THE EFFECT OF INVESTOR SENTIMENT ON EARNINGS MANAGEMENT

by

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Presented to the Faculty of the Graduate School of

The University of Texas at Arlington in Partial Fulfillment

of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

THE UNIVERSITY OF TEXAS AT ARLINGTON

AUGUST 2020

Acknowledgements

I would like first and foremost to express my sincere appreciation to my dissertation chairs: Li-Chin Jennifer Ho and Stephanie Jean Binger Rasmussen, for their encouragement, infinite patience, numerous discussions, academic guidance and careful reviews of dissertation manuscripts. My special thanks are given to Dr. Ho for her generous guidance in the dissertation topic selection, research methodology development, dissertation reviews and discussions. My special thanks are given to Dr. Rasmussen for her encouragement during my PhD study and dissertation reviews and discussions. Without their generous assistance, my dissertation would not be completed.

Next, I would like to express my appreciation to my committee member, Mary Milam Whiteside. This work is greatly benefitted from her inspiring suggestions, detailed comments and invaluable guidance.

Finally, I would like to thank my beloved family. Without their continuous support, I would not successfully complete my PhD study.

Abstract

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The University of Texas at Arlington, 2020

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The association between investor sentiment and corporate reporting decisions/outcomes has been recently examined in the accounting and finance literature. As an important outcome of corporate reporting decisions, earnings management (EM) may be affected by investor sentiment. In this dissertation, I examine two research questions. The first is whether investor sentiment is associated with the propensity of firms' engaging in the two primary forms of EM: accrual earnings management (AEM) and real earnings management (REM). The second question is whether firms' internal governance strength and external audit quality would moderate the association between investor sentiment and AEM as well as REM.

For the first research question, the results are mixed depending on the proxy of investor sentiment. Specifically, when Michigan Consumer Confidence Index is

used as the sentiment proxy, I find a significant and positive association between investor sentiment and the propensity of (1) AEM, (2) the overall measure of REM, and (3) the specific REM mechanism through accelerating sales. However, when investor sentiment is proxied by the index developed by Baker and Wurgler (2006), I find no relation with the propensity of AEM and only a positive association with the propensity of REM through accelerating sales.

Regarding the second research question, I find no evidence that either the strength of internal corporate governance mechanisms or quality of external auditors affect the association between investor sentiment and AEM. In terms of REM, the evidence is also mixed depending on which sentiment proxy is used.

Table of Contents

List of Tables

Chapter 1

Introduction

In this dissertation, I first use two proxies of investor sentiment and two different types of earnings management (EM) to examine whether there is a relationship between investor sentiment and the propensity of EM. Then I further test whether the strength of internal corporate governance mechanisms and external audit quality would moderate the association between investor sentiment and EM.

1.1 Overview of the Research Question

Previous literature examines associations between investor sentiment and corporate decisions/outcomes (*e.g.*, Baker and Wurgler, 2002; Baker and Stein, 2004; Baker and Wurgler, 2007; Simpson, 2013). The definition of investor sentiment is "a belief about future cash flows and investment risks that is not justified by the facts at hand" (Baker and Wurgler, 2007, page 129). Individual investors perform differently during different investor sentiment periods. During high investor sentiment periods, investors are optimistic, and they overestimate their knowledge, underreact to outside information, underestimate risks, and are over confident about a firm's future performance. During low investor sentiment periods, investors are pessimistic, and they underestimate their knowledge, overreact to outside information, overestimate risks, and are under confident about a firm's future performance (Kahneman and Riepe, 1998). Managers' behavior on corporate reporting decisions, such as EM, could be affected by investors'

sentiment-driven expectations of future earnings (Baker and Wurgler, 2007; Simpson, 2013). Therefore, the effect of investor sentiment on EM should be thoroughly studied, which could shed more light on how managers play earnings games in the capital market.

On one hand, previous studies (*e.g.*, Ali and Gurun, 2009; Simpson 2013) argue that managers have motivations to manage earnings upward during high investor sentiment periods, in order to meet optimistic individual investors' and analysts' expectations. Therefore, investor sentiment may have a positive association with EM. On the other hand, Ge et al. (2019) argue that managers are more likely to engage in conservative reporting during high investor sentiment periods in order to avoid the litigation risk, which indicates that managers are less likely to manage earnings upward during high investor sentiment periods. In addition, based on Mian and Sankaraguruswamy's (2012) argument, managers may have stronger incentives to manage earnings upward in order to meet or beat benchmarks during low investor sentiment periods, since there is a greater stock price decrease for bad earnings news during low investor sentiment periods relative to high investor sentiment periods. Therefore, investor sentiment may have a negative association with EM. These two competing arguments raise an empirical question: is investor sentiment positively or negatively associated with EM?

My first research question examines whether investor sentiment is associated with the propensity of accrual earnings management (AEM). One way

to engage in AEM is to record income-increasing accruals to avoid negative or decreased earnings (Burghstahler and Dichev, 1997), or income-decreasing accruals in order to increase future earnings (Healy, 1985). Although Simpson (2013) provides the evidence of a positive association between investor sentiment and AEM, it is possible that a negative association between investor sentiment and EM exists in some situations. Prospect theory indicates that "the value function is normally concave for gains, commonly convex for losses, and is generally steeper for losses than for gains" (Kahneman and Tversky 1979, page 263), which explains that the market reacts more strongly and in a more asymmetric manner to negative earnings than to positive earnings surprise. Empirically, Mian and Sankaraguruswamy (2012) find there is a smaller stock price decrease to bad news during periods of high investor sentiment compared to that during periods of low investor sentiment. If bad news triggers a less negative price shock during periods of high investor sentiment, managers may have weaker incentives to manage earnings upward (Mian and Sankaraguruswamy, 2012) during high sentiment periods.

My second research question examines whether there is an association between investor sentiment and the propensity of REM, an alternative form of EM. REM is used to manage earnings by taking real economic activities. Both Ali and Gurun (2009) and Simpson (2013) only examine the effect of investor sentiment on AEM. Studies that solely rely on AEM cannot fully explain the complete effect of

investor sentiment on EM activities (Fields et al., 2001; Zang, 2012). Furthermore, previous studies show that there is an association between AEM and REM, and the association is not only substitutive, but also complementary (Barton, 2001; Chen et al., 2012; Zang, 2012). Therefore, similar to AEM, I expect there is an association (either positive or negative) between investor sentiment and REM.

My third research question examines whether the strength of internal corporate governance mechanisms affects the association between investor sentiment and AEM/REM. Internal corporate governance is able to mitigate agency problems and better align the interests of executives with shareholders. As discussed in Lin and Hwang (2010), "a good corporate governance structure helps ensure that the management properly utilizes the enterprise's resources in the best interest of absentee owners, and fairly reports the financial condition and operating performance of the enterprise" (Lin and Hwang, 2010, page 59).

Prior literature finds that internal corporate governance plays important roles in constraining EM (*e.g.*, Klein, 2002; Xie et al., 2003; Davidson et al., 2005; Yang and Krishnan, 2005; Lin and Hwang, 2010). Although managers have incentives to manipulate earnings in different investor sentiment periods (Ali and Gurun, 2009; Mian and Sankaraguruswamy, 2012; Simpson, 2013; Ge et al., 2019), their abilities may be constrained by effective internal corporate governance mechanisms.

My last research question is to examine whether firms' external audit quality affects the association between investor sentiment and AEM/REM. External auditors are important and necessary in solving "the agency problems associated with the separation of ownership and control along with information asymmetry between management and absentee owners" (Lin and Hwang, 2010, page 59). Previous studies find that external auditors are important in monitoring management activities and controlling EM (Chi et al., 2011). Firms with higher audit quality are less likely to use AEM, while they could be more likely to use REM. Acting as an important monitoring mechanism that constrains managers' ability to engage in EM, external audit quality may serve as another moderator that affects the association between investor sentiment and AEM/REM.

Overall, my dissertation examines the association between investor sentiment and EM in a more comprehensive way. I further examine whether two important monitoring mechanisms, internal corporate governance mechanisms and external auditors moderate the association between investor sentiment and EM.

To test the association between investor sentiment and AEM/REM, I use the sentiment index (BW) developed by Baker and Wurgler (2006) and Michigan Consumer Confidence Index (MICH) as proxies for investor sentiment. I use the modified Jones model (Dechow et al., 1995) and Kothari et al. model (Kothari et al., 2005) to measure AEM. Following Roychowdhury (2006), REM is measured by considering the three real activities manipulations (*i.e.*, accelerating sales,

overproduction, and reducing discretionary expenditures). To test whether internal corporate governance mechanisms affect the association between investor sentiment and AEM/REM, board size, board independence, audit committee size, and CEO duality are used as proxies for the strength of internal corporate governance mechanisms (*e.g.*, Jensen, 1993; Yermack, 1996; Eisenberg et al., 1998; Dalton et al., 1999; Coles et al., 2008; Lin and Hwang, 2010). Finally, I focus on auditor size and auditor tenure to examine the moderating effect of external audit quality on the association between investor sentiment and AEM/REM. (*e.g.*, Zang 2012).

The data used in this study to measure EM and calculate other control variables are from the Compustat provided by Wharton Research Data Services (WRDS). In addition, the audit quality data, including auditor size and auditor tenure, are also collected from the Compustat in WRDS. The data used to calculate proxies of internal corporate governance strength are collected from Institutional Shareholder Services (ISS) in WRDS. The data of BW are downloaded from Wurgler's webpage at New York University. The data of MICH are collected from the website of Institute for Social Research at the University of Michigan.

My sample consists of U.S. firms that are components of S&P 1500 with the period from 2005 to 2018. To examine the association between investor sentiment and EM, I construct a regression model in which the main independent variable is investor sentiment, based on either BW or MICH. The dependent

variable is the proxies of AEM or REM. I construct another regression model to examine the moderating effects of the internal corporate governance strength and external audit quality. I also include several firm-specific characteristics that are likely to be associated with EM as control variables in the models.

The following findings are documented in this dissertation. First, I find that investor sentiment as proxied by MICH is positively associated with the propensity of (1) AEM, (2) overall REM and (3) the specific REM mechanism through accelerating sales. However, when investor sentiment is proxied by the BW index, I find no relation with the propensity of AEM and only a positive relation with the propensity of REM through accelerating sales. Second, for AEM, there is no evidence that either the strength of internal corporate governance mechanisms or external audit quality affects the association between investor sentiment and EM. For REM, there is no evidence that either the strength of internal corporate governance mechanisms or external audit quality affects the association between BW and EM, while there is limited evidence that either the strength of internal corporate governance mechanisms or external audit quality affects the association between MICH and EM. Overall, there is limited evidence that internal corporate governance mechanisms or external auditors affect the association.

1.2 Significance of the Research Question

My dissertation makes the following contributions. First, my dissertation contributes to the EM literature by examining whether there are associations

between investor sentiment and different forms of EM (*i.e.*, AEM and REM). Although extensive accounting literature examines different motivations and incentives for EM, there is limited literature focusing on the effect of investor sentiment on EM. Both Ali and Gurun (2009) and Simpson (2013) find that firms are more likely to engage in upward AEM during high investor sentiment periods. However, Ge et al. (2019) argue that managers are less likely to engage in upward earning accruals during high investor sentiment periods. The arguments by Mian and Sankaraguruswamy (2012) suggest a different possibility that managers may have stronger incentives to manage earnings upward in order to meet or beat benchmarks during low investor sentiment periods, since there is a greater stock price decrease for bad earnings news, during low investor sentiment periods than during high investor sentiment periods. In addition, Ali and Gurun (2009) and Simpson (2013) only provide evidence on the association between investor sentiment and AEM, one form of EM. Studies that solely rely on AEM may not fully explain the complete effect of investor sentiment on EM activities (Fields et al., 2001; Zang, 2012). By studying whether investor sentiment is associated with different forms of EM, my study could shed more light on the issue regarding the relation between investor sentiment and EM.

Second, there are limited studies to examine whether internal corporate governance strength and external audit quality can moderate the association between investor sentiment and REM. My dissertation extends the prior literature

on the association between investor sentiment and EM by examining whether internal corporate governance strength and external audit quality moderates the association between investor sentiment and AEM/REM.

1.3 Organization of the Dissertation

I organize the remainder of the dissertation as follows:

Chapter 2 provides the background and literature review of EM, investor sentiment, internal corporate governance strength and external audit quality. Section 2.1 provides definitions, motivations and evidence of EM. Section 2.2 provides definitions and measurements of investor sentiment, as well as discusses the relationship between investor sentiment and EM. Section 2.3 provides the literature reviews of internal corporate governance strength and its effect on EM. Section 2.4 provides the literature reviews of external audit quality and its effect on EM.

Chapter 3 develops research hypotheses. In section 3.1 the associations between investor sentiment and AEM/REM are hypothesized. In section 3.2 the effects of internal corporate governance strength and external audit quality on the association between investor sentiment and AEM/REM are hypothesized.

Chapter 4 provides research design and methodology. Section 4.1 describes measurements of EM. Section 4.2 develops empirical models to examine hypotheses. Section 4.3 presents data and sample selection procedure.

Chapter 5 provides empirical results. Section 5.1 presents descriptive statistics of test variables. Section 5.2 is main results for hypotheses **H1** and **H2**. Section 5.3 is main results for hypotheses **H3** and **H4**. Sections 5.4 and 5.5 are two additional tests and results.

Chapter 6 provides summary and conclusion, in which I summarize major findings and conclude the entire dissertation.

Chapter 2

Background and Literature Review

In this chapter, I first review the background of EM and the literature about motivation of EM. Then I review investor sentiment and the literature about the association between investor sentiment and EM. I finally review the literature on internal corporate governance strength and external audit quality, as well as their effects on EM.

2.1 Earnings Management

2.1.1 Definition of EM

Levitt (1998) defines EM as "a gray area where the accounting is being perverted, where managers are cutting corners, and where earnings reports reflect the desire of management rather than the underlying financial performance of the company" (Levitt, 1988, page 14). Healy and Wahlen (1999) state that managers intentionally manage financial reports to mislead shareholders and investors or to affect business activities, which results in EM. Firms use two primary tools to manage earnings: AEM and REM.

AEM is used by recording income-increasing accruals to avoid negative or decreased earnings (Burghstahler and Dichev, 1997), or income-decreasing accruals in order to increase future earnings (Healy, 1985). The disadvantages of AEM are that it can violate Generally Accepted Accounting Principles (GAAP) and

can be easily detected by auditors. AEM cannot persist long since firm must reverse AEM in future earnings statement. Financial Accounting Standards Board (FASB) states that "accrual accounting uses accrual, deferral, and allocation procedures whose goal is to relate revenue, expenses, gains, and losses to periods to respect an entity's performance during a period"[1]. This statement indicates that accounting standard is helpful in detecting AEM and reflecting true economic activities.

A survey by Graham et al. (2005) suggests that many financial executives prefer to use REM instead of AEM in order to meet benchmarks. Schipper (1989) explains REM as "A minor extension of this (EM) definition would encompass 'real' earnings management, accomplished by timing investment or financing decisions to alter reported earnings or some subset of it" (Schipper, 1989, page 92). REM is used by taking real economic activities to manage earnings. For example, firms offer price discount or more lenient credit terms to accelerate sales, and reduce discretionary expenditures and cost of goods sold (COGS) through increased production. These real economic activities yield abnormal levels of cash flow from operation (CFO), production costs (PROD), and discretionary spending and expense (DISEXP) which result in REM.

[1] Financial Accounting Standards Board (FASB). 1985. Statement of Financial Accounting Concepts, No. 6, page 145.

2.1.2 Motivations and Evidences of EM

I first discuss three primary motivations of EM: capital market expectations and valuations, contract incentives and regulatory changes. Then I review evidences of EM, including AEM and REM in each section.

Capital Market Expectations and Valuations

One important question is why managers choose to manage earnings. According to the capital market motivation, investors and financial analysts rely heavily on the accounting information provided by firm's managers to evaluate the firm's performance. Therefore, there are incentives for managers to manage earnings in order to meet capital market expectations, as well as investors and financial analysts' evaluations. EM may affect these expectations and evaluations when the firm issues equity offerings, avoids earnings decreases or losses, strives to meet expectations of financial analysts and management, and executes management buyouts.

1. Equity Offerings

Prior studies indicate that there is upward EM before seasoned equity offerings (SEOs), initial public offerings (IPOs) and stock financed acquisitions. The upward EM results in higher stock price, which in turn causes the firm value to increase and the capital cost to decrease. Teoh et al. (1998) indicate that there is unusually high AEM in the SEO year relative to those of nonissues. However, SEO firms perform with poor market returns in the subsequent period. They

indicate that firms from the most aggressive quartile of AEM have worse firm performance than firms from the most conservative quartile in the three years' performance measurement. However, Venkataraman et al. (2008) indicate that in the pre-IPO period, there is less discretion to manage earnings since auditors are more conservative for their IPO clients. Therefore, there is less AEM in the pre-IPO period than the post-IPO period.

Rangan (1998) focuses on the relationship between AEM and SEO's underperformance in the subsequent period by using a sample of 230 SEOs during the period of 1987-1990. Similar to Teoh et al. (1998), he finds that there is unusually high AEM around the SEOs, while poor earnings performance in the subsequent years. Both studies find that AEM is negatively associated with subsequent stock returns.

2. Avoiding Earnings Decreases or Losses

Previous studies provide evidence that managers have incentives to avoid documenting negative or decreased earnings. Hayn (1995) provides the first evidence that firms have incentives to avoid reporting earning losses. She examines firms' distribution of earnings to price ratio from 1963 to 1990, and results suggest that, if a firm is expected to have small negative earnings, it is more likely to engage in upward EM to avoid these negative earnings.

Consistent with Hayn (1995), Burgstahler and Dichev (1997) propose that firms use EM to avoid decreased or negative earnings, which can be detected by

examining frequencies of small earnings decreases and increases. Results indicate firms are more likely to engage in EM by manipulating both CFO and changes in working capital. They explain the motivation to avoid earnings decrease and loss. First, managers assume that investors make their decision based on the level of earnings, which motivates managers opportunistically to avoid earnings decrease or loss. Second, prospect theory indicates that the value functions of individuals are concave in gain and convex in loss, which motivates managers to increase earnings from negative to positive.

Beatty et al. (2002) examine whether there is a relationship between the high frequency of small earnings increases and low frequency of small earnings decreases, and whether this relationship is attributable to EM in public firms. They use samples of public and private bank holding firms and find lower frequency of small earnings decreases in public firms than private firms, which suggests that firms are more likely to manipulate earnings upward to eliminate small earnings decreases. The results show that the asymmetric pattern of small earnings reports is attributable to EM.

