equals the steel materials price index on the last day of the quarter
	Cement materials price index	*Cement*	Equals the cement materials price index on the last day of the quarter
	Gross domestic fixed capital formation	*GFCF*	Equals the gross domestic fixed capital formation of Thailand
	Gross Domestic Product	*GDP*	Equals the quarterly gross domestic product of Thailand
	Set Index	*Index*	Equals the set index level on the last day of the quarter
	Periods pertaining to the subprime mortgage crisis	*Subprime*	Equals 1 if quarter is between fourth quarter of 2007 to second quarter of 2009; and 0 otherwise

Table 2 (continued). The variables.

Variable	Name	Symbols	Definitions
Control variables	Company size	*Size*	Equals natural logarithm of market capitalization
	Return on total assets	*ROA*	Return on total assets
	Accruals of previous period	*Accruals*	Accruals of previous period divided by assets of previous year
	LEVI	$LEVI_t / LEVI_{t-1}$ where *LEV* is calculated as total debts to total assets.	If *LEVI* > 1, the company has increasing leverage, which induces managers to manipulate earnings in order to loosen debt constraints.

3.2 Regression analysis

Using (1), the time series of M-scores for each construction company in the sample can be estimated. The effect of market sentiment and political costs on earnings management behavior is estimated by the time-series regression between M-scores and six independent variables of interest; and also considering the assumption of four control variables. In particular, the following time series regression models are used to test **Hypothesis 2**:

$$Mscore_t = \beta_0 + \beta_1 Subprime_t + \beta_2 Steel_t + \beta_3 Cement_t + \beta_4 GFCF_t + \beta_5 GDP_t + \beta_6 SET_t + \beta_7 Size_t + \beta_8 ROA_t + \beta_9 Accruals_t + \beta_{10} LEVI_t \quad (3)$$

Note that all variables in (3) are computed as the (market capitalization) weighted average across all firms in the construction sector.

3.3 Sample selection and data description

The study covers the period of first quarter of 2005 to third quarter of 2016 (47 quarters) for 9 listed companies in the construction sector of the SET, namely CK, CNT, ITD, NWR, PLE, SEAFCO, STEC, STPI, and SYNTEC. Full company name can be obtained from the official website of the SET (www.set.or.th). Other construction companies are omitted due to missing values in data as these excluded companies were listed in the SET after the first quarter of 2005.

Quarterly data on financial and economic variables that constitute dependent variable, independent variables, and control variables in our regression models are retrieved from SETSMART (SET Market Analysis and Reporting Tool) or the web-based application from the SET that can seamlessly integrate comprehensive sources of Thai listed company data, i.e., historical stock prices, historical indices, listed company profile, and historical news.

4 Results and discussions

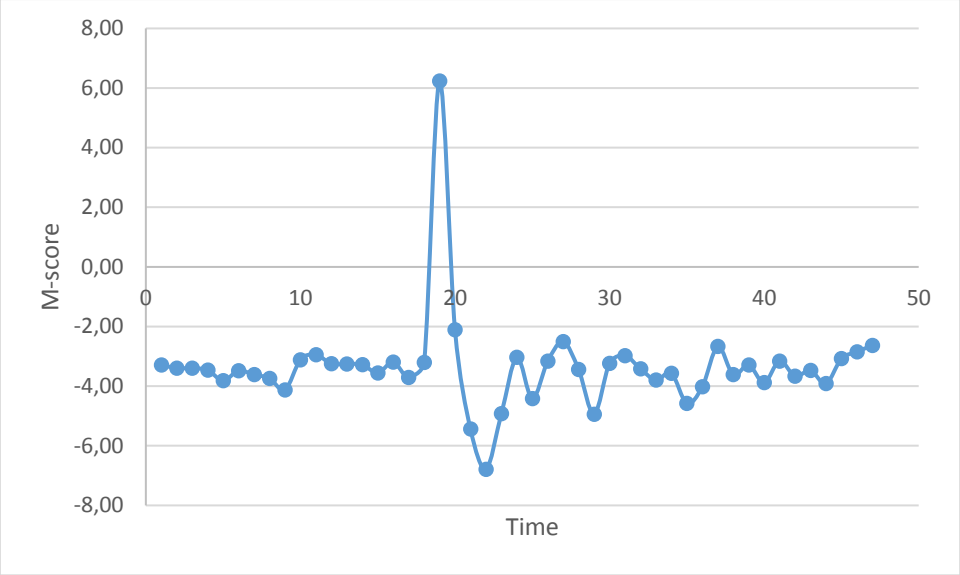
In this section we present the results of data analysis. Initially, we conduct a descriptive analysis to show the behavior of the variables used in the models. Then we test the hypothesis for the equality between two M-score means. Finally, results of the time series regression models used to evaluate the hypotheses are presented.

Table 3. Descriptive statistics of the main variables.

Variable	N	Mean	Median	Maximum	Minimum	Standard deviation
Mscore	47	-4.228	-3.47	-2.51	-9.57	1.834
Subprime	47	0.149	0	1	0	0.360
Steel	47	101.182	99.8	157.097	80.767	15.379
Cement	47	107.319	108.8	119.1	94.586	6.663
GFCF	47	5.263	5.27	6.15	3.93	0.560
GDP	47	2.073	2.03	2.53	1.66	0.237
Index	47	1024.364	975.3	1585.67	431.5	347.301
Size	47	85.184	65.02	170.95	21.73	47.168
ROA	47	5.604	5.263	11.456	0.118	2.425
Accruals	47	-0.0464	-0.04	0.02	-0.19	0.0340
LEVI	47	2.419	2.306	4.93	1.574	0.518

Notes: Variables are defined in Table 2. The variable *Size* is used in logarithmic scale, while the variable *GDP* is in $millions in order to linearize its relation with the dependent variable.