3. Meeting Expectations of Financial Analysts and Management

Financial analysts and managers usually forecast expected earnings, which results in incentives for firms' managers to manage earnings. Brown and Caylor (2005) discuss that it becomes important for managers to avoid negative earnings surprise since the middle of 1990s. The reason is to build credibility and increase

stock price. Burgstahler and Eames (2006) find there is an unusual low frequency of small negative earnings surprises and high frequency of zero or small positive earnings surprises, indicating that managers try to increase earnings to meet and beat analyst forecasts.

Firms can also try to meet or beat earnings benchmarks through managing financing, investment or operating activities. Graham et al. (2005) conduct a survey of 400 U.S. Chief Financial Officers and Chief Executive Officers (CEO), and find that corporate executives are willing to use REM to meet or beat targets even though REM would decrease long-term firm value. The survey indicates that in order to meet earnings targets, 80% of surveyed Chief Financial Officers cut expenditures of advertising, maintenance, research and development (R&D), and more than 50% of surveyed Chief Financial Officers postpone new projects.

Perry and Grinaker (1994) explore the extent to which earnings expectation affects R&D expenditure. They study large U.S. firms and find that firms prefer to modify R&D expenditure in order to meet current earnings goals. Bange and De Bondt (1998) indicate that firms adjust R&D to smooth earnings and improve firm's value. They also use a sample of U.S. firms with large R&D expenditure and indicate that by managing R&D expenditure, the difference between reported income and earnings forecast is reduced.

Roychowdhury (2006) investigates real activities that managers use to manage earnings and find that managers use offering price discounts,

overproduction to lower COGS and reduction of discretionary spending and expense in order to meet or beat analysts' earnings forecasts. The author examines cash flow from operation, production costs and discretionary spending and expense to detect REM around the zero earnings threshold. Results show these real activities are positively related to EM, which suggests that manager manage earnings through these real activities.

Gunny (2010) examines the association between REM and firms just meeting earnings benchmarks and the association between REM and the subsequent operating performance. She discusses that AEM can be achieved through using different accounting methods. However, REM is more complicated and needs to change underlying operating activities. She implies that "operating decisions are controlled by managers, but accounting choices are subject to auditor scrutiny" (Gunny, 2010, page 856). Furthermore, AEM is preferred because firms can adjust the earnings through AEM at the fiscal year's end when manager need to engage in EM. For REM, it is a signal of superior future earnings and allows firms to perform better in the future. She finds that REM is positively related to firms just meeting earnings benchmarks, and firms adopting REM have better subsequent operating performance.

4. Management Buyouts

Prior literature shows that there is downward EM for management buyout (Perry and William, 1994; Wu, 1997; Mao and Renneboog, 2015). Managers face

the fiduciary duty to shareholders to get the best price for the publicly-held shares. At the same time, as buyers, managers want to pay the lowest price possible. Therefore, they have incentives to report decreased earnings before the buyout. Perry and William (1994) focus on 175 management buyouts from 1981 to 1988 and find that managers manipulate accrual earnings downward before the buyout. Wu (1997) uses a sample of 87 buyout cases during 1980 to 1987 to examine earnings manipulation. Results show that in the year before the management buyout, the sample has lower earnings changes than median earnings changes of the industry, which suggests that managers manage earnings downward prior to the management buyout. More recently, Mao and Renneboog (2015) examine EM in U.K. buyout and non-buyout companies. They find that the negative earnings manipulation often occurs prior to the management buyout, both by AEM and REM for U.K. buyout companies.

In summary, since investors and financial analysts mainly rely on accounting information to evaluate firms' performance, managers have incentives to manipulate earnings upward in order to achieve benchmarks and influence stock prices. AEM is negatively associated with subsequent stock returns since there is a reverse in subsequent periods on the nature of AEM. However, REM does not result in the decline in the subsequent performance, since the costs and benefits of REM and the decline in the future performance need to be evaluated by managers when they manage real activities.

Contract Incentives

Contract incentives are important motivations of EM. Managers are likely to report upward earnings to maximize their personal wealth when managers try to meet requirements of management compensation contract, and when firm has debt contract issues.

1. Contract Incentives - Management Compensation

Healy and Wahlen (1999) indicate that "accounting data are used to help monitor and regulate the contracts between the firm and its many stakeholders" (Healy and Wahlen, 1999, page 375). Management compensation contracts are designed to align the interests of managers and shareholders (Watts and Zimmerman, 1978 and 1986). To maximize their personal wealth, managers are likely to manipulate the firm's financial performance through EM. There is downward AEM if the cap is reached for firms with caps on bonus award compared to firms without bonus caps, while there is upward AEM until profits fall into the range of boundaries (Healy, 1985).

Bergstresser and Philippon (2006) examine the association between AEM and stock-based CEO compensation. Results show that CEOs with stock-based compensation are more aggressive on the use of AEM to influence their firms' performance. CEOs exercise a large amount of options and sell an unusually large amount of shares when they boost earnings by AEM. Contrary to Bergstresser and Philippon (2006), Laux and Laux (2009) focus on how the board of directors

designs the CEO incentive pay scheme and monitors financial reporting, and what the effect is on the level of EM. They indicate that the increase of stock-based compensation does not generate more incentive to manage earnings, since the effect of board monitoring is enhanced, which may reduce the incentive of compensation.

In summary, Bergstresser and Philippon (2006) indicate that the managers' compensation may motivate them to manage earnings. However, this EM may be constrained by the monitoring ability of board (Laux and Laux, 2009).

2. Contract Incentives - Debt Contracts

DeFond and Jiambalvo (1994) focus on firms with debt covenant violations to study the relationship between EM and debt covenant. Results suggest that firms experience significant income-increasing accruals in the year before debt covenant violations and income-decreasing accruals during the year of debt covenant violations. Jaggi and Lee (2002) explore the association between EM and financial distress, and whether waivers for debt covenant violations affect the magnitude of EM. They find that if firms can get waivers for debt covenant violations, there is upward AEM. While, if they are not able to obtain waivers, there is downward AEM.

Rodriguez-Perez and Van Hemmen (2010) investigate relationships among debt, diversification and AEM by using a sample of Spanish firms. They measure discretionary accruals and find that for less diversified firms, AEM is negatively associated with debt, since these firms undertake monitors, which reduces

opportunities for EM. For more diversified firms, AEM is positively associated with debt, since diversification causes information asymmetry, which is exploited by diversified firms to manipulate EM.

In addition to AEM, REM is another way to avoid violations of debt covenants. Kim et al. (2010) study the effect of debt covenant on REM and find that REM is more pronounced when the debt covenant slack is tighter. Firms are more likely to engage in REM especially when the negotiation is restricted. In summary, the debt covenant may motivate managers to manage earnings, especially for more diversified firms and for those firms that managers can get waivers for debt covenant violations and when the debt covenant slack is tighter.

Regulatory Changes

The Sarbanes-Oxley Act of 2002 (SOX) was the most far-reaching regulatory change in recent years that intended to control EM and reduce information asymmetry. Following accounting scandals of public firms, the U.S. Congress passed SOX to protect investors from fraudulent accounting activities. The effect of SOX on EM has been widely studied. Cohen et al. (2008) indicate that AEM is the popular method of EM in the pre-SOX period. However, managers appear to switch from AEM to REM after the passage of SOX.

Koh et al. (2008) examine the effect of SOX on firms meeting or beating analysts' expectations. They group samples into periods of pre-scandal, scandal and post-scandal. They find that there are no market rewards for firms when reported

earnings meet or beat analyst expectations after SOX, which reduces the pressure on managers to manipulate earnings and causes managers to shift from EM to expectations management after SOX[2]. Therefore, there is a decline of EM to meet or beat analyst expectations after SOX, since the scrutiny on such behavior is increased, and firms are more likely to rely on expectations management. However, Bartov and Cohen (2009) find that AEM and expectations management decrease, and REM increases after SOX. The mixed results of these studies are partially due to that Koh et al. 's (2008) sample is based on firms who meet or beat expectations while Bartov and Cohen's (2009) sample is not. Bartov and Cohen (2009) examine the role of REM to meet or beat benchmarks, while Koh et al. (2008) do not. In summary, the magnitude of AEM has decreased after SOX. Some part of this decrease has been offset by an increase of REM. However, despite the offset, Coates and Srinivasan (2014) indicate that there is an improvement in accounting quality after SOX.

2.1.3 Relationship between AEM and REM

The relationship between AEM and REM is not only substitutive (Barton, 2001; Zang, 2012), but also complementary (Mizik and Jacobson, 2007). On one hand, managers may choose AEM (REM) if the use of REM (AEM) is constrained.

[2] Expectation management means that the firm ensures that the market has a clear understanding of what the firm can deliver. Managers may influence forecast analyst's expectation upward or downward to make sure the market has not too low or high expectation (Parasuraman et al., 1985; Coye, 2004).

On the other hand, when using one method cannot reach targets, managers may use the other method as complementary.

How firms trade off REM and AEM are determined by their relative cost and timing. Zang (2012) examines how managers trade off REM and AEM by using a sample during the period of 1987-2008. She finds that a substitutive relation exists between these two EM methods. Firms use REM as a substitution if the use of AEM is constrained. However, if it is costly to use REM, more AEM will be used. Chi et al. (2011) investigate whether firms shift to REM if higher audit quality constrains the use of AEM, and find that the auditor size and auditor industry expertise are positively associated with REM. This suggests that higher audit quality results in a shift from AEM to REM.

Cohen and Zarowin (2010) examine the trade off between AEM and REM around SEOs. They find that, after the passage of SOX, firms shift from AEM to REM, because it is too costly to use AEM. REM causes a more severe decline in the post-SEO operating performance than AEM. Mizik and Jacobson (2007) also examine the relationship between AEM and REM around SEOs. They find that managers adopt both EM methods at the time of SEOs.

Some studies examine the trade off between AEM and REM conditioning on regulatory changes. As previously discussed, Cohen and Zarowin, (2010) find that managers are motived to shift from AEM to REM after SOX. Chan et al. (2014) examine the effect of voluntary adoption of compensation clawback provisions on

EM methods selection made between AEM and REM. They expect that clawbacks discourage managers to use AEM, since it attracts more scrutiny from SEC and auditors. On the other hand, REM is less likely to attract the scrutiny from SEC and auditors, since SEC and auditors are less likely to deem these activities as improper. Results confirm their expectations that clawback adopters are negatively related to AEM while positively related to REM. They also find that the total EM is increased after the voluntary adoption of compensation clawback provisions.

In summary, the relationship is both substitutive and complementary between AEM and REM. When using one method is constrained, managers may shift to the other method. When the use of one method cannot help managers meet or beat benchmarks, the other method may be used as complementary to reach targets. As suggested by Zang (2012) and Cohen and Zarowin (2010), both AEM and REM should be considered within EM research, because studies that solely rely on AEM cannot fully explain EM activities.

2.2 Investor Sentiment

In this section, I first review the definition and measurements of investor sentiment. Then I review the literature on the relationship between investor sentiment and EM.

2.2.1 Definition of Investor Sentiment

The effect of investor sentiment has been a subject for academic research over past decades. Investor sentiment is defined as "a belief about future cash flows

and investment risks that is not justified by the facts at hand" (Baker and Wurgler, 2006, page 129). The behavioral finance literature indicates that individual investors are optimistic during the periods of high investor sentiment and pessimistic during the periods of low investor sentiment. These individual investor behavioral biases cause share prices to deviate from the fundamental level.

2.2.2 Measurements of Investor Sentiment

There are various methods to measure investor sentiment. The first common method is the top-down approach, which is used to explain how investor sentiment affects stock price. "The top-down approach focuses on the measurement of reduced-form, aggregate sentiment and traces its effects to market returns and individual stocks" (Baker and Wurgler, 2007, page 130).

Baker and Wurgler (2006, 2007) use the top-down approach to construct a composite investor sentiment index based on six measures of investor sentiment from 1965 to 2018. These measures are "trading volume as measured by NYSE turnover; the dividend premium; the closed-end fund discount; the number and first-day returns on IPOs; and the equity share in new issues" (Baker and Wurgler, 2007, page 138). NYSE turnover is defined as "the ratio of trading volume to the number of shares listed on the New York Stock Exchange" (Baker and Wurgler, 2007, page 137). The dividend premium is defined as "the difference between the average market-to-book-value ratios of dividend payers and nonpayers" (Baker and Wurgler, 2007, page 137). The closed-end fund discount is measured as "the

difference between the net asset value of a fund's actual security holdings and the fund's market price" (Baker and Wurgler, 2007, page 137). The number and average first-day returns on IPOs are calculated as the total number of IPOs and the average first-day returns on IPOs during a calendar year.

Previous studies indicate these six measures are associated with investor sentiment. Baker and Stein (2004) indicate that share turnover is positively associated with investor sentiment while dividend premium is negatively associated with investor sentiment. Prior studies (Zweig, 1973; Lee et al., 1991) suggest closed-end fund discount is negatively associated with investor sentiment. Ritter (1991) argues that managers are more likely to issue IPOs and investors are more likely to overvalue equity during high investor sentiment periods. Baker and Wurgler (2000) find that high equity shares in new issues predict low market returns.

First, the six proxies are obtained from different databases. Each proxy is regressed on macroeconomic factors[3] to mitigate the influence of common business cycle variation. Residuals of six regressions are used as the new six proxies. Then principle components analysis is conducted for these proxies and first principle components are obtained. The sum of first principle components multiplied with six proxies is the investor sentiment index (BW) in Baker and Wurgler (2006).

[3] These macroeconomic factors include "growth in industrial production, real growth in durable, nondurable, and services consumption, growth in employment, and an NBER recession indicator" (Baker and Wurgler, 2007, page 139).

The second common method to measure investor sentiment is MICH. The consumer confidence measurement was devised by Professor George Katona in the late 1940s at the University of Michigan. There are more than 500 telephone interviews on U.S. samples each month. The consumer confidence survey includes the following five questions[4]:

1. "We are interested in how people are getting along financially these days. Would you say that you (and your family living there) are better off or worse off financially than you were a year ago?"
2. "Now looking ahead-do you think that a year from now you (and your family living there) will be better off financially, or worse off, or just about the same as now?"
3. "Now turning to business conditions in the country as a whole-do you think that during the next twelve months we'll have good times financially, or bad times, or what?"
4. "Looking ahead, which would you say is more likely-that in the country as a whole we'll have continuous good times during the next five years or so, or that we will have periods of widespread unemployment or depression, or what?"

[4] The five survey questions, the score of each question and how to calculate MICH are explained at https://data.sca.isr.umich.edu/fetchdoc.php?docid=24770.

5. “About the big things people buy for their homes-such as furniture, a refrigerator, stove, television, and things like that. Generally speaking, do you think now is a good or bad time for people to buy major household items?”

Questions can be answered with only three options: "positive", "negative" or "neutral". For each question, the relative score is calculated by the number of “positive” replies minus the number of “negative” replies, divided by total replies and plus 100. MICH is the sum of five relative scores, divided by 6.7558, then added with 2.0[5].

2.2.3 Investor Sentiment and EM

There is limited literature examining the effect of investor sentiment on EM. Ali and Gurun (2009) examine the effect of individual investors’ limited attention on accruals accounting, which is motivated by Sloan (1996) that accruals are overvalued because of individual investors’ limited attention. They measure total and current accruals, and use investor sentiment index by Baker and Wurgler (2006). Results indicate that individual investors are more active, which increases the effect of their limited attention during high investor sentiment periods. Furthermore, individual investors are optimistic about future earnings and

[5] Here 6.7558 a constant scale representing the original base value in 1966 and 2.0 is a constant to correct for sample design changes from the 1950s.

overestimate expected stock returns during high investor sentiment periods. During low investor sentiment periods, individual investors are pessimistic about future earnings and subject earnings components to be more scrutiny.

Simpson (2013) examines the relationship between investor sentiment and AEM using MICH. She expects that there is a positive association between investor sentiment and AEM. She argues that managers try to meet investors' optimistic expectation for firm's future performance through AEM during high investor sentiment periods. On the other hand, because of the increased scrutiny by pessimistic investors, managers are more conservative and less likely to manage earnings during low investor sentiment periods. Results indicate that during high investor sentiment periods, managers are tending to manage accrual earnings upwards to maximize investors' sentiment-driven expectations. During low investor sentiment periods, since there is increased scrutiny from pessimistic investors, managers will not overstate accrual earnings or manage accrual earnings downwards.

In conclusion, Ali and Gurun (2009) and Simpson (2013) find that managers are more likely to manage AEM during high investor sentiment periods. Simpson (2013) further finds that managers are less likely to manipulate AEM during low investor sentiment periods.

2.2.4 Investor Sentiment and Earnings News/Management Forecasts

Some studies (Livnat and Petrovits, 2009; Mian and Sankaraguruswamy, 2012; Seybert and Yang, 2012; Hurwitz, 2018) examine the effect of investor sentiment on the association between stock returns and either earnings news or management forecasts. These studies provide the evidence that earnings news or management forecasts may affect stock prices differently in different investor sentiment periods.

Livnat and Petrovits (2009) investigate the effect of investor sentiment on immediate and long-term stock returns and their relationship to earnings surprises and accruals. They group BW into low, neutral and high sentiments using data from 1987 to 2005. During low investor sentiment periods, firms with extreme positive earnings surprises and low accruals have higher stock returns compared to high investor sentiment periods. They indicate that investors can incorporate new information that is contrary to their prior belief. Therefore, mispricing can be corrected shortly thereafter.

Different from Livnat and Petrovits (2009), Mian and Sankaraguruswamy (2012) investigate whether the sensitivity of stock prices to earnings news is affected by investor sentiment. They find that for good earnings news, there is a greater stock price increase during high investor sentiment periods than during low investor sentiment periods. Meanwhile, for bad earnings news, there is a greater stock price decrease during low investor sentiment periods than during high

investor sentiment periods. Results indicate that for good earnings news, there is a positive association between investor sentiment and the sensitivity of stock price. While for bad earnings news, there is a negative association between investor sentiment and the sensitivity of stock price.

Furthermore, Seybert and Yang (2012) study firm returns to management earnings guidance in different investor sentiment periods to examine the relationship between investor sentiment and market reactions, and whether this relationship is effected by earnings guidance. They use cumulative abnormal returns as the market reactions proxy and MICH as the investor sentiment proxy. Results indicate that market reactions are high to earnings surprises following high investor sentiment periods. Particularly, investors react more significantly to bad news forecasts following high investor sentiment periods.

More recently, Hurwitz (2018) explores the effect of investor sentiment on management earnings forecasts. The author expects that during high investor sentiment periods, investors' optimistic attitude leads managers to report more optimistic annual earnings forecasts. During low investor sentiment periods, investors' pessimistic attitude may lead managers to report (1) more optimistic annual earnings forecasts in order to correct investors' pessimistic attitude, or (2) more pessimistic annual earnings forecasts, since managers may be affected by investors' pessimistic attitude. Results indicate that management earnings forecast bias is positively related to investor sentiment. Managers have more pessimistic

earnings forecasts during periods of low investor sentiment than high investor sentiment, which is consistent with the unintentional bias view that managers are affected by investors' pessimistic attitude.

Although these studies use different measures of investor sentiment and earnings news or management forecasts to examine how investor sentiment affects the association between stock returns and earnings news or management forecasts, all results show that earnings news or management forecasts may affect stock returns differently in different investor sentiment periods.

2.2.5 Investor Sentiment and Stock Market

Several previous studies have examined the relationship between investor sentiment and stock prices. Efficient Market Hypothesis in Malkiel and Fama (1970) indicates that the fundamental value of a firm should equal the present value of expected future cash flows. Behavioral finance, on the other hand, argues that a group of individual investors' behavioral biases could cause actual market prices to deviate from the fundamental level (Singh, 2012). Behavioral finance studies investigate the effect of investor sentiment on the stock market and find that investor sentiment explains that stock price is poorly related to its fundamental value (Brown and Cliff, 2005).

The issue regarding investor sentiment and stock markets has been addressed in various settings. Some studies examine how investor sentiment affects stock markets (Morck et al., 1990; Stambaugh et al., 2012). Some studies (Baker

and Wurgler, 2006; Lemmon and Portniaguina, 2006) focus on the effect of investor sentiment on various stocks, such as young stocks, unprofitable stocks and small stocks. Other study (Brown and Cliff, 2005) explore the ability of individual investor sentiment to predict near-term stock market returns relative to institutional investor sentiment.

Morck et al. (1990) investigate how the investor sentiment affects investment through stock market. They provide three theories to explain how investor sentiment affects investment through false signals, financing costs, or market pressure on managers. First, managers depend on stock markets when they make investor investment decisions. However, the information from stock markets may not reflect future fundamentals correctly. Second, "the stock market affects investment through its influence on the cost of funds and external financing" (Morck et al., 1990, page 158). The third theory indicates that since managers maximize investors' sentiment-driven expectations in order to protect their interests, the stock market exerts pressure on investment quite aside from its informational and financing role. Results indicate that investor sentiment affects stock returns, and stock returns can predict investment. Therefore, investor sentiment impacts investment through the stock market.

Stambaugh et al. (2012) explain how investor sentiment affects stock prices by combining two concepts. The first concept is that the market-wide sentiment affects stock prices at the same time in the same direction. Second, Miller (1977)

indicates that with impediments to short selling, it is difficult for rational traders to exploit overpricing. They examine whether the sentiment-related overpricing can partially explain 11 asset-pricing anomalies. They use BW as the proxy of investor sentiment and find a strong and positive association between anomalies and mispricing during high investor sentiment periods.

Baker and Wurgler (2006) challenge the classical finance theory which states that investor sentiment does not affect stock prices, realized or expected returns, through examining the relationship between investor sentiment and the cross-section of stock returns. Results indicate that young stocks, high-return volatility stocks, unprofitable stocks and non-dividend payers receive higher subsequent returns than old stocks, low-return volatility stocks, profitable stocks and dividend payers during low investor sentiment periods.

Prior studies indicate that small stocks are mainly held by individual investors, and large stocks are mainly held by institutional investors (Lee et al., 1991; Nagel, 2005). Since individual investors have different attitudes during different magnitudes of investor sentiment periods, they may have different effects on stock returns between small and large firms. Lemmon and Portniaguina (2006) use MICH as the proxy of investor optimism to examine the effect of investor sentiment on small and large stocks' returns. Results indicate that individual investors value small stocks more than large stocks during high confidence periods.

Therefore, there are lower returns with small stocks subsequently. However, they get opposite results for large stocks mainly held by institutional investors.

Brown and Cliff (2005) study the effect of investor sentiment on short-term stock market returns to examine whether investor sentiment can predict short-term returns. They measure investor sentiment by using Kalman filter and principal component analysis. Results indicate that although investor sentiment is strongly associated with contemporaneous stock returns, it has very limited ability to predict near-term stock returns. Schmeling (2007) investigates the difference between individual and institutional investor sentiments in stock returns. The author finds that institutional investor sentiment can predict stock returns correctly, but individual investor sentiment incorrectly forecasts stock returns.

In summary, previous studies provide evidence that there is an association between investor sentiment and stock prices. However, the association is mixed, which is affected by the firm's characteristics. Therefore, firm's characteristics, for example, firm size, type and performance, may be controlled in the study of investor sentiment and stock prices.

2.3 Internal Corporate Governance and EM

Internal corporate governance is a set of controlling and monitoring mechanisms to separate the ownership and control, through which management activities are monitored to mitigate agency problems and align managers' interests and various stakeholders' interests. These mechanisms facilitate efficient assets allocation, and also mitigate the inappropriate expropriation of resources. "A good corporate governance structure helps ensure that the management properly utilizes the enterprise's resources in the best interest of absentee owners, and fairly reports the financial condition and operating performance of the enterprise" (Lin and Hwang, 2010, page 59). Two main internal corporate governance mechanisms, board of directors and audit committees, are established and expected to control and monitor the behavior of managers and financial reporting.

2.3.1 Board of Directors and EM

Board of directors is one of the important mechanisms in monitoring firm management and constraining EM because it is established as the top of internal governance structure (Fama and Jensen, 1983). Regarding the relation between board and EM, prior studies examine the following key characteristics of board size, independence and chair/CEO duality.

Board Size

Previous evidence regarding board size and corporate management is mixed. First, when board size increases to a point, it suffers from coordination and

communication issues, which might reduce the efficiency of communication and coordination, and the board's ability to control management (Lipton and Lorsch, 1992; Jensen, 1993).

Ching et al. (2006) examine whether corporate governance strength affects the use of EM for SEO firms using data from Hong Kong. They use board independence and board size as proxies of corporate governance strength and signed discretionary current accruals as the proxy of EM. Results indicate that SEO firms with larger boards are more likely to engage in upward EM around SEO. This finding is consistent with Jensen's (1993) argument that larger boards provide less of a control function than do smaller boards. They further find that independent directors and outside blockholders help suppress the use of positive discretionary accruals by family-controlled firms.

On the other hand, some previous studies find that larger board of directors can increase the ability of the board to control management, improve firm performance, as well as reduce EM. Xie et al. (2003) examine the association between EM and different characteristics of a firm's board, and find that a larger board of directors is better at preventing EM, since a larger board might have more experienced directors.

More recently, Cornett et al. (2008) use AEM to examine how governance structure influences firm performance. They find board size has no significant

impact on the reduction of EM. These studies show that the evidence of association between board size and EM is mixed.

Board Independence

As discussed earlier, results of the association between board size and EM are mixed, which indicates that board size alone may not be sufficient in examining the association between board and EM. Other board characteristics, for example, board composition and therefore independence need to be considered and controlled. Most corporate boards include both dependent and independent directors. Dependent directors refer to the firm's top managers and others who are relatives of management and may share valuable information. Independent directors may independently evaluate managers' decisions through their expertise and objectivity. Therefore, the composition of a board of directors is important and critical in internal corporate governance.

Beasley (1996) hypothesizes and finds that board independence is negatively associated with financial reporting fraud. By examining the board composition of fraud and no-fraud firms, he reports that financial reporting fraud decreases as the number of independent directors on the board increases. Also, Dechow et al. (1996) show that firms with more dependent directors are more likely to engage in EM. These studies provide the evidence that independent directors can more efficiently monitor managers than dependent directors and improve the financial reporting quality.

Klein (2002) examines whether board characteristics are associated with EM. She studies discretionary accruals based on large and publicly-traded U.S. firms in the pre-SOX period to examine whether EM is associated with audit committee and board independence. She finds that EM is more pronounced for firms that have board with fewer independent members.

Xie et al. (2003) use discretionary current accruals based on a sample from S&P 500 lists to examine the association between board independence and EM. They categorize board members as being inside, affiliated or outside and find that independent outside directors have a negative association with discretionary current accruals, which suggests that independent directors can reduce EM.

Similar to Xie et al. (2003), Davidson et al. (2005) also find that board independence is negatively associated with EM based on Australian firms. Lin and Hwang (2010) examine the association between corporate governance variables and EM based on empirical data from 48 prior studies. Results further indicate that board independence is negatively related to EM.

Although most of previous studies (*e.g.*, Klein, 2002; Xie et al., 2003; Davidson et al., 2005; Lin and Hwang, 2010) use AEM as a proxy of EM, REM as another proxy of EM has also been used to study the effect of board independence on EM. Osma (2008) examines the association between board independence and REM based on U.K. firms' data. Results show that a more independent board can reduce REM by constraining R&D cuts. Overall, prior studies consistently find a

negative relation between EM and board independence, which indicates that firms with more independent boards are less likely to engage in EM.

Board Chair/CEO Duality

CEO duality in which the CEO also serves as the board chair, indicates the CEO has more power and has been criticized as a signal of weak corporate governance. A CEO with more power is more likely to maximize his/her own personal wealth at the expense of shareholders' wealth. Jensen (1993) argues that CEO with duality may be more effective in information controlling, in which the information may not be available to other board members. Therefore, it may impede effective monitoring and result in greater AEM. Davidson et al. (2004) examine whether EM is greater following CEO duality creating successions than for non-duality successions. They hypothesize that CEO with duality has more power to control the impressions made by the firm as it releases accounting information, therefore would be associated with greater EM. The discretionary current accruals are calculated as the proxy of EM. Results indicate that more EM is reported after CEO duality-creating successions, compared to that after non-duality successions.

However, some studies do not find the evidence that there is an association between CEO duality and EM. Davidson et al. (2005) study the relationship between internal governance structure and EM using Australian firms. They use discretionary accruals as the proxy of EM, and CEO duality as one of the proxies of internal corporate governance. There is no evidence to support an association

between CEO duality and EM. Similar to Davidson et al. (2005), Cornett et al. (2008) also find that CEO duality is not related to the usage of EM.

2.3.2 Audit Committee and EM

The function of audit committee is to help board of directors to efficiently perform their duty, and oversee the reliability of financial reporting and related internal controls. The existence of an audit committee indicates higher quality monitoring and may reduce opportunistic EM. In this section I review the prior literature about the effect of audit committee on EM. Characteristics of audit committee examined by prior studies include size, independence and expertise.

Audit Committee Size

Audit committee is assigned by the board of directors and consists of three or more directors, since audit committee with more directors provides more valuable resources and contributes more expertise in monitoring the financial reporting and accounting. Some studies (Xie et al., 2003; Yang and Krishnan, 2005; Lin et al., 2006; Lin and Hwang, 2010) find there is an association between audit committee size and EM. Yang and Krishnan (2005) indicate that firms with more audit committee members are less likely to engage in EM. Lin and Hwang (2010) examine the association between corporate governance variables and EM based on empirical data from 48 prior studies. Results show that audit committee size has a negative association with EM.

However, some other studies do not find audit committee size is related to EM. Xie et al. (2003) find that although there are significant association between characteristics of audit committee (independence and expertise, number of meetings, etc.) and EM, these characteristics do not include the number of directors on the audit committee. Similar to board size, the evidence of association between audit committee size and EM is mixed, since not only audit committee size but also audit committee composition may play a crucial role in controlling EM.

Audit Committee Independence

Similar to those on board of directors, independent directors on audit committee also independently oversee financial reporting and accounting through their expertise and objectivity. Results (Klein, 2002; Lin and Hwang, 2010) show that audit committees with more independent directors would provide more effective financial reporting oversight and reduce opportunistic EM. Klein (2002) finds that firms with audit committees comprised of less than a majority of independent directors engage in more EM. Yang and Krishnan (2005) focus on quarterly financial statements as well as annual statements to evaluate roles of audit committees in monitoring the firm's financial reporting. Results indicate that firms with higher audit committee independence and more audit committee members, are less likely to manage earnings. Lin and Hwang (2010) find similar results that audit committee independence has a negative association with EM. Overall, these results consistently show that audit committee independence can constrain EM.

Based on the studies discussed above, the internal corporate governance strength, including board size, board independence, CEO duality, audit committee size and independence may affect EM. With poor internal corporate governance, managers may have less constraint, therefore earnings are more likely to be managed.

2.4 External Audit Quality and EM

Audit quality is defined as the "market-assessed joint probability that a given auditor will both (a) discover a breach in the client's accounting system, and (b) report the breach" (DeAngelo 1981, page 186). The external audit is important and necessary in solving "the agency problems associated with the separation of ownership and control, along within formation asymmetry between management and absentee owners" (Lin and Hwang, 2010, page 59). The responsibilities of external auditors include inspecting and verifying financial statements to ensure that financial statements truly reflect economic conditions and operating results of the entity, and conform with accounting standards (*e.g.*, GAAP or IFRS) (Lin and Hwang, 2010). In this section I review prior studies that focus on two proxies of audit quality: auditor size and auditor tenure.

Auditor Size

Auditor size, as an important audit quality indicator has been evaluated to examine the association between auditor quality and EM. Becker et al. (1998) use Big Six auditors as the proxy of high audit quality, and discretionary accruals as

the proxy of EM to examine the association between audit quality and EM. Results support the hypothesis that firms with non-Big Six auditors report higher income-increasing discretionary accruals. Similar to Becker et al. (1998), Francis et al. (1999) also use Big Six auditors and discretionary accruals to examine the association between audit quality and EM. They argue that firms with more aggressive and/or opportunistic EM prefer to hire Big Six auditors to make their reports more credible. In the same time, Big Six auditors can constrain opportunistic EM. They find that discretionary accruals are lower in Big Six audited firms, suggesting auditor size is negatively related to EM. Findings from Becker et al. (1998) and Francis et al. (1999) consistently indicate that larger auditors can constrain opportunistic reporting with high levels of accruals, therefore reduce EM.

Auditor Tenure

Auditor tenure could impact EM in two ways. On one hand, as auditor tenure increases, the auditor is more engaged with the audited firm and could be less likely to be independent, which may result in lower audit quality (Beck et al., 1988; Lys and Watts, 1994). On the other hand, as auditor tenure increases, the auditor can gain more experience, and it is more likely to detect earnings misstatement, as well as EM. In addition, more adopted regulations (*i.e.*, SOX) may increase the independence of auditor, in which auditor is more efficient in detecting EM. Therefore, more adopted regulations along with increased tenure enhance the detection of EM (Johnson et al., 2002; Myers et al., 2003).

Recent studies indicate that there is a positive association between auditor tenure and earnings quality. Johnson et al. (2002) use absolute value of discretionary accruals and the persistence of accrual as proxies of reporting quality. If there is less than two or three years that an auditor provides service to a company, it is defined as short auditor tenure. If there is more than nine years, it is defined as long auditor tenure. They find that short auditor tenure is related to low financial reporting quality relative to medium auditor tenure of four to eight years. Also, they do not find evidence that long auditor tenure can reduce financial reporting quality relative to medium auditor tenure.

Consistent with Johnson et al. (2002), Myers et al. (2003) argue that with the increase of auditor tenure, auditors can learn more about the business and rely less on management estimates. With current and discretionary accruals as proxies of earnings quality, they find that the magnitudes of both current and discretionary accruals decrease as auditor tenure extended. Results indicate that auditors who have longer relationship with the firm can constrain the use of EM.

In summary, recent studies imply that medium and long auditor tenure can reduce EM, since auditors gain more experience, learn more about the business, and rely less on management estimates, which enhances them to detect EM. Overall, auditors with high quality can constrain EM. Characteristics of auditors that may detect and constrain EM include auditor size and auditor tenure.

Chapter 3

Hypothesis Development

3.1 The Association between Investor Sentiment and AEM/REM

3.1.1 Hypothesis 1: The Association between Investor Sentiment and AEM

My dissertation examines four questions. My first research question examines whether there is an association between investor sentiment and AEM. Previous studies show there is an association between investor sentiment and accrual mispricing (Ali and Gurun, 2009), earnings response coefficient (Mian and Sankaraguruswamy, 2012), EM (Simpson, 2013) and accounting conservatism (2019). Although these studies examine the association between investor sentiment and different EM proxies (total accruals, abnormal accruals, etc.), they provide similar evidences that investors have different behaviors, and managers are motivated differently to manage earnings in different investor sentiment periods. Kahneman and Riepe (1998) state that optimism causes people to overestimate their knowledge, underreact to outside information, underestimate risks, and be over confident about a firm's future performance. Pessimism causes people to underestimate their knowledge, overreact to outside information, overestimate risks, and be under confident about a firm's future performance. Individual investors are optimistic to future stock performance during high investor sentiment periods while pessimistic to future stock performance during low investor sentiment periods. Managers' behavior on corporate reporting decisions, such as

EM, is affected by investors' sentiment-driven expectations of future earnings (Baker and Wurgler, 2007; Simpson, 2013). In other words, it implies that investor sentiment may affect the level of EM. Therefore, the effect of investor sentiment on EM should be thoroughly studied, which can help investors understand how managers may play games with them in order to mislead them.

Ali and Gurun (2009) argue that individual investors are optimistic (pessimistic) about future stock performance and pay limited (more) attention to accruals and cash components of earnings in high (low) investor sentiment periods. Therefore, during high investor sentiment periods, investors are more likely to ignore EM, and managers are more likely to manage earnings upward to meet investors expectation on stock performance. Simpson (2013) further addresses this argument that "managers' motives to overstate earnings by taking income increasing accruals are likely to be higher in high investor sentiment periods (*e.g.*, due to pressure to meet optimistic investor and analyst expectations), whereas in low sentiment periods, managers may have incentives to understate earnings (*e.g.*, because of reputational risk arising from heightened investor scrutiny)" (Simpson, 2013, page 870).

In contrast to Ali and Gurun (2009) and Simpson (2013), Ge et al. (2019) argue that managers are more likely to engage in conservative reporting during high investor sentiment periods, which indicates that managers are less likely to manage earnings upward during high investor sentiment periods. Mian and

Sankaraguruswamy (2012) find that there is a greater stock price decrease for bad earnings news, during low investor sentiment periods than high investor sentiment periods. These findings imply that managers may have stronger incentives to manipulate earnings upward to avoid bad news reporting during low investor sentiment periods as well. These arguments discuss investors' behavioral biases and managers' response to investors' behavior through EM. In high investor sentiment periods, investors are more likely to ignore EM, and managers are more likely to manipulate earnings to meet investors expectation on stock performance (Ali and Gurun, 2009; Simpson, 2013). In low investor sentiment periods, investors are more sensitive to bad news and underestimate stock performance, therefore, managers are motivated to manipulate earnings in order to avoid missing earnings expectations (Mian and Sankaraguruswamy, 2012).