Figure 1. M-scores for construction companies during the study period.



Notes: The blue line shows the M-score time series for sampled companies. M-score values that exceed the benchmark value of -2.22 indicate statistically significant fraudulent reporting.

4.1 Descriptive statistics

Table 3 lists the descriptive statistics of the main variables used in this study.

Figure 1 reveals that there are two reporting periods (19th and 20th observations representing 3rd and 4th quarters 2009 respectively) where the level of earnings management in the financial sector of the SET exceeds the benchmark value of -2.22. This reveals that the presence of earnings management among Thai construction firms in the past ten years is not persistent, which is a good news to relevant regulated bodies. As mentioned by Nikomborirak and Tangkitvanich (1999), improved corporate governance and imposition of stricter rules and regulations by the Stock Exchange Commission of Thailand after the Asian financial crisis during the late 1990s can be the main reason for the absence of earnings management behaviour during subsequent crises.

4.2 Regression results

The regression results of (3) is displayed in Table 4. General econometrics problems such as unit root, serial correlation and heteroscedasticity may result in biased parameter estimates or biased inferences, and therefore need to be addressed. Original variables have been transformed using first-difference or natural logarithm to deal with these problems. We use $D(X)$ to denote the first difference of variable X. The Durbin-Watson statistic is very close to 2, while the Breusch-Pagan-Godfrey F statistic is not significant at 5%. These statistics indicate that both serial correlation and heteroscedasticity are not present.

Table 4. Regression of exogenous macroeconomic variables on M-scores in the construction sector.

	Coefficient	**T value**
Intercept	8.138*	1.940
Subprime	1.233**	2.126
Steel	-0.0730***	-5.344
Cement	-0.0103	-0.307
GFCF	-0.104	-0.153
GDP	-0.076	-0.047
D(Index)	0.00132	0.629
D(Size)	-0.0274**	-2.417
D(ROA)	0.166	0.994
Accruals	14.649**	2.507
LEVI	-1.140***	-3.040
Adjusted R^2	0.609	
F value	7.9996***	
Durbin-Watson statistic	2.114	
Breusch-Pagan-Godfrey F statistic	0.403	

Notes: *, **, and *** represent significance at the 10 percent, 5 percent, and 1 percent levels respectively. The Durbin-Watson statistic is very close to 2, indicating that there is no autocorrelation. The Breusch-Pagan-Godfrey F statistic is not significant at 5%, indicating that heteroscedasticity is not present. Original variables, defined in Table 2, have been transformed using first-difference and natural logarithm to deal with unit root. *D(X)* represents the first difference of variable *X*. *LN(Y)* denotes the logarithmic representation of variable *Y*.

Results of the t-tests show that the coefficient for the political costs variable $Steel$ is statistically significant. This variable shows negative signal, indicating that Thai construction firms have more incentive to manipulate earnings when political costs

reduce. This finding is somewhat counterintuitive as previous western works often find that political costs motivate firms to manipulate their earnings to avoid further political costs. Yet, the recent China research provided by … contends that firms tend to decreases their earnings to avoid a negative impact of tightening government policies. Positive movement on steel materials prices represents an additional cost to construction firms. Thus, it is possible that reduced profits as a result of higher costs no longer requires firms to engage in earnings management.

In contrast, all variables that represent market sentiment do not significantly affect the M-scores. We conclude that it is not always true that bad market sentiment creates an incentive for firms to exhibit fraudulent reporting behavior as suggested by previous research.

Table 5 reveals that the coefficient for the dummy variable, *Subprime*, is statistically significant at the 5% level. The positive sign of the coefficient means that the subprime mortgage crisis has a positive influence on the earnings management behaviour in Thai construction companies. This is consistent with the graphical examination in Figure 1 where M-scores of the construction sector exceeds the benchmark value during the crisis period.

Regarding the significance of our control variables, *Leverage* and *Size* are statistically significant. This is contradicting our initial prediction that the asset-liability ratio is positively associated with earnings management. However, the presence of creditors could inhibit opportunistic behaviour of managers as noted by Jensen (1986). Some previous studies have also found a tendency for managing earnings during periods of low leverage (Dechow and Skinner, 2000; Jelinek, 2007). The negative sign of the market capitalization variable is also counterintuitive. Previous works on political costs tend to suggest that large companies manipulate earnings more than small companies to avoid regulation. Our finding seems to suggest an opposite phenomenon in the Thai construction sector.

5 Conclusions

In this paper, we use the Beneish's (1999) M-score model to compute the chance that Thai construction companies will commit fraudulent reporting behaviour during the past ten years. We find that our sampled firms have managed their earnings to the extent that exceeds an acceptable benchmark during the subprime crisis period.

Next, we examine whether higher political costs and worsened market sentiment will encourage Thai construction firms to engage in earnings management by running time series regressions of M-scores on factors that affect political costs, market sentiment, and some control variables. Results show that coefficients associated with political costs variables, namely steel materials price index and company size, are statistically significant. But our findings oppose those of previous western works that often suggest that more political costs are associated with higher earnings management. All

variables that represent market sentiment however give no signal with regard to how earnings management behavior is affected by characters of market sentiment.

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