Similar to Simpson (2013), I first examine the association between investor sentiment and AEM. While Simpson (2013) finds that investor sentiment is a positively associated with AEM, my first hypothesis is formulated in non-directional form due to the conflicting arguments just described.

H1: There is an association between investor sentiment and AEM.

3.1.2 Hypothesis 2: The Association between Investor Sentiment and REM

As discussed before, previous studies examine the associations between investor sentiment and mispricing (Ali and Gurun, 2009), earnings response coefficient (Mian and Sankaraguruswamy, 2012), EM (Simpson, 2013) and

accounting conservatism (Ge et al., 2019). However, most of these studies focus on accruals or accruals based EM proxies. Fields et al. (2001) argue that studying solely on one EM method is isolated and cannot fully explain the overall effect of EM activities. However, there is very limited research reported on the effect of investor sentiment on REM, another popular method used by managers to manage earnings. My second research question examines whether there is an association between investor sentiment and REM. I employ two relationships, the association between investor sentiment and AEM (addressed in **H1**), and the association between AEM and REM (addressed below), to develop this hypothesis. First, I hypothesize there is an association between investor sentiment and AEM. Then I discuss that there is an association between AEM and REM below. Combined with these two associations, I expect there is an association between investor sentiment and REM.

Schipper (1989) and Roychowdhury (2006) define REM as real economic activities that managers take to manage earnings such as accelerating sales and reducing discretionary spending. Since I expect an association between investor sentiment and AEM (**H1**), a natural extension of this hypothesis is to expect that investor sentiment is also associated with other forms of EM available to managers, including REM.

Also, previous studies show that the association between AEM and REM is not only substitutive, but also complementary (Barton, 2001; Zang, 2012; Mizik

and Jacobson, 2007). On one hand, a substitutive association exists between AEM and REM, in which based on their relative costs, managers trade off two EM methods and adjust AEM according to realized REM (Barton, 2001; Zang, 2012). On the other hand, when using one method cannot reach targets, managers may use the other method as complementary in order to meet earnings goals (Mizik and Jacobson, 2007; Cohen and Zarowin, 2010; Chen et al., 2012).

Above arguments indicate that, in addition to using AEM, managers may also use REM to manage earnings. Consistent with my formulation of **H1**, I hypothesize that there is a possibility that managers may use REM differently during different investor sentiment periods. The second hypothesis is formulated as non-direction and stated as follows,

H2: There is an association between investor sentiment and REM.

3.2 The Effects of Internal Corporate Governance Strength and External Audit Quality on Association between Investor Sentiment and AEM/REM

My third and fourth research questions are to examine whether firm's internal corporate governance strength and external audit quality affect the association between investor sentiment and AEM/REM. Previous studies show that internal corporate governance mechanisms and external auditors play important roles in controlling EM (*e.g.*, Becker et al., 1998; Klein, 2002; Xie et al., 2003; Davidson et al., 2005; Lin and Hwang, 2010). Properly structured corporate governance monitor firms' management efficiently in financial reporting process,

which improves the financial reporting quality as well as reduces EM. A quality audit constrains opportunistic AEM since AEM is likely to draw more scrutiny from regulator or auditor. As a substitute of AEM, REM may be more likely to be adopted by managers for firms with higher audit quality. In **H1** (**H2**), I hypothesize there is an association between investor sentiment and AEM (REM). Therefore, the strength of internal corporate governance mechanisms and external audit quality are expected to moderate the association between investor sentiment and AEM and/or REM.

3.2.1 Hypothesis 3: The Effect of Internal Corporate Governance Strength on the Association between Investor Sentiment and AEM/REM

Internal corporate governance is the system that is necessary and important to direct and control companies. A quality internal corporate governance can monitor and constrain the use of EM, one of the inappropriate expropriation of resources exploited by managers. For internal corporate governance, the board of directors, and, in particular, audit committee has oversight for financial reporting process and therefore play important roles in controlling EM.

Previous studies (Jensen, 1993; Yermack, 1996) argue that board size is negatively related to firm performance, since small boards monitor management activities more effectively than large boards. However, Dalton et al. (1999) find board size is positively related to firm performance. Xie et al. (2003) find that larger board size is better at preventing EM. More recently, Cornett et al. (2008) find

board size is not related to EM. These studies show that the relation between board size and EM is mixed and needed further evaluation.

The associations between board independence and EM, audit committee independence and EM are widely studied. Previous studies (*e.g.,* Klein, 2002; Xie et al., 2003; Lin and Hwang, 2010) use AEM as a proxy of EM and indicate that the independence of board and audit committee is negatively related to AEM. In addition, REM has also been examined to evaluate the effect of internal corporate governance strength on EM by Osma (2008) and Garven (2015), which show that independent board and committee members are negatively associated with REM.

Jensen (1993) argues that CEO with duality may be more effective in information controlling, in which the information may not be available to other board members. Therefore, it may impede effective monitoring and result in greater AEM. Although the findings of association between CEO duality and AEM are mixed in recent studies (Davidson et al., 2004; Davidson et al., 2005; Cornett et al., 2008), based on Jensen's (1993) argument I expect there are associations between CEO duality and AEM/REM. I include CEO duality as a proxy for internal corporate governance strength in my study to examine whether it affects EM, both AEM and REM.

Since managers have different incentives to manage earnings in different investor sentiment periods (Ali and Gurun, 2009; Mian and Sankaraguruswamy,

2012; Simpson, 2013; Ge et al., 2019), these incentives may be moderated by proper internal corporate governance.

Hence, I formulate my third hypothesis as follow:

H3a: The strength of internal corporate governance mechanisms may moderate the association between investor sentiment and AEM.

H3b: The strength of internal corporate governance mechanisms may moderate the association between investor sentiment and REM.

3.2.2 Hypothesis 4: The Effect of External Audit Quality on the Association between Investor Sentiment and AEM/REM

As stated in Lin and Hwang (2010, page 59), the external audit is important and necessary in solving "the agency problems associated with the separation of ownership and control, along with information asymmetry between management and absentee owners". The responsibilities of external auditors include inspecting and verifying financial statements to ensure that financial statements truly reflect economic conditions and operating results of the entity, and conform with accounting standards (Lin and Hwang, 2010). External auditors have efforts in detecting misstatements or omission in firm's financial statements therefore increase financial reporting quality.

Similar to internal corporate governance, a quality audit constrains opportunistic AEM, since AEM is likely to draw more scrutiny from regulator and auditor. Different characteristics of external audit quality have been examined to

study their effects on AEM. Both Francis et al. (1999) and Becker et al. (1998) indicate that clients of non-Big Six auditors engage in more upward AEM than clients of Big Six auditors, suggesting auditor size is negatively related to AEM. These findings consistently indicate that larger auditors can constrain opportunistic reporting with high levels of accruals, therefore reduce AEM.

As another proxy for audit quality, auditor tenure is also examined when studying the relationship between audit quality and AEM. Johnson et al. (2002) indicate that compared to medium and long auditor tenure, short auditor tenure results in low financial reporting quality and high AEM. Myers et al. (2003) find that auditors with longer tenure increase clients' earnings quality, suggesting auditor tenure is negatively associated with AEM.

The constraint of external audit quality on REM may not be the same as that on AEM, since REM is less likely to draw scrutiny from regulator or auditor. In addition, Zang (2012) finds that AEM and REM function as substitutes. With the high audit quality, the usage of AEM is constrained by auditors which results in more usage of REM by managers. Therefore, audit quality may be negatively associated with AEM while positively associated with REM.

Acting as an important monitoring mechanism that constrains managers' ability to engage in EM, external audit quality may serve as another moderator in affecting the relationship between investor sentiment and AEM/REM.

Hence, I formulate hypotheses as follows:

H4a: External audit quality may moderate the association between investor sentiment and AEM.

H4b: External audit quality may moderate the association between investor sentiment and REM.

Chapter 4

Research Design and Methodology

4.1 Measurements of EM

Investors and financial analysts rely heavily on the accounting information in firm's financial statements to evaluate firm performance and make investment decisions. In order to influence investors' decisions, managers may report attractive financial statements through managing earnings, one of the most important indicators of firm's performance. As indicated earlier, I focus on two EM mechanisms in this dissertation: AEM and REM.

4.1.1 Measures of AEM

One common method for identifying AEM is the modified Jones model (Dechow et al., 1995). Jones (1991) develops a model with the assumption that total accruals are largely determined by the change in revenues (*ΔREV*) and the gross property, plant, and equipment. However, sales revenues are not completely exogenous. For example, managers may manipulate credit sales by extending generous credit in order to increase sales. Dechow et al. (1995) exclude the increase in trade receivables (*ΔREC*) from the change in revenues. The managerial control is captured in abnormal total accruals, that is residuals of total accruals.

$$TA_{i,t}/A_{i,t-1} = \alpha_1\left[1/A_{i,t-1}\right] + \alpha_2\left[\left(\Delta REV_{i,t} - \Delta REC_{i,t}\right)/A_{i,t-1}\right] + \alpha_3\left[PPE_{i,t}/A_{i,t-1}\right] + \varepsilon_{i,t} \quad (1)$$

Where $TA_{i,t}$ is total accruals for firm *i* in year *t*. Total accruals is estimated as income before extraordinary items minus CFO excluding extraordinary items and discontinued operations. It is calculated as *IB-(OANCF-XIDOC)* where *IB* is the variable for income before extraordinary items, *OANCF* is CFO, and *XIDOC* is the extraordinary items and discontinued operations from North American (NA) Compustat. $A_{i,t-1}$ is total assets for firm *i* at the previous year (*AT* in NA Compustat). $\Delta REV_{i,t}$ is the revenue (*SALE* in NA Compustat) in year *t* minus the revenue in year *t-1*. $\Delta REC_{i,t}$ is the net receivable (*RECT* in NA Compustat) in year *t* minus the net receivable in year *t-1* for firm i. $PPE_{i,t}$ is the gross property, plant and equipment (*PPEGT* in NA Compustat) for firm *i* at year *t*.

I estimate Model (1) cross-sectionally to obtain the normal accruals for each year and industry with at least 10 observations. The classification of industry is based on two-digit SIC codes. The discretionary accruals are calculated as actual total accruals minus the estimate of normal accruals from Model (1). I use the dichotomous variable *POSI_AEM* as a proxy for the propensity of AEM, which is 1 for firm-years with positive discretionary accruals, while 0 otherwise.

In addition, Kothari et al. (2005) argue that the modified Jones model causes misspecification in discretionary accruals for firms with extreme past performance. They include return of assets to address this issue. In this study, I employ this model to calculate the discretionary accruals, as a robustness test for the modified Jones model.

$$TA_{i,t}/A_{i,t-1} = \alpha_1\left[1/A_{i,t-1}\right] + \alpha_2\left[\left(\Delta REV_{i,t} - \Delta REC_{i,t}\right)/A_{i,t-1}\right] +$$

$$\alpha_3\left[PPE_{i,t}/A_{i,t-1}\right] + \alpha_4\left(ROA_{i,t-1}\right) + \varepsilon_{i,t} \quad (2)$$

Where $ROA_{i,t-1}$ is the return on assets for firm *i* in the previous year, which is calculated as net income before extraordinary items (*NI* in NA Compustat) divided by total assets at the beginning of the year. Similar to the proxy of AEM from the modified Jones model, the proxy for the propensity of AEM from Kothari et al. (2005) model is the dichotomous variable *POSI_AEM_K*, which is 1 for firm-years with positive discretionary accruals, while 0 otherwise.

4.1.2 Measures of REM

Following Roychowdhury (2006), I use abnormal levels of CFO, PROD and DISEXP as proxies of REM. The abnormal levels of these proxies are similar to that of discretionary accruals, which are calculated as the difference between actual and estimated components of each respective proxy. To determine abnormal levels of CFO, the first step is to estimate the following model:

$$CFO_{i,t}/A_{i,t-1} = \beta_0 + \beta_1\left(1/A_{i,t-1}\right) + \beta_2\left(S_{i,t}/A_{i,t-1}\right) + \beta_3\left(\Delta S_{i,t}/A_{i,t-1}\right) + \varepsilon_{i,t} \quad (3)$$

Where $CFO_{i,t}$ is the cash flow from operations minus extraordinary items and discontinued operations during period t for firm *i*, which is calculated as *OANCF-XIDO*C from NA Compustat. $S_{i,t}$ is the sales (*SALE* in NA Compustat) for firm *i* during period t and $\Delta S_{i,t} = S_{i,t} - S_{i,t-1}$. I regress Model (3) cross-sectionally

to obtain the estimated CFO for each year and industry with at least 10 observations. The abnormal CFO (*AB_CFO*) is calculated as the actual *CFO* minus the estimated *CFO*.

Similarly, to determine abnormal levels of PROD, I first estimate the following model:

$$PROD_{i,t}/A_{i,t-1} = \beta_0 + \beta_1\left(1/A_{i,t-1}\right) + \beta_2\left(S_{i,t}/A_{i,t-1}\right) + \beta_3\left(\Delta S_{i,t}/A_{i,t-1}\right) + \beta_4\left(\Delta S_{i,t-1}/A_{i,t-1}\right) + \varepsilon_{i,t} \quad (4)$$

Where $PROD_{i,t}$ is the production costs for firm *i* that are expressed as cost of goods sold (*COGS* in NA Compustat) plus the change of inventory (*INVT* in NA Compustat) from previous year. I regress Model (4) cross-sectionally to obtain the estimated PROD for each year and industry with at least 10 observations. The abnormal PROD (*AB_PROD*) are calculated as the actual PROD minus the estimated PROD.

Finally, I estimate the following model to determine abnormal levels of DISEXP:

$$DISEXP_{i,t}/A_{i,t-1} = \beta_0 + \beta_1\left(1/A_{i,t-1}\right) + \beta_2\left(S_{i,t-1}/A_{i,t-1}\right) + \varepsilon_{i,t} \quad (5)$$

Where $DISEXP_{i,t}$ is the discretionary expenses for firm *i*. It is defined as the total expenses of advertising (*XAD* in NA Compustat), R&D (*XRD* in NA Compustat) and SG&A (*XSGA* in NA Compustat). I regress Model (5) cross-sectionally to obtain the estimated DISEXP for each year and industry with at least

10 observations. The abnormal levels of DISEXP (*AB_DISEXP*) are measured as the actual DISEXP minus the estimated DISEXP.

Three variables, abnormal levels of CFO (*AB_CFO*), PROD (*AB_PROD*) and DISEXP (*AB_DISEXP*), measure various aspects of REM. These variables have different association with REM and need to have consistent signs to construct an aggregated REM measure. As discussed in previous studies (Cohen et al., 2008; Cohen and Zarowin, 2010; Ho et al. 2015), firms engaging in REM through the approaches of accelerating sales and reducing discretionary spending yield negative abnormal CFO and negative DISEXP, while reporting of lower COGS through increased production yields positive PROD. Therefore, with respective coefficients, REM is the aggregate of the three proxies,

$$REM = REM_{CFO} + REM_{PROD} + REM_{DISEXP} \quad (6)$$

Here $REM_{CFO} = -AB\_CFO$

$REM_{PROD} = AB\_PROD$

$REM_{DISEXP} = -AB\_DISEXP$

The proxy for the propensity of REM is the dichotomous variable, *POSI_REM*, which is 1 for firm-years with positive *REM*, while 0 otherwise. The proxies for propensities of three REM components are dichotomous variables, *POSI_REM*$_{CFO}$, *POSI_REM*$_{PROD}$ and *POSI_REM*$_{DISEXP}$. These three variables are assigned to value of 1 for firm-years with positive *REM*$_{CFO}$, *REM*$_{PROD}$ and

REM$_{DISEXP}$ respectively. *POSI_REM*$_{CFO}$, *POSI_REM*$_{PROD}$ and *POSI_REM*$_{DISEXP}$ are assigned to a value of 0 otherwise.

4.2 Empirical Models Examining Hypotheses

In **H1** and **H2**, I hypothesize that there is an association between the investor sentiment and AEM/REM. I construct the following regression model to test **H1** and **H2**:

$$Prob(EM_{i,t}) = \alpha_0 + \alpha_1 SENT_{i,t-1} + \alpha_2 SHARE_{i,t-1} + \alpha_3 NOA_{i,t-1} + \alpha_4 MB_{i,t-1} + \alpha_5 ASSETS_{i,t-1} + \alpha_6 LEV_{i,t-1} + \alpha_7 ROA_{i,t-1} + \alpha_8 INDUSTY_k + \varepsilon_{i,t} \quad (7)$$

Where $EM_{i,t}$ represents six different dependent dichotomous variables: *POSI_AEM, POSI_AEM_K, POSI_REM* and three components of REM ($POSI\_REM_{CFO}$, $POSI\_REM_{PROD}$ and $POSI\_REM_{DISEXP}$). $SENT_{i,t-1}$ is the previous fiscal year's investor sentiment index and represents two different sentiment variables, *SENT_BW* for BW developed by Baker and Wurgler (2006), and *SENT_MICH* for MICH developed by the Michigan Consumer Research Center. The primary variable to test **H1** and **H2** in Model (7) is *SENT*. Given that **H1** and **H2** are non-directional hypotheses, I do not predict the sign of coefficient on *SENT* (α_1).

I control for market share (*SHARE*), net operating assets (*NOA*), market to book ratio (*MB*), firm size (*ASSETS*), leverage (*LEV*), return of assets (*ROA*) and industry effect (*INDUSTRY*) (Zang, 2012; Simpson, 2013; Ho et al.,

2015). $SHARE_{i,t-1}$ is the previous fiscal year's market share which represents the leadership position of a firm in the market. It is expressed as a firm's sales (*SALE* in NA Compustat) divided by the total sales of its industry. Zang (2012) shows that leading firms are less likely to engage in AEM than REM since it is costly to ruin firms' reputation.

$NOA_{i,t-1}$ is the net operating assets and represents firms' accounting flexibility, which is expressed as shareholder's equity (*CEQ* in NA Compustat) less cash and marketable securities (*CHE* in NA Compustat) plus total debt (*LT* in NA Compustat) scaled by lagged sales (*SALE* in NA Compustat). Zang (2012) finds that net operating assets relative to sales have a negative relation to AEM while positive relation to REM.

$MB_{i,t-1}$ is the previous year's market to book ratio and represents the firm's growth potential, which is expressed as the ratio of market value of shareholders' equity (*CSHO*×*PRCC*_F in NA Compustat) to book value of shareholders' equity (*CEQ* in NA Compustat). $ASSETS_{i,t-1}$ is the natural log of total assets (*AT* in NA Compustat) at the end of previous year. $LEV_{i,t-1}$ is the previous year's debt-to-equity ratio and represents the firm's capital structure, calculated as short-term debt (*DLC* in NA Compustat) plus long-term debt (*DLTT* in NA Compustat) divided by shareholders' equity (*CEQ* in NA Compustat). $ROA_{i,t-1}$ shows the firm's profitability relative to total assets, which represents the efficiency of firm's management. These variables are related to managerial

incentives to engage in EM that need to be controlled in regression models. Since comparability across industry is desirable, and EM is likely to vary by industry, I control for industry effects by including a dummy indicator (*INDUSTRY*), which equals 1 if the firm belongs to the industry *k* based on the two-digit SIC codes.

In **H3**, I hypothesize that the strength of internal corporate governance mechanisms has an effect on the association between investor sentiment and EM. In **H4**, I hypothesize that external audit quality has an effect on the association between investor sentiment and EM. To test **H3** and **H4**, I use the following regression model:

$$Prob(EM_{i,t}) = \beta_0 + \beta_1 SENT_{i,t-1} + \beta_2 BIND\_D_{i,t} + \beta_3 BSIZE\_D_{i,t} + \beta_4 DUALITY_{i,t} + \beta_5 ACSIZE\_D_{i,t} + \beta_6 BIG4_{i,t} + \beta_7 TENURE\_D_{i,t} + \beta_8 SENT_{i,t-1} \times BIND\_D_{i,t} + \beta_9 SENT_{i,t-1} \times BSIZE\_D_{i,t} + \beta_{10} SENT_{i,t-1} \times DUALITY_{i,t} + \beta_{11} SENT_{i,t-1} \times ACSIZE\_D_{i,t} + \beta_{12} SENT_{i,t-1} \times BIG4_{i,t} + \beta_{13} SENT_{i,t-1} \times TENURE\_D_{i,t} + \beta_{14} SHARE_{i,t-1} + \beta_{15} NOA_{i,t-1} + \beta_{16} MB_{i,t-1} + \beta_{17} ASSETS_{i,t-1} + \beta_{18} LEV_{i,t-1} + \beta_{19} ROA_{i,t-1} + \beta_{20} INDUSTY_k + \varepsilon_{i,t} \quad (8)$$

All variables are as previously defined with the following exceptions. *BIND_D*, *BSIZE_D*, *DUALITY* and *ACSIZE_D* are proxies for internal corporate governance strength. $BIND\_D_{i,t}$ is the dummy variable for board independence (*BIND*), which equals 1 when the percentage of independent directors on the board for firm *i* at year *t* is larger than the median percent for all firm-year observations,

and 0 otherwise. $BSIZE\_D_{i,t}$ is the dummy variable for the size of board (*BSIZE*) for firm *i* at year *t*. It has the value of 1 if the number of directors on the board is larger than the median value for all observations, and 0 otherwise. *DUALITY* is the indicator of CEO duality, which equals to 1 if the CEO also serves as the chair of board, 0 otherwise. $ACSIZE\_D_{i,t}$ is the dummy variable for the size of audit committee (*ACSIZE*). It is defined as 1 if the size of audit committee is larger than the median size of audit committee for all observations, and 0 otherwise. *BIG4* and *TENURE_D* are proxies of audit quality. $BIG4_{i,t}$ is the indicator variable which equals 1 if the firm's auditor belongs to the Big Four audit firms, and 0 otherwise. $TENURE\_D_{i,t}$ is the dummy variable for the number of years an auditor-client business relationship lasts (*TENURE*)[6]. It is defined as 1 if the number of years is larger than the median number of years for all observations, and 0 otherwise.

The primary variables to test **H3** and **H4** in the above regressions are $SENT \times BIND\_D$, $SENT \times BSIZE\_D$, $SENT \times DUALITY$, $SENT \times ACSIZE\_D, SENT \times BIG4$ and $SENT \times TENURE\_D$. Given that **H3** are non-directional hypothesis, I do not predict the signs of coefficients on $SENT \times BIND\_D$, $SENT \times BSIZE\_D$, $SENT \times DUALITY$, and $SENT \times ACSIZE\_D$ (β_8, β_9, β_{10} and β_{11}). Given that **H4** are non-directional hypothesis, I do not predict the signs of coefficients on $SENT \times BIG4$ and $SENT \times TENURE\_D$(β_{12} and β_{13}).

[6] The auditor tenure is calculated relative to 1977, the first year that auditor data are available in WRDS. The mergers and dissolution of Big Eight/Six/Five/Four are considered.

4.3 Data and Sample Selection

I collect data for regression tests from multiple sources. The investor sentiment index BW is available at Wurgler's webpage at New York University[7]. The data of MICH is collected from the website of Institute for Social Research at the University of Michigan[8]. The financial data used in this study to measure EM and control variables are downloaded from the Compustat provided by WRDS. The data used to calculate the proxies of internal corporate governance strength are collected from ISS in WRDS. In addition, the external audit quality data, including auditor size and auditor tenure, are collected from the Compustat in WRDS.

My sample consists of U.S. firms that are components of S&P 1500 from 2005 to 2018[9, 10]. I choose the post-SOX period because prior research documents that SOX significantly changes EM behavior (Cohen et al., 2008; Zang, 2012). Therefore, the association between investor sentiment and EM, and the effects of corporate governance strength and audit quality on the association between investor sentiment and EM might be different between post-SOX and pre-SOX periods.

Table 1 summarizes the sample selection process. I start from the Compustat from 2005 to 2018, US public firms listed on U.S. stock exchanges

[7] http://people.stern.nyu.edu/jwurgler/.
[8] http://www.sca.isr.umich.edu/.
[9] I use 2004-2017 data to calculate a firm's AEM and REM because previous years' financial data are used to calculate them. In addition, the proxies for investor sentiments and control variables are calculated in the period of 2004-2017 because they are using previous year's variables in regression tests.
[10] I construct my sample based on S&P 1500 firms because ISS only provides S&P 1500 firms' data that are used to calculate the proxies of internal corporate governance strength.

(85,105 firm-years and 10,029 unique firms). Consistent with previous studies (Zang, 2012; Simpson, 2013; Ho et al., 2015), I exclude 29,775 firm-years (3,330 unique firms) in financial services (SIC codes 6000-6999) and utilities (SIC codes 4900-4999) industries, because these firms likely have certain firm characteristics that could affect EM behavior differently than other firms. I exclude firm-years which are not associated with S&P 1500 firms (41,887 firm-years and 4,995 unique firms). Then I exclude 533 firm-years (28 unique firms) without corporate governance data and 15 firm-years (2 unique firms) without audit quality data. Next I exclude firm-years that total assets or book value is not positive (298 firm-years and 15 unique firms) from the sample. Then I exclude firm-years without sufficient data to calculate EM proxies (2,668 firm-years and 267 unique firms). Finally, my sample consists of 9,949 firm-year observations and 1,392 unique firms.

--- TABLE 1 ---

Chapter 5

Empirical Results

5.1 Descriptive Statistics

Table 2 presents the descriptive statistics for variables used in the regression tests. All continuous variables are winsorized at 1 and 99 percentiles. For the analysis of AEM, the mean and median of the proxy from the modified Jones model, *POSI_AEM*, are 0.442 and 0.000, while the mean and median of the proxy from Kothari et al.'s model, *POSI_AEM_K* are 0.450 and 0.000. These descriptive statistics are similar between the modified Jones and Kothari et al.'s models, which indicate that 44.2% (45.0% for Kothari et al.'s model) of firm-year observations have engaged in upward AEM. In Zang (2012), the median of AEM is 0.0178, which indicates the number of firm-years with upward AEM is larger than that with downward AEM. The decline of upward AEM is caused by the different periods in Zang (2012) (1987-2008) and in this study (2006-2018). As discussed before, previous studies (Cohen et al., 2008; Zang, 2012) find that the level of AEM declines after the passage of SOX. Since my sample period is post-SOX, the firms report less incidence of upward AEM than those reported in Zang (2012)[11].

--- TABLE 2 ---

[11] In addition, Ho et al. (2015) report 49.3% of firm-years engage in upward AEM, higher than the results in my study. The difference is likely caused by the different sample periods and different countries in Ho et al. (2015) (2002-2011, Chinese firms) and in my study (2006-2018, U.S. firms).

For REM-related variables, the mean values of *POSI_REM*, $POSI\_REM_{CFO}$, $POSI\_REM_{PROD}$ and $POSI\_REM_{DISEXP}$ are 0.541, 0.519, 0.522 and 0.551 respectively. The median values of all four variables are 1.000. These descriptive statistics indicate that, overall, 54.1% of firm-year observations have engaged in upward REM. The result is similar to Zang (2012), which also indicates the number of firm-years engaging in upward REM is larger than those engaging in downward REM. The descriptive statistics also show that 51.9%, 52.2% and 55.1% of firm-year observations engage in upward REM through the approaches of accelerating sales, lowering COGS and reducing discretionary spending, respectively.

Table 2 also reports the descriptive statistics for the proxies of investor sentiment, variables of internal corporate governance strength, variables of external audit quality and control variables. The mean and median values of *SENT_BW* are -0.042 and -0.020, while the mean and median values of *SENT_MICH* are 81.58 and 84.13. These descriptive statistics for the proxies of investor sentiment are calculated based on the averaged investor sentiment index of previous fiscal year for each firm-year observation.

For the variables of internal corporate governance strength, the mean and median values of *BIND* are 0.793 and 0.818, indicating that, on average, 79.3% of board members are independent. The mean and median values of *BSIZE* are 8.962 and 9.000, indicating that, for an average firm, its board contains 9 members. For

CEO duality, the mean value of *DUALITY* is 0.450, indicating that in 45% of total firm-year observations, CEO also serves as the chair of board. The mean and median values of *ACSIZE* are 3.717 and 4.000, indicating that, for an average firm, its audit committee contains 3.72 members. For audit quality, the mean value of *BIG4* is 0.921 which indicates that 92.1% of total firm-year observations are clients of Big Four audit firms. For auditor tenure, the mean and median values are 16.22 and 13.00, which indicate that the average (median) years of the auditor-client relationship are about 16 (13).

For the control variables, the market share of an average firm is 3.2% (*SHARE*), the mean value of *NOA* is 1.181, the mean value of *MB* is 3.628, the mean value of *ASSETS* is 7.691, the mean value of *LEV* is 0.195, and the mean value of *ROA* is 0.058. In general, the descriptive statistics of control variables are similar to the findings of previous studies (*i.e.*, Cohen et al., 2008).

Table 3 presents the Pearson and Spearman correlation matrix for all variables used in the regression analysis. Panel A shows Pearson and Spearman Pairwise correlations for all EM proxies which include *POSI_AEM*, *POSI_AEM_K*, *POSI_REM* and the three dichotomous variables for components of REM. The Spearman correlations among these variables are similar to Pearson correlations[12]. The correlation between two measures of AEM, *POSI_AEM* and *POSI_AEM_K* are

[12] The coefficients of correlation among the proxies of EM in Panel A of Table 3 are the same between Pearson and Spearman correlations, since I use dichotomous variables for all six EM proxies.

significant and positive, with a Pearson coefficient of 0.86. For the measures of REM and three components of REM, they are positively and significantly correlated with each other, with a coefficient of 0.39 between *POSI_REM* and $POSI\_REM_{CFO}$, 0.83 between *POSI_REM* and $POSI\_REM_{PROD}$, and 0.70 between *POSI_REM* and $POSI\_REM_{DISEXP}$. The correlation between AEM and REM is positive and significant, with a coefficient of 0.14 (0.13) between *POSI_AEM* (*POSI_AEM_K*) and *POSI_REM*, suggesting that firms may use both EM methods to manage earnings. The correlation between AEM and REM is consistent with the findings of Cohen and Zarowin (2010) and Zang (2012).

--- TABLE 3 ---

Panel B of Table 3 presents the Pearson and Spearman correlation matrix for primary and control variables used in the regression analysis. The correlations between *POSI_AEM* and two investor sentiment indexes are insignificant, with a Pearson coefficient of 0.01 between *POSI_AEM* and *SENT_BW*, and 0.00 between *POSI_AEM* and *SENT_MICH*. The correlations between *POSI_REM* and two investor sentiment indexes are insignificant, with Pearson coefficients of -0.00 (0.00) between *POSI_REM* and *SENT_BW* (*SENT_MICH*). Three of four proxies of corporate governance strength, *BIND_D*, *DUALITY* and *ACSIZE_D*[13], have

[13] To study the effects of internal corporate governance strength and external audit quality on the association between EM and investor sentiment, dummy variables are used instead of continuous variables for the proxies of internal corporate governance strength and external audit quality. Dummy variables *BIND_D*, *BSIZE_D*, *ACSIZE_D* and *TENURE_D* represent the continuous

significant correlations with *POSI_AEM*, with Pearson coefficients of -0.03, 0.03 and 0.04 respectively. Two of four proxies of corporate governance, *BSIZE_D* and *ACSIZE_D*, have significant correlations with *POSI_REM*, with a Pearson coefficient of -0.02, and 0.04 respectively. For the proxies of audit quality, *POSI_AEM* has a negative and significant correlation with *BIG4* (Pearson coefficient: -0.04), while *POSI_AEM* has a positive and significant correlation with *TENURE_D* (Pearson coefficient: 0.03). Both *BIG4* and *TENURE_D* have negative and significant correlations with *POSI_REM* with Pearson coefficients of -0.05 and -0.02 respectively. The coefficients of Spearman correlations are similar to those of Pearson correlations. However, since control factors may influence the relation between investor sentiment and EM, the univariate correlation relation may not draw conclusions without further analysis.

5.2 Main Results for **H1** and **H2**

Table 4 and Table 5 report the cross-sectional regression analysis for Model (7), which is used to examine **H1** and **H2**. Table 4 reports the main results for **H1** with the control of industry fixed effects[14]. The four columns represent four regression results with *POSI_AEM* and *POSI_AEM_K* as dependent variables, and *SENT_BW* and *SENT_MICH* as main independent variables. In the regressions

variables *BIND*, BSIZE, *ACSIZE* and *TENURE* respectively. The other variables *DUALITY* and *BIG4* are remained since they are dummy variables.

[14] I follow Ho et al. (2015) and control for industry fixed effects in all regressions. Regressions with both industry and year fixed effects are also performed and the results are similar to those with industry fixed effect only.

based on the modified Jones model, the sign of the coefficient on *SENT_BW* is positive but insignificant at the conventional level, while the coefficient on *SENT_MICH* is positive and significant (coefficient = 0.003 and t-stat = 2.16). In regressions based on Kothari et al.'s model, the coefficient on *SENT_BW* is positive but insignificant at the conventional level, while the coefficient on *SENT_MICH* is positive and significant (coefficient = 0.003 and t-stat = 2.08). These results support **H1** and provide some evidence that investor sentiment is positively related to the propensity of AEM, which are consistent with Simpson (2013) and suggest that firms are more likely to engage in upward AEM during high investor sentiment periods.

--- TABLE 4 ---

Table 4 also shows several significant coefficients on control variables which are in general consistent with the findings of previous studies. First, the sign on *NOA* is negative and significant across all four models, consistent with Zang's (2012) findings that net operating assets representing firms' accounting flexibility have a negative relation with AEM. Second, the sign on *MB* is negative and significant across all four models, consistent with Ho et al. (2015), suggesting that firms with higher growth potential are less likely to engage in upward AEM. Third, the sign on *ASSETS* is negative and significant, consistent with Simpson (2013) and Ho et al. (2015), suggesting that larger firms are less likely to engage in upward AEM. Fourth, the signs on *LEV* and *ROA* are positive and significant, consistent

with Simpson (2013) and Ho et al. (2015), suggesting that firms with higher financial leverage and greater profitability are more likely to engage in upward AEM.

Table 5 presents the cross-sectional regression analysis for **H2**. Panel A shows the regression results of *POSI_REM* and three dichotomous variables for components of REM on *SENT_BW*. The coefficients on *SENT_BW* in the regressions of *POSI_REM*, $POSI\_REM_{PROD}$, and $POSI\_REM_{DISEXP}$ are insignificant but the coefficient on $POSI\_REM_{CFO}$ is positive and significant (coefficient = 0.094 and t-statistic = 2.17). These results suggest that firms are more likely to engage in upward REM through the approach of accelerating sales in higher investor sentiment periods, while there is no relation between investor sentiment and the propensity of the aggregate REM, and between investor sentiment and the propensity of specific REM through the approach of lowering COGS or reducing discretionary spending.

--- TABLE 5 ---

Panel B show the regression results of *POSI_REM* and three dichotomous variables for components of REM on *SENT_MICH*. The coefficients on *SENT_MICH* in four regressions are positive, in which coefficients on the variable *SENT_MICH* in the regressions of *POSI_REM* (coefficient = 0.002 and t-stat = 1.73) and $POSI\_REM_{CFO}$ (coefficient = 0.003 and t-stat = 2.30) are significant. The results suggest that MICH has positive associations with the propensity of

aggregate REM and specific REM mechanism with accelerating sales. The results in Panel A and Panel B of Table 5 suggest that firms are more likely to engage in upward REM through the approach of accelerating sales in high investor sentiment periods, for both BW and MICH. However, only MICH is positively related to the propensity of aggregate REM.

Similar to Table 4, Table 5 also shows several significant coefficients on control variables which are in general consistent with the findings of previous studies. First, the signs on *NOA* in the regressions of *POSI_REM* are consistent with Zang's (2012) findings that *NOA* have a positive association with REM. The results of *NOA* in Table 4 and Table 5 suggest that firms with more accounting flexibility tend to engage more in downward AEM and upward REM. Second, the signs on *MB* in the regressions of *POSI_REM* are negative and significant, similar to those in Table 4 and consistent with Ho et al. (2015). The results suggest that firms with higher growth potential are less likely to engage in upward AEM and upward REM. Third, the signs on *LEV* are positive and significant in REM regressions and are the same as those in AEM regressions in Table 4, suggesting firms with higher financial leverage are more likely to engage in upward AEM and REM. Fourth, the signs on *ROA* are negative and significant, which are opposite to those on AEM and consistent with Simpson (2013) and Ho et al. (2015). The results of *ROA* in Table 4 and Table 5 suggest that firms with greater profitability may engage more in upward AEM and downward REM.

Overall, results in Table 4 and Table 5 indicate positive associations between MICH and the propensity of (1) AEM, (2) aggregate REM and (3) specific REM mechanism through accelerating sales, which largely supports **H1** and **H2**. However, BW is only positively related to the propensity of specific REM mechanism through the approach of accelerating sales. I perform the regressions with several control variables and the results of control variables on the propensity of AEM and REM are in general consistent with the findings of previous studies (Zang, 2012; Simpson, 2013; Ho et al., 2015).

5.3 Main Results for **H3** and **H4**

In **H3** and **H4**, I hypothesize that the strength of internal corporate governance mechanisms and external audit quality moderate the associations between investor sentiment and AEM/REM. Table 6 and Table 7 represent the regressions results to test **H3** and **H4**, and the primary variables of interest are the interaction terms between investor sentiment and variables of internal corporate governance strength and external audit quality.

Table 6 presents results for **H3a** and **H4a**. Column (1) shows the results for *POSI_AEM* using *SENT_BW*. The coefficient on *SENT_BW* is insignificant at the conventional level, indicating that BW is not associated with the propensity of AEM after controlling for the strength of internal corporate governance mechanisms and external audit quality. For the variables of internal corporate governance strength in Column (1), the coefficient on *BIND_D* (coefficient = -

0.056 and t-stat = -2.06) is negative and significant, while the coefficients on *BSIZE_D* (coefficient = 0.096 and t-stat = 2.85), *DUALITY* (coefficient = 0.088 and t-stat = 3.30) and *ACSIZE_D* (coefficient = 0.193 and t-stat = 5.32) are positive and significant. These results suggest that, board independence has a negative association with the propensity of AEM, while board size, CEO duality and audit committee size have positive associations with the propensity of AEM. These results are consistent with the findings of previous studies that firms with higher board independence are less likely to engage in upward AEM (*e.g.*, Dechow et al., 1996; Klein, 2002; Xie et al., 2003), while AEM is more pronounced for firms with more directors on the board (Lipton and Lorsch, 1992; Jensen, 1993) and CEO duality (Jensen, 1993; Davidson et al., 2004). In addition, similar to the finding on firms with larger board size, firms with larger audit committee size are also more likely to engage in upward AEM.

--- TABLE 6---

For the variables of external audit quality in Column (1), the coefficient on *BIG4* is insignificant at the conventional level, while the coefficient on *TENURE_D* (coefficient = 0.123 and t-stat = 4.38) is positive and significant. The results suggest that the propensity of AEM is positively related to auditor tenure, while the propensity of AEM has no relation with auditor size. These results are consistent with the findings of prior literature that the auditor with longer tenure is more

engaged with the audited firm and is less likely to be independent, which results in lower earnings quality (Beck et al., 1988; Lys and Watts, 1994).

In **H3a**, I predict that four internal corporate governance mechanisms, board independence, board size, CEO duality and audit committee size may affect the association between investor sentiment and AEM. As reported in Column (1) of Table 6, the coefficients on *SENT_BW*× *BIND_D* (coefficient = 0.055 and t-stat = 0.64) and *SENT_BW*× *ACSIZE_D* (coefficient = 0.131 and t-stat = 1.13) are positive, while the coefficients on *SENT_BW*× *BSIZE_D* (coefficient = -0.007 and t-stat = -0.08) and *SENT_BW*× *DUALITY* (coefficient = -0.053 and t-stat = -0.62) are negative. However, all coefficients on the interaction terms between *SENT_BW* and internal corporate governance proxies are insignificant at the conventional level. These results indicate that internal corporate governance strength does not affect the association between BW and the propensity of AEM. Therefore, the results based on BW do not support **H3a**.

In **H4a**, I predict that two external audit quality factors, auditor size and auditor tenure may moderate the association between investor sentiment and AEM. For the external audit quality proxies in Column (1) of Table 6, the coefficients on *SENT_BW*× *BIG4* (coefficient = 0.142 and t-stat = 0.85) and *SENT_BW*× *TENURE* (coefficient = 0.041 and t-stat = 0.47) are insignificant. Similar to the findings on internal corporate governance strength, external audit quality factors do not affect

the association between BW and the propensity of AEM, either. Therefore, the results based on BW do not support **H4a**.

In the regression of *POSI_AEM* using *SENT_MICH* (Column (3) of Table 6), the coefficient on the variable *SENT_MICH* (coefficient = 0.003 and t-stat = 0.70) is insignificant, further indicating that the propensity of AEM is not associated with investor sentiment, after controlling for internal corporate governance strength and external audit quality. The coefficients on the variables of internal corporate governance strength and external audit quality are insignificant, which are inconsistent to those in Column (1). The results indicate that the propensity of AEM is not associated with external corporate governance strength in the study of association between MICH and the propensity of AEM. The coefficients on variables of interaction terms between proxies of internal corporate governance strength, external audit quality and *SENT_MICH* are insignificant, which are consistent to those in Column (1), suggesting that internal corporate governance strength or external audit quality may not affect the association between investor sentiment and the propensity of AEM. Therefore, neither **H3a** nor **H4a** is supported.

Columns (2) and (4) of Table 6 show the results of cross-sectional regression analysis for *POSI_AEM_K* using *SENT_BW* and *SENT_MICH*, which are similar to those in Columns (1) and (3) respectively. As previous discussed with respect to Columns (1) and (3) of Table 4, the propensity of AEM has no relation

with BW, therefore internal corporate governance strength or external audit quality may not affect the association between BW and the propensity of AEM. As previous discussed with respect to Columns (2) and (4) of Table 4, the propensity of AEM has a positive association with MICH. However, after controlling for internal corporate governance strength and external audit quality, this association is insignificant. Therefore, neither **H3a** nor **H4a** is supported.

Table 7 presents results for **H3b** and **H4b**. Panel A is the results for *POSI_REM* and three dichotomous variables for components of REM using *SENT_BW*. The coefficients on *SENT_BW* in the regressions of *POSI_REM*, $POSI\_REM_{CFO}$, $POSI\_REM_{PROD}$ and $POSI\_REM_{DISEXP}$ are insignificant at the conventional level, which suggests that BW has no relation with the propensity of REM, after controlling for the strength of internal corporate governance mechanisms and external audit quality. For the variables of internal corporate governance strength, the coefficients on *BIND_D* are negative and significant in the regressions of *POSI_REM* (coefficient = -0.091 and t-stat = -3.28), $POSI\_REM_{PROD}$ (coefficient = -0.081 and t-stat = -2.94) and $POSI\_REM_{DISEXP}$ (coefficient = -0.067 and t-stat = -2.45), while the coefficient on *BIND_D* is insignificant in the regression of $POSI\_REM_{CFO}$. The results suggest that firms with lower board independence are more likely to engage in upward REM through the approaches of lowering COGS and reducing discretionary spending. The coefficients on *BSIZE_D* are negative and significant in regressions of *POSI_REM*

(coefficient = -0.073 and t-stat = -2.11) and $POSI\_REM_{DISEXP}$ (coefficient = -0.131 and t-stat = -3.83), while insignificant in the regressions of $POSI\_REM_{CFO}$ and $POSI\_REM_{PROD}$. The results suggest that firms with smaller board size are more likely to engage in upward REM, especially through the approach of reducing discretionary spending.

--- TABLE 7 ---

The coefficients on *DUALITY* in regressions of *POSI_REM* (coefficient = 0.049 and t-stat = 1.81), $POSI\_REM_{CFO}$ (coefficient = 0.051 and t-stat = 1.84), $POSI\_REM_{PROD}$ (coefficient = 0.052 and t-stat = 1.92) and $POSI\_REM_{DISEXP}$ (coefficient = 0.064 and t-stat = 2.39) are positive and significant, which suggests that firms with dual CEO are more likely to engage in upward REM through the approaches of accelerating sales, lowering COGS through increased production, and reducing discretionary spending. Similarly, the coefficients on *ACSIZE_D* in the regressions of *POSI_REM* (coefficient = 0.198 and t-stat = 5.29), $POSI\_REM_{CFO}$ (coefficient = 0.148 and t-stat = 3.94), $POSI\_REM_{PROD}$ (coefficient = 0.141 and t-stat = 3.80) and $POSI\_REM_{DISEXP}$ (coefficient = 0.192 and t-stat = 5.19) are positive and significant, which suggest that firms with larger audit committee size are more likely to engage in upward REM through those three approaches.

In **H3b**, I predict that the strength of four internal corporate governance mechanisms may affect the association between investor sentiment and REM. As

shown in Panel A of Table 7, the coefficients on *SENT_BW×BIND_D* and *SENT_BW×ACSIZE_D* are positive, while the coefficients on *SENT_BW×BSIZE_D* and *SENT_BW×DUALITY* are negative in all four regressions. However, none of the coefficients is significant, indicating that internal corporate governance strength does not affect the association between BW and the propensity of REM. Therefore, the results based on BW do not support **H3b**.

In **H4b**, I predict that two audit quality factors, auditor size and auditor tenure may affect the association between investor sentiment and REM. For the external audit quality proxies in Panel A of Table 7, the coefficients on *SENT_BW×BIG4* are positive in the four regressions, and *SENT_BW×TENURE* are mixed. However, none of them is statistically significant. Similar to the findings on internal corporate governance strength, external audit quality may not moderate the association between BW and the propensity of REM. Therefore, the results do not support **H4b**.

As reported in Panel A of Table 5, BW has no significant association with the propensity of REM, including *POSI_REM*, $POSI\_REM_{PROD}$ and $POSI\_REM_{DISEXP}$. Therefore, neither internal corporate governance strength nor external audit quality moderates the association between BW and REM. Even there is a positive relation between *SENT_BW* and $POSI\_REM_{CFO}$ (Panel A of Table 5), the effect of internal corporate governance strength or external audit quality on this relationship is insignificant.

Panel B of Table 7 shows the regression results for *POSI_REM* and three dichotomous variables for components of REM using *SENT_MICH.* The coefficient on *SENT_MICH* (coefficient = -0.014 and t-stat = -2.97) in the regression of $POSI\_REM_{CFO}$ (Column 2) is negative and significant, suggesting that firms are less likely to engage in upward REM through the approach of accelerating sales as investor sentiment increases, with the control of internal corporate governance strength and external audit quality. The coefficients on *SENT_MICH* in the other three regressions are insignificant, indicating that there is no correlation between MICH and the propensity of specific REM through the approach of lowering COGS or reducing discretionary spending.

The coefficient on *BIND_D* (coefficient = -0.478 and t-stat = -2.32) in the regression of *POSI_REM* is negative and significant, suggesting that REM is negatively related to board independence. The coefficient on *BIND_D* (coefficient = -0.512 and t-stat = -2.50) in the regression of $POSI\_REM_{PROD}$ is negative and significant, while the coefficients on *BIND_D* in the regressions of $POSI\_REM_{CFO}$ and $POSI\_REM_{DISEXP}$ are insignificant, indicating that the negative association between board independence and the propensity of REM is mostly attributable to the approach of lowering COGS. The coefficient on *DUALITY* (coefficient = 0.383 and t-stat = 1.88) is positive and significant in the regression of *POSI_REM*, suggesting that firms with dual CEO role are more likely to engage in upward overall REM. The coefficients on *BSIZE_D* and *ACSIZE_D* in the regression of

POSI_REM are insignificant at the conventional level, indicating that these corporate governance strength variables may not associate with the propensity of overall REM.

The signs of coefficients on internal corporate governance interaction terms in Column (1) of Panel B are the same as those in Column (1) of Panel A in Table 7. Moreover, the coefficients on *SENT_MICH*×*BIND_D* in the regressions of *POSI_REM* (coefficient = 0.005 and t-stat = 1.88) and $POSI\_REM_{PROD}$ (coefficient = 0.005 and t-stat = 2.11) are positive and significant. The positive effect of board independence on the association between MICH and the propensity of aggregate REM is mostly attributable to the approach of lowering COGS through increased production. As discussed above, the negative coefficient on *BIND_D* indicates that firms with high board independence are less likely to engage in upward REM than those with low board independence. Although not related to my hypotheses, it is interesting to note that the positive coefficient on *SENT_MICH*×*BIND_D* weakens the negative association between board independence and REM as investor sentiment increases in my data but the generalizability of this result is not clear. Similarly, the coefficients on *BIND_D* and *SENT_MICH*×*BIND_D* in the regression of $POSI\_REM_{PROD}$ in Column (3) suggest that there is a negative association between board independence and the propensity of REM through the approach of lowering COGS, however this negative association weakens as investor sentiment increases in my data but the generalizability of this result is not

clear. Considering both the main effects and the interaction of *SENT_MICH×BIND_D*, boards with fewer independent members seem to be generally associated with higher levels of aggregate REM. This difference appears to decrease, however, with the increase of investor sentiment.

Column (1) of Panel B shows that the coefficient on *SENT_MICH×ACSIZE_D* (coefficient = 0.006 and t-stat = 1.90) is positive and significant at 10% statistical level. The positive effect of audit committee size on the association between MICH and the propensity of overall REM is mostly attributable to the approach of reducing discretionary spending, which exhibits a positive and significant coefficient on *SENT_MICH×ACSIZE_D* (coefficient = 0.006 and t-stat = 1.78) in the regression of $POSI\_REM_{DISEXP}$. However, the coefficients on *SENT_MICH* and *ACSIZE_D* is insignificant in most REM regressions. The positive coefficient on *SENT_MICH×ACSIZE_D* suggests that the association begins to exist between *SENT_MICH* and REM for firms with above median *ACSIZE_D*. Therefore, **H3b** is partially supported.

For the interaction terms with external audit quality factors in Column (1) of Panel B, the coefficient on *SENT_MICH×BIG4* (coefficient = -0.001 and t-stat = -0.22) is negative, while the coefficient on *SENT_MICH×TENURE_D* (coefficient = 0.001 and t-stat = 0.32) is positive. However, neither of them is significant at the conventional level. The results indicate that external audit quality factors may not moderate the association btween MICH and the propensity of

overall REM. The coefficient on *SENT_MICH×BIG4* (coefficient = 0.016 and t-stat = 3.25) for $POSI\_REM_{CFO}$ is positive and significant in Column (2). As discussed before, both *SENT_MICH* and *BIG4* have negative association with $POSI\_REM_{CFO}$. Therefore, the positive coefficient on *SENT_MICH×BIG4* suggests that the presence of a Big Four auditor weakens the negative association between MICH and the propensity of specific REM through the approach of accelerating sales.

There are several findings from the regression tests shown in Table 6 and Table 7 in my study. First, the regressions of AEM on the interaction terms in Table 6 show that internal corporate governance strength or external audit quality does not moderate the associations between investor sentiment and the propensity of AEM, either using BW or MICH. For REM in Panel A Table 7, there is no evidence that either internal corporate governance strength or external audit quality would affect the association between BW and EM. In Panel B Table 7, the results indicate that board independence, audit committee size and Big Four auditor may moderate the association between MICH and the propensity of REM. Overall, there is limited evidence that the strength of internal corporate governance mechanisms or external audit quality moderates the association.

Second, the regressions of REM on MICH provide evidence that internal corporate governance strength and external audit quality may partially affect the association between MICH and the propensity of REM, which is different to the

results from the regressions of REM on BW. BW is a market measure of investor sentiment based on a sort of investors' real actions. MICH is based on surveys in which a respondent may not actually reflect the opinion of the participant (*e.g.*, a participant may feel optimistic but not take any action to involve in market). In addition, Simpson (2013) argues that MICH merely captures macroeconomic factors that may correlate with investor sentiment and EM.

Finally, since I use the sample data in the post-SOX period, and SOX significantly lowers the level of EM through expanding the responsibilities of management, external auditors and corporate governance, the overall constraints of corporate governance and external auditors on EM may be significant in both high and low investor sentiment periods. Therefore, the effects of internal corporate governance strength and external audit quality on the association between investor sentiment and EM may not be significantly different between high and low investor sentiment periods.

5.4 Additional Test I: Effect of Macroeconomic Factors on EM

One explanation for the different results from the regressions of EM between BW and MICH, is that they have different measurement methods which may capture macroeconomic condition differently. BW is a market measure of investor sentiment based on a sort of investors' real actions. Baker and Wurgler (2007) argue that BW controls for macroeconomic activities, "growth in industrial production, real growth in durable, nondurable, and services consumption, growth in

employment, and an NBER recession indicator" (Baker and Wurgler, 2007, page 139)[15]. MICH is based on surveys in which a respondent may not actually reflect the opinion of the participant. In addition, Simpson (2013) argue that MICH merely captures macroeconomic factors that may correlate with investor sentiment and EM.

Although Simpson (2013) suggests that fundamental macroeconomic factors do not affect the association between investor sentiment and AEM, these factors may influence the association between investor sentiment and REM, and the effects of internal corporate governance strength and external audit quality on the association between investor sentiment and EM. As a robustness test, I control for macroeconomic factors in the regression models, following the approach in Simpson (2013). The macroeconomic factors include annual inflation, growth in industrial production and growth in real GDP. The re-estimated models are:

$$Prob(EM_{i,t}) = \alpha_0 + \alpha_1 SENT_{i,t-1} + \alpha_2 INF_{t-1} + \alpha_3 IPG_{t-1} + \alpha_4 GRGDP_{t-1} + \alpha_5 SHARE_{i,t-1} + \alpha_6 NOA_{i,t-1} + \alpha_7 MB_{i,t-1} + \alpha_8 ASSETS_{i,t-1} + \alpha_9 LEV_{i,t-1} + \alpha_{10} ROA_{i,t-1} + \alpha_{11} INDUSTY_k + \varepsilon_{i,t} \quad (9)$$

$$Prob(EM_{i,t}) = \beta_0 + \beta_1 SENT_{i,t-1} + \beta_2 BIND\_D_{i,t} + \beta_3 BSIZE\_D_{i,t} + \beta_4 DUALITY_{i,t} + \beta_5 ACSIZE\_D_{i,t} + \beta_6 BIG4_{i,t} + \beta_7 TENURE\_D_{i,t} +$$

[15] Baker and Wurgler (2007) calculate the index with and without regressing macroeconomic factors. The results indicate that macroeconomic condition play a minor role in investor sentiment. In this study, I conduct additional tests to further examine whether macroeconomic factors impact the association between investor sentiment and EM.

$$\beta_8 SENT_{i,t-1} \times BIND\_D_{i,t} + \beta_9 SENT_{i,t-1} \times BSIZE\_D_{i,t} + \beta_{10} SENT_{i,t-1} \times DUALITY_{i,t} + \beta_{11} SENT_{i,t-1} \times ACSIZE\_D_{i,t} + \beta_{12} SENT_{i,t-1} \times BIG4_{i,t} + \beta_{13} SENT_{i,t-1} \times TENURE\_D_{i,t} + \alpha_{14} INF_{t-1} + \alpha_{15} IPG_{t-1} + \alpha_{16} GRGDP_{t-1} + \beta_{17} SHARE_{i,t-1} + \beta_{18} NOA_{i,t-1} + \beta_{19} MB_{i,t-1} + \beta_{20} ASSETS_{i,t-1} + \beta_{21} LEV_{i,t-1} + \beta_{22} ROA_{i,t-1} + \beta_{23} INDUSTY_k + \varepsilon_{i,t} \quad (10)$$

Here INF_{t-1} is inflation measured as the growth in consumer price index on a seasonally adjusted basis in the previous year. IPG_{t-1} is growth in industrial production in the previous year. $GRGDP_{t-1}$ is growth in real GDP in the previous year. I collect these macroeconomic data from the Federal Reserve Economic Data at the Federal Reserve Bank of St. Louis[16].

Table 8 reports the regression results of the propensity of AEM that include three macroeconomic factors as control variables. The table is simplified by excluding the regression results of *POSI_AEM_K* on investor sentiment, since their results are similar to those of *POSI_AEM*[17]. The overall results indicate that macroeconomic factors are not related to the propensity of AEM. The coefficient on *SENT_BW* remains positive and insignificant. The coefficient on *SENT_MICH* remains positive and significant, although the significance is decreased from 5% to

[16] https://fred.stlouisfed.org/.

[17] In the additional test I, the difference between results of cross-sectional analysis for *POSI_AEM_K and POSI_AEM* is that the growth in real GDP (*GRGDP*) has a positive and significant association with *POSI_AEM_K* using *SENT_MICH*. This difference does not affect the conclusion that the macroeconomic factors in general do not change the association between investor sentiment and AEM.

10% at the conventional level. Overall, the results are consistent with those in Table 4. These results suggest that controlling for macroeconomic factors does not change the association between investor sentiment and the propensity of AEM, which is consistent with Simpson (2013).

--- TABLE 8 ---

Table 9 reports the regression results of the propensity of REM that include three macroeconomic factors as control variables. The table is simplified by excluding the regression results for three components of REM, and focuses on the regression analysis for the propensity of aggregated REM measure *POSI_REM* to examine whether investor sentiment affects REM at market level, after controlling for macroeconomic condition. For the regression using *SENT_BW* in Column (1), the coefficient on *INF* is positive and significant (coefficient = 1.434 and t-stat = 1.95), the coefficient on *IPG* is negative and significant (coefficient = -5.923 and t-stat = -3.36), while the coefficient on *GRGDP* is insignificant at the conventional level. These results suggest that inflation is positively related to the propensity of REM, while growth in industrial production is negatively related to the propensity of REM. Consistent with that in Panel A of Table 5, the coefficient on *SENT_BW* is insignificant, indicating that the association between BW and the propensity of REM is unchanged after controlling for the macroeconomic condition.

--- TABLE 9 ---

For the regression using *SENT_MICH* in Column (2), the coefficients on *INF*, *IPG* and *GRGDP* are all insignificant, indicating that these macroeconomic factors exhibit no relation with the propensity of REM. Compared to that in Panel B of Table 5, the coefficient on *SENT_MICH* in Table 9 is positive but insignificant. However, their coefficients (0.002 and 0.003) and t-stat (1.63 and 1.73) are close to each other. Therefore, the association between MICH and the propensity of REM is considered unchanged after controlling for macroeconomic condition.

Table 10 reports the regression results of Model (10) using *POSI_AEM* as the dependent variable to examine whether the effects of internal corporate governance strength and external audit quality on the association between investor sentiment and the propensity of AEM are changed after controlling for macroeconomic condition. The coefficients on *INF*, *IPG* and *GRGDP* are insignificant, indicating that these macroeconomic factors are not related to the propensity of AEM in the study of the associations between internal corporate governance strength, external audit quality and the propensity of AEM. Furthermore, the coefficients on the interaction terms between internal corporate governance proxies, external audit quality proxies and investor sentiments are insignificant, which are consistent with those in Table 6. These results indicate that the effects of internal corporate governance strength and external audit quality on the association between investor sentiment and the propensity of AEM are considered unchanged at market level when macroeconomic factors are controlled.

--- TABLE 10 ---

Table 11 reports the regression results of Model (10) using *POSI_REM* as the dependent variable, to examine whether the effects of internal corporate governance strength and external audit quality on the association between investor sentiment and the propensity of REM are changed at market level after controlling for macroeconomic condition. The coefficients on *INF* and *GRGDP* are insignificant, while the coefficient on *IPG* is negative and significant (coefficient = -5.508 and t-stat = -3.08) in the regression of *POSI_REM* using *SENT_BW*. The results indicate that industrial production growth is negatively related to the propensity of REM, while inflation or growth in real GDP is not related to the propensity of REM when using BW. In the regression of *POSI_REM* using *SENT_MICH*, the coefficients on *INF, IPG* and *GRGDP* are all insignificant, indicating that these macroeconomic factors have no relation with the propensity of REM. Furthermore, the coefficients on all interaction terms in regressions of *POSI_REM* using both *SENT_BW* and *SENT_MICH* are similar to those in Panel A and Panel B of Table 7, indicating that the effects of internal corporate governance strength and external audit quality on the association between investor sentiment and the propensity of REM are unchanged at market level when macroeconomic factors are controlled.

--- TABLE 11 ---

In summary, although Baker and Wurgler (2007) control for macroeconomic condition in calculating investor sentiment index, their findings indicate that macroeconomic conditions play a minor role in investor sentiment. In my tests, I further find that controlling for macroeconomic factors in general does not affect the association between investor sentiment and EM, or does not change the effect of internal corporate governance strength or external audit quality on this association. Compared to that in Panel B of Table 5, although the coefficient on *SENT_MICH* in Table 9 is changed from significant to insignificant, their t-stat values are considered close to each other. Simpson (2013) documents that MICH merely captures macroeconomic factors. After controlling for macroeconomic condition, the association between MICH and EM remains the same as that without controlling for macroeconomic factors, which is consistent with Simpson (2013). Finally, the effects of internal corporate governance strength and external audit quality on the association between investor sentiment and REM remain the same when macroeconomic factors are controlled. Therefore, macroeconomic factors may not explain the different results between BW and MICH, when studying the association between investor sentiment and EM.

5.5 Additional Test II: Effect of SOX on EM through Internal Corporate Governance

The main results for **H3** and **H4** show that internal corporate governance strength and external audit quality partially affect the association between MICH

and EM, while neither internal corporate governance strength or external audit quality moderates the association between BW and EM. One of the explanations is that I use the sample data in the post-SOX period, in which although internal corporate governance strength is associated with EM, this association is weaker than that in the pre-SOX period (Ghosh et al., 2010). SOX significantly reduces the level of EM through expanding the responsibilities of management, auditors and corporate governance. The overall constraints of internal corporate governance and external auditors on EM may be significant in both high and low investor sentiment periods (Cohen et al., 2008; Zang, 2012). Therefore, the effects of internal corporate governance strength and external audit quality on the association between investor sentiment and EM might not be significantly different between high and low investor sentiment periods in the post-SOX period.

I extend the sample data period to 1996-2018, which includes both pre- and post-SOX periods[18]. To control the effect of SOX, I include *SOX* as a dummy variable. I also include audit committee independence as a proxy in regressions since audit committees comprise of both independent and dependent directors during pre-SOX years[19].

[18] 1996 is the beginning year that data of corporate governance for S&P 1500 listed companies are available for ISS in WRDS.
[19] "Standards Relating to Listed Company Audit Committees" mandates that audit committee must be composed of independent directors only (SEC, 2003).

SOX provides a comprehensive definition of board member independence and mandates audit committees must be composed of independent directors only, which indicates that SOX affects board independence, audit committee independence and audit committee size, therefore may affect EM. For the other proxies of internal corporate governance mechanisms, SOX does not have requirements on board size or CEO duality. Ghosh et al. (2010) find there is no evidence that these proxies have relations with EM. Based on the augments, I re-estimate Models (7) and (8) as below:

$$Prob(EM_{i,t}) = \alpha_0 + \alpha_1 SENT_{i,t-1} + \alpha_2 SOX_t + \alpha_3 SHARE_{i,t-1} + \alpha_4 NOA_{i,t-1} + \alpha_5 MB_{i,t-1} + \alpha_6 ASSETS_{i,t-1} + \alpha_7 LEV_{i,t-1} + \alpha_8 ROA_{i,t-1} + \alpha_9 INDUSTY_k + \varepsilon_{i,t} \quad (11)$$

$$Prob(EM_{i,t}) = \beta_0 + \beta_1 SENT_{i,t-1} + \beta_2 BIND\_D_{i,t} + \beta_3 BSIZE\_D_{i,t} + \beta_4 DUALITY_{i,t} + \beta_5 ACIND\_D_{i,t} + \beta_6 ACSIZE\_D_{i,t} + \beta_7 BIG4_{i,t} + \beta_8 TENURE\_D_{i,t} + \beta_9 SOX_t + \beta_{10} SENT_{i,t-1} \times BIND\_D_{i,t} + \beta_{11} SENT_{i,t-1} \times BSIZE\_D_{i,t} + \beta_{12} SENT_{i,t-1} \times DUALITY_{i,t} + \beta_{13} SENT_{i,t-1} \times ACIND\_D_{i,t} + \beta_{14} SENT_{i,t-1} \times ACSIZE\_D_{i,t} + \beta_{15} SENT_{i,t-1} \times BIG4_{i,t} + \beta_{16} SENT_{i,t-1} \times TENURE\_D_{i,t} + \beta_{17} SENT_{i,t-1} \times SOX_t + \beta_{18} BIND\_D_{i,t} \times SOX_t + \beta_{19} ACIND\_D_{i,t} \times SOX_t + \beta_{20} SENT_{i,t-1} \times ACSIZE\_D_{i,t} + \beta_{21} SENT_{i,t-1} \times BIND\_D_{i,t} \times SOX_t + \beta_{22} SENT_{i,t-1} \times ACIND\_D_{i,t} \times SOX_t + \beta_{23} SENT_{i,t-1} \times$$

$$ACSIZE\_D_{i,t} \times SOX_t + \beta_{24}SHARE_{i,t-1} + \beta_{25}NOA_{i,t-1} + \beta_{26}MB_{i,t-1} +$$

$$\beta_{27}ASSETS_{i,t-1} + \beta_{28}LEV_{i,t-1} + \beta_{29}ROA_{i,t-1} + \beta_{30}INDUSTY_k + \varepsilon_{i,t} \quad (12)$$

Here SOX_t is a dummy variable which equals 1 in the period of 2005-2018, while 0 in the period of 1996-2004. $ACIND\_D_{i,t}$ is the dummy variable for audit committee independence, which equals 1 when the percentage of independent directors on the audit committee is equaling to or larger than the median percentage of independent directors on the audit committee for all firm-year observations, and 0 otherwise[20].

Table 12 presents the regression results of the propensity of AEM using *SENT_BW* and *SENT_MICH* with the sample of 17,549 firm-years from 1996 to 2018. Similar to additional test I, I exclude the regression results of *POSI_AEM_K* on investor sentiment. First the coefficients on *SOX* are negative and significant in regressions using BW and MICH in Column (1), suggesting that firms are less likely to engage in upward AEM after the passage of SOX. These results are consistent with the findings of prior literature (*e.g.*, Cohen et al., 2008; Koh et al. 2008; Bartov and Cohen 2009; Zang, 2012) that SOX constrains AEM. SOX as an accounting quality regulatory likely increases the cost of engaging in upward AEM, which results in reducing the propensity of AEM and leads managers to use other

[20] Here I define $ACIND\_D_{i,t}$ as 1 when the percentage of independent director on the audit committee is equaling to or larger than the median percentage of independent directors on the committee because both median and maximum percentages of independent members on the committee are 1 (100 percent).

methods to manage earnings. Second, although the coefficient on *SENT_BW* is negative, it is insignificant and indicates that the propensity of AEM is still not related to BW when using the sample with both pre- and post-SOX periods. Third, the coefficient on *SENT_MICH* in Column (2) of Table 12 is positive and significant, which is similar to that in Column (2) of Table 4. These results indicate that although SOX constrains the propensity of AEM, the associations between investor sentiment and the propensity of AEM remain the same when using both pre- and post-SOX periods, compared to those using the post-SOX period only.

--- TABLE 12 ---

Table 13 reports the regression results of REM using *SENT_BW* and *SENT_MICH*. Similar to additional test I, I focus on the regression analysis for the propensity of aggregated REM measure *POSI_REM* to examine whether investor sentiment affects REM at market level. First the coefficients on *SOX* are positive and significant, suggesting that firms are more likely to engage in upward REM after the passage of SOX. These results are consistent with previous findings (*e.g.*, Cohen et al., 2008; Bartov and Cohen 2009; Zang, 2012) and suggest that there is an increase of REM after SOX. The results from Table 12 and Table 13 provide evidence that managers appear to switch from AEM to REM after SOX. Second, although the coefficient on *SENT_BW* is negative, it is insignificant and indicates that the propensity of aggregate REM is still not related to BW when using the sample with both pre- and post-SOX periods. Third, the coefficient on

SENT_MICH remains positive and significant which is similar to that in Column (2), Panel B of Table 4. These results suggest that although firms are more likely to engage in upward REM after SOX, the associations between investor sentiment and the propensity of REM remain the same when using both pre- and post-SOX periods, compared to those using post-SOX period only.

--- TABLE 13 ---

Table 14 presents the regression results of Model (12) using *POSI_AEM* to examine whether SOX changes the effects of internal corporate governance strength and external audit quality on the association between investor sentiment and the propensity of AEM. The coefficient on *SOX* in Column (1) is negative and significant in the regression of *POSI_AEM* (coefficient = -0.193 and t-stat = -2.73), which suggests that SOX has a negative association with the propensity of AEM when studying with BW. The coefficients on *ACSIZE_D* and *ACIND_D* are insignificant which indicate that audit committee may not relate to the propensity of AEM before SOX when studying with BW. The coefficient on *BIG4* is negative and significant (coefficient = -0.092 and t-stat = -2.06). This coefficient is different to that in Columns (1) of Table 6 and suggests that there is a negative association between auditor size and the propensity of AEM when using data with both pre- and post-SOX periods. In addition, the coefficients on *SENT_BW* and other proxies of internal corporate governance strength and external audit quality are in general

consistent with those in Columns (1) of Table 6, further confirm their associations with the propensity of AEM.

--- TABLE 14 ---

The main coefficients of interest in Table 14 are those on interaction terms between proxies of internal corporate governance strength, proxies of eternal audit quality and investor sentiment. Compared to those shown in Columns (1) of Table 6, the coefficient of *SENT_BW×BIND_D* is changed from positive and insignificant to positive and significant (coefficient = 0.091 and t-stat = 1.82), which suggests that board independence has positive effect on the association between BW and the propensity of AEM in the pre-SOX period. However, the coefficient on *SENT_BW×BIND_D×SOX* is negative and insignificant, which indicates SOX may not change the effect of board independence on the association between BW and the propensity of AEM.

--- TABLE 14 ---

Compared to those shown in Columns (1) of Table 6, the coefficient of *SENT_BW×TENURE_D* is changed from positive and insignificant to positive and significant in the regression of *POSI_AEM* (coefficient = 0.061 and t-stat = 1.77), which suggests that auditor tenure moderates the association between investor sentiment and the propensity of AEM in pre-SOX periods. However, auditor tenure has no effect on the association between BW and the propensity of AEM when studying the sample with the post-SOX period, as shown in Columns (1) of Table

6. The other coefficients on interaction terms between proxies of internal corporate governance, proxies of external audit quality and investor sentiment remains insignificant in Table 14, indicating that those proxies do not affect the association between BW and the propensity of AEM.

The other interaction terms with significant coefficients in Column (1) of Table 14 are *ACSIZE_D*×*SOX* in the regression of *POSI_AEM* (coefficient = 0.130 and t-stat = 2.67), which suggests that SOX affects the association between audit committee size and the propensity of AEM after SOX. This explains that the association between audit committee size and the propensity of AEM is positive and insignificant in Table 14 while positive and significant in Table 6.

Table 14 also reports the coefficients for regressions using *SENT_MICH*. The coefficients on *SOX* are positive but insignificant in the regression of *POSI_AEM*, which suggests that SOX may not relate to the propensity of AEM when MICH is used. Compared to results in Columns (3) of Table 6 that *BSIZE_D* is positive and insignificant, the coefficient on *BSIZE_D* in Column (2) of Table 14 is positive and significant (coefficient = 0.412 and t-stat = 2.57), suggesting that board size has a positive relation with the propensity of AEM when using the sample of pre- and post-SOX periods, but this relationship does not exist after SOX. In addition, the coefficients on *SENT_MICH* and other proxies of internal corporate governance strength and external audit quality are consistent with those in Columns (3) of Table 6, further confirm their associations with the propensity of AEM.

Compared to those shown in Columns (3) of Table 6, the coefficient of *SENT_MICH×BSIZE_D* is changed from negative and insignificant to negative and significant in the regression of *POSI_AEM* (coefficient = -0.004 and t-stat = -2.03), which suggests that board size moderates the association between investor sentiment and the propensity of AEM in pre-SOX periods. However, the coefficient on *SENT_MICH×BSIZE_D* in Columns (3) of Table 6 is insignificant. These results indicate that the effect of board size on the association between MICH and AEM only appears after controlling for SOX. The other coefficients on interaction terms between proxies of internal corporate governance strength, proxies of external audit quality and investor sentiment remain insignificant, indicating that those proxies do not affect the association between MICH and the propensity of AEM after controlling for SOX.

Table 15 reports the regression results of Model (12) using *POSI_REM* to examine whether SOX changes the effects of internal corporate governance strength and external audit quality on the association between investor sentiment and the propensity of aggregate REM at market level. The main coefficients that examine these effects are those on interaction terms between proxies of internal corporate governance, proxies of external audit quality and investor sentiment. Compared to that shown in Column (1), Panel A of Table 7, the coefficient of *SENT_BW×BIND_D* is changed from positive and insignificant to positive and significant (coefficient = 0.113 and t-stat = 2.18) in the regression of *POSI_REM*,

which indicates that board independence has positive effect on the association between BW and the propensity of REM in the pre-SOX period. However, the coefficient on *SENT_BW*× *BIND_D*× *SOX* is negative and insignificant, which indicates SOX does not change the effect of board independence on the association between BW and the propensity of AEM in the post-SOX period. These findings are consistent with the results in Column (1), Panel A of Table 7 that board independence may not moderate the association between BW and the propensity of AEM.

--- TABLE 15 ---

Column (1) of Table 15 also shows that the coefficients on all internal corporate governance strength and external audit quality proxies are insignificant, except for the coefficient on *BIG4* (coefficient = -0.294 and t-stat = -6.31), which is negative and significant. These results indicate that there is no relation between internal corporate governance strength and the propensity of REM, or between auditor tenure and the propensity of REM, while the auditor size has a negative association with the propensity of REM when using both pre- and post-SOX data. The results from Column (1) in Panel A of Table 7 and Column (1) of Table 15 suggest that the relations between internal corporate governance strength, external audit quality and REM are more significant after the passage of SOX, when using BW.

Column (1) of Table 15 shows that the coefficient on *BIND_D*× *SOX* (coefficient = -0.105 and t-stat = -1.93) is negative and significant, while the coefficients on *ACSIZE_D*×*SOX* (coefficient = 0.179 and t-stat = 3.57) and *ACIND_D*×*SOX* (coefficient = 0.206 and t-stat = 2.67) are positive and significant, suggesting that SOX changes the associations between these proxies and the propensity of REM, which yields significant association between these proxies and the propensity of REM in the post-SOX period, as shown in Panel A of Table 7.

Columns (2) of Table 15 presents the coefficients for the regression using *SENT_MICH*. The coefficients on interactions terms between the variables of internal corporate governance strength, the variables of external audit quality and *SENT_MICH* are insignificant, which indicate that internal corporate governance strength or external audit quality has no effect on the association between MICH and the propensity of REM, when the sample period expands to both pre- and post-SOX periods. However, board independence and audit committee size have positive effects on the association between MICH and the propensity of REM, based on the findings in Panel B of Table 7. These results suggest that SOX affects board independence and audit committee size therefore they change the association between MICH and the propensity of REM.

In Summary, the cross-sectional regression analysis shows that the propensity of AEM decreases while the propensity of REM increases after the passage of SOX. SOX in general does not affect the association between investor

sentiment and EM, and has limited influence on the moderating effect of internal corporate governance strength or external audit quality on the association between investor sentiment and EM.

Chapter 6

Summary and Conclusion

My dissertation explores the association between investor sentiment and EM, and how investor sentiment is related to different types of EM. EM, as managers' behavior on corporate reporting decisions is affected by investors' sentiment-driven expectations of future earnings (Baker and Wurgler 2007; Simpson, 2013). In this dissertation, I examine the effect of investor sentiment using both Baker and Wurgler's investor sentiment index and Michigan Consumer Confidence Index on AEM/REM which can help investors understand how managers play games with them in order to mislead them.

I find that there is positive association between Michigan Consumer Confidence Index and EM, the propensity of both AEM and REM, which is consistent with Ali and Gurun (2009) and Simpson (2013) that firms engage in more upward AEM in high sentiment periods. However, for investor sentiment index developed by Baker and Wurgler (2006), there is a positive relation with the propensity of specific REM only through the approach of accelerating sales. By studying the association between investor sentiment and different forms of EM, my study fills the gap between Ali and Gurun (2009) and Simpson's (2013) findings and Mian and Sankaraguruswamy's (2012) argument that managers may have stronger incentives to manage earnings upward in order to meet or beat benchmarks during low investor sentiment periods.

Second, by studying the effects of internal corporate governance strength and external audit quality on the associations between investor sentiment and the propensity of both AEM and REM, my dissertation investigates whether internal corporate governance and external auditors as controlling and monitoring mechanisms, perform different constraints on different forms of EM in different market environments. I find that either internal corporate governance strength or external audit quality may not moderate the association between the propensity of AEM and investor sentiment, either using Baker and Wurgler's investor sentiment index or Michigan Consumer Confidence Index. For REM, there is no evidence that either internal corporate governance strength or external audit quality affects the association between Baker and Wurgler's investor sentiment index and EM, while there is limited evidence that either the strength of internal corporate governance mechanisms or external audit quality affects the association between MICH and EM. Overall, there is limited evidence that internal corporate governance mechanisms or external auditors affect the association.

Third, I confirm Simpson's (2013) findings that controlling for macroeconomic factors may not change the association between Michigan Consumer Confidence Index and the propensity of AEM, and further find that controlling for macroeconomic factors may not change the associations between Baker and Wurgler's investor sentiment index and the propensity of AEM/REM, or Michigan Consumer Confidence Index and the propensity of REM, either. I also

find that controlling for macroeconomic factors does not change the effects of internal corporate governance strength or external audit quality on the association between investor sentiment and EM, either using Baker and Wurgler's investor sentiment index or Michigan Consumer Confidence Index. Therefore, macroeconomic factors may not explain the different results between Baker and Wurgler's investor sentiment index and Michigan Consumer Confidence Index, when studying the association between investor sentiment and EM, as well as the moderating effect of internal corporate governance strength or external audit quality on this association.

Finally, I extend my data sample from 2005-2018 to 1996-2018 including both pre- and post-SOX periods to examine whether the effects of internal corporate governance strength and external audit quality on the association between investor sentiment and EM are changed after the passage of SOX. I find that that the propensity of AEM decreases while the propensity of REM increases after the passage of SOX, which are consistent with previous studies (*e.g.*, Cohen et al., 2008; Bartov and Cohen 2009; Zang, 2012). My findings provide evidence that the association between AEM and REM is not only substitutive, but also complementary. For the association between investor sentiment and EM in both pre- and post-SOX periods, it remains the same as that in the post-SOX period only, for both the propensity of AEM and the propensity of REM, as well as for both Baker and Wurgler's investor sentiment index and Michigan Consumer Confidence

Index. Furthermore, although some internal corporate governance mechanisms and external audit quality factors affect the association between investor sentiment and EM using pre-and post-SOX data, most of internal corporate governance strength or audit quality factors' effects on the association remain the same as those using post-SOX data only. Therefore, SOX may not affect the association between investor sentiment and EM, and has limited influence on the moderating effect of internal corporate governance strength or external audit quality on this association.

Appendix

Variable Definition, Calculation and Database

$A_{i,t-1}$	The total assets for firm *i* at year *t-1*. It is *AT* from NA Compustat in WRDS.
$ACIND\_D_{i,t}$	The dummy variable for the independence of audit committee for firm *i* at fiscal year *t*. which is 1 when the percentage of independent directors on the audit committee is equaling to or larger than the median percentage of independent directors on audit committee for all firm-year observations, and 0 otherwise. It is collected and calculated from ISS in WRDS.
$ACSIZE_{i,t}$	The audit committee size measured as the number of directors on the audit committee for firm *i* at fiscal year *t*. It is collected from ISS in WRDS.
$ACSIZE\_D_{i,t}$	The dummy variable for the size of audit committee for firm *i* at fiscal year *t*. It has the value of 1 if the audit committee size is larger than the median size of audit committee for all observations, and 0 otherwise.
$ASSETS_{i,t-1}$	The log value of total assets at the end of previous year. It is calculated as log(*TA*) from NA Compustat in WRDS.

$BIG4_{i,t}$	The indicator which is defined as 1 if the firm's auditor belongs to the Big Four audit firms, and 0 otherwise. It is collected based on *AU* from NA Compustat in WRDS.
$BIND_{i,t}$	The independence of board of directors, which is defined as the percentage of independent directors on the board for firm *i* at fiscal year *t*. It is collected from ISS in WRDS.
$BIND\_D_{i,t}$	The dummy variable for the independence of board of directors, which is 1 when the percentage of independent directors on the board is larger than the median percentage of independent directors on the board for all firm-year observations, and 0 otherwise.
$BSIZE_{i,t}$	Board size measured as the number of directors on the board for firm *i* at year *t.* It is collected from ISS in WRDS.
$BSIZE\_D_{i,t}$	The dummy variable for board size for firm *i* at fiscal year *t*. It has the value of 1 if firm's board size is larger than the median size of board for all observations, and 0 otherwise.
$CFO_{i,t}$	The cash flow from operations minus extraordinary items and discontinued operations for firm *i* during period t. It is calculated as (*OANCF-XIDOC*) from NA Compustat in WRDS.

$DISEXP_{i,t}$	The discretionary expenses for firm i in period t. It is measured as the total expenses of advertising, R&D and SG&A, which is (*XAD*+*XRD*+*XSGA*) from NA Compustat in WRDS.
$DUALITY_{i,t}$	CEO duality for firm *i* at fiscal year *t*, which equals to 1 if the CEO also serves as the chair of board, 0 otherwise. It is collected from ISS in WRDS.
$EM_{i,t}$	The dependent variable for EM. It represents five different dependent dichotomous variables: *POSI_AEM, POSI_AEM_K*, *POSI_REM* and three components of REM ($POSI\_REM_{CFO}$, $POSI\_REM_{PROD}$ and $POSI\_REM_{DISEXP}$).
$GRGDP_{t-1}$	The growth in real GDP in previous year. It is collected from the Federal Reserve Economic Data, a database at the Federal Reserve Bank of St. Louis.
$INDUSTRY_k$	The industry dummy indicator equaling 1 if the firm belongs to the industry *k* based on the two-digit SIC codes. It is collected from NA Compustat in WRDS.
IPG_{t-1}	The growth in industrial production in previous year. It is collected from the Federal Reserve Economic Data, a database at the Federal Reserve Bank of St. Louis.

INF_{t-1}	Inflation measured as the growth in consumer price index on a seasonally adjusted basis in the previous year. It is collected from the Federal Reserve Economic Data, a database at the Federal Reserve Bank of St. Louis.
$LEV_{i,t-1}$	The previous year's debt-to-equity ratio representing the firm's capital structure, measured as short-term debt plus long-term debt divided by shareholders' equity. It is calculated as *(DLC+DLTT)/CEQ* from NA Compustat in WRDS.
$MB_{i,t-1}$	The previous year's market to book ratio which is expressed as the ratio of market value of shareholders' equity to book value of shareholders' equity. It is calculated as (*CSHO*×*PRCC_F*)/*CEQ* from NA Compustat in WRDS.
$NOA_{i,t-1}$	The net operating assets and represents firms' accounting flexibility, which is defined as shareholder's equity minus cash and marketable securities and plus total debt at the beginning of the year, then divided by lagged sales. It is calculated as (*CEQ-CHE+LT*)/lag (*SALE*) from NA Compustat in WRDS.

$POSI\_AEM$	The dichotomous variable represents the propensity of AEM from the modified Jones model, which is 1 for firm-years with positive discretionary accruals, while 0 otherwise.
$POSI\_AEM\_K$	The dichotomous variable represents the propensity of AEM developed by Kothari et al. (2005), which is 1 for firm-years with positive discretionary accruals, while 0 otherwise.
$POSI\_REM$	The dichotomous variable represents the propensity of aggregate REM from three specific REM mechanisms, which is 1 for firm-years with positive value of *REM*, while 0 otherwise.
$POSI\_REM_{CFO}$	The dichotomous variable represents the propensity of specific REM mechanism from abnormal CFO, which is 1 for firm-years with positive REM_{CFO}, while 0 otherwise.
$POSI\_REM_{PROD}$	The dichotomous variable represents the propensity of specific REM mechanism from abnormal PROD, which is 1 for firm-years with positive REM_{PROD}, while 0 otherwise.
$POSI\_REM_{DISEXP}$	The dichotomous variable represents the propensity of specific REM mechanism from abnormal DISEXP, which is 1 for firm-years with positive $REM_{PDISEXP}$, while 0 otherwise.

$PPE_{i,t}$	The gross property, plant and equipment for firm *i* in year *t.* It is *PPEGT* from NA Compustat in WRDS.
$PROD_{i,t}$	The production costs that are expressed as COGS plus the change of inventory from previous period, for firm *i* during period t. It is calculated as (*COGS+INVT*) from NA Compustat in WRDS.
REM	The variable of REM, which is the aggregate of the three proxies, REM_{CFO}, REM_{PROD} and REM_{DISEXP}.
REM_{CFO}	The component of abnormal CFO in *REM*, which is defined as the abnormal CFO with -1 coefficient.
REM_{PROD}	The component of abnormal PROD in *REM*, which is defined as the abnormal PROD.
REM_{DISEXP}	The component of abnormal DISEXP in *REM*, which is defined as the abnormal DISEXP with -1 coefficient.
$ROA_{i,t-1}$	The return on assets for firm *i* in period *t-1*. It is defined as net income before extraordinary items divided by total assets at the beginning of the year. It is calculated as (*NI/TA*) from NA Compustat in WRDS.
$S_{i,t}$	The sales for firm *i* during period t. It is *SALE* from NA Compustat in WRDS.

$SENT_{i,t-1}$	The previous fiscal year's investor sentiment index and represents two different sentiment variables, $SENT\_BW$ for BW developed by Baker and Wurgler (2006), and $SENT\_MICH$ for MICH developed by the Michigan Consumer Research Center.
$SENT\_BW$	The investor sentiment index BW developed by Baker and Wurgler (2006). It is obtained from http://people.stern.nyu.edu/jwurgler/.
$SENT\_MICH$	MICH developed by the Michigan Consumer Research Center. It is obtained from http://www.sca.isr.umich.edu/.
$SHARE_{i,t-1}$	The previous fiscal year's market share expressed as a firm's sales (*SALE* in NA Compustat) divided by the total sales of its industry (based on two-digit SIC codes). It is collected from NA Compustat in WRDS.
SOX_t	A dummy variable represents the pre- and post-SOX periods, which is defined as 1 in the period of income before extraordinary items minus CFO excluding extraordinary items and discontinued operations 2005-2018, while 0 in the period of 1996-2004.
$TA_{i,t}$	The total accruals for firm *i* in year *t*. It is defined as income before extraordinary items minus CFO excluding

	extraordinary items and discontinued operations. It is calculated as *IB-(OANCF-XIDOC)* from NA Compustat in WRDS.
$TENURE_{i,t}$	The number of years an auditor-client business relationship lasts. It is collected based on *AU* from NA Compustat in WRDS.
$TENURE\_D_{i,t}$	The dummy variable for the number of years an auditor-client business relationship lasts, which is defined as 1 if the number of years is larger than the median number of years for all observations, and 0 otherwise.
$\Delta REC_{i,t}$	The net receivable in in year *t* less the net receivable for firm *i* in year *t-1*. It is calculated based on *RECT* from NA Compustat in WRDS.
$\Delta REV_{i,t}$	The revenue in year *t* minus revenue in year *t-1* for firm *i*. It is calculated based on *SALE* from NA Compustat in WRDS.
$\Delta S_{i,t}$	The sales change from year *t-1* to *t* for firm *i*. It is calculated based on *SALE* from NA Compustat in WRDS.

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Table 1. Sample selection description.

	No. of firm-year observations	***No. of unique firms***
Initial sample in the Compustat from 2005 to 2018, US firms	85,105	10,029
Excluding firm-years		
Financial services (SIC 6000-6999) and utilities (SIC 4900-4999)	(29,755)	(3,330)
Non S&P1500 firms	(41,887)	(4,995)
Missing corporate governance data	(533)	(28)
Missing audit quality data	(15)	(2)
Non-positive total assets and book value	(298)	(15)
With insufficient data to calculate AEM and REM proxies	(2,668)	(267)
Final samples	9,949	1,392

Table 2. Descriptive statistics of test variables.

Variable	Mean	Std dev	25%	Median	75%
Earnings Management					
POSI_AEM	0.442	0.497	0.000	0.000	1.000
POSI_AEM_K	0.450	0.497	0.000	0.000	1.000
POSI_REM	0.541	0.498	0.000	1.000	1.000
$POSI\_REM_{CFO}$	0.519	0.500	0.000	1.000	1.000
$POSI\_REM_{PROD}$	0.522	0.500	0.000	1.000	1.000
$POSI\_REM_{DISEXP}$	0.551	0.497	0.000	1.000	1.000
Investor Sentiment					
SENT_BW	-0.042	0.308	-0.158	-0.020	0.149
SENT_MICH	81.58	10.79	71.84	84.13	91.84
Internal Corporate Governance					
BIND	0.793	0.108	0.714	0.818	0.875
BSIZE	8.962	2.092	7.000	9.000	10.00
DUALITY	0.450	0.498	0.000	0.000	1.000
ACSIZE	3.717	1.013	3.000	4.000	4.000
External Audit Quality					
BIG4	0.921	0.270	1.000	1.000	1.000
TENURE	16.22	11.95	7.000	13.00	24.00
Control Variables					
SHARE	0.032	0.059	0.002	0.008	0.028
NOA	1.181	0.856	0.651	0.955	1.399
MB	3.628	3.671	1.693	2.591	4.087
ASSETS	7.691	1.547	6.549	7.536	8.669
LEV	0.195	0.161	0.038	0.187	0.302
ROA	0.058	0.076	0.029	0.060	0.096

Variables are defined in Appendix. The sample period spans the years 2005-2018 and the number of observations is 9,949.

Table 3. Pearson and Spearman Pairwise correlations.

Panel A: Pearson and Spearman Pairwise correlations for *POSI_AEM*, *POSI_AEM_K*, *POSI_REM* and three dichotomous variables for components of REM, $POSI\_REM_{CFO}$, $POSI\_REM_{PROD}$ and $POSI\_REM_{DISEXP}$.

	POSI_AEM	***POSI_AEM_K***	***POSI_REM***	$POSI\_REM_{CFO}$	$POSI\_REM_{PROD}$	$POSI\_REM_{DISEXP}$
POSI_AEM		**0.86**	**0.14**	**0.23**	**0.10**	**0.11**
POSI_AEM_K	**0.86**		**0.13**	**0.21**	**0.09**	**0.10**
POSI_REM	**0.14**	**0.13**		**0.39**	**0.83**	**0.70**
$POSI\_REM_{CFO}$	**0.23**	**0.21**	**0.39**		**0.38**	**0.14**
$POSI\_REM_{PROD}$	**0.10**	**0.09**	**0.83**	**0.38**		**0.57**
$POSI\_REM_{DISEXP}$	**0.11**	**0.10**	**0.70**	**0.14**	**0.57**	

Bold correlation coefficient indicates that two-tailed *t*-test of difference from zero is significant at 0.05.

The Pearson (Spearman) correlations are lower (upper) triangle of the diagonal.

Variables are defined in Appendix. The sample period spans the years 2005-2018 and the number of observations is 9,949.

Panel B: Pearson and Spearman Pairwise correlations for proxies of AEM, REM, internal corporate governance strength, external audit quality and control variables.

	POSI_AEM	*POSI_REM*	*SENT_BW*	*SENT_MICH*	*BIND_D*	*BSIZE_D*	*DUALITY*	*ACSIZE_D*	*BIG4*	*TENURE_D*	*SHARE*	*NOA*	*MB*	*ASSETS*	*LEV*	*ROA*
POSI_AEM		**0.14**	0.01	0.00	**-0.04**	**-0.02**	0.00	**0.05**	**-0.04**	**0.04**	**-0.03**	**-0.10**	**-0.03**	**-0.09**	**-0.05**	**0.06**
POSI_REM	**0.14**		-0.00	0.00	0.00	**-0.02**	-0.01	**0.04**	**-0.05**	-0.01	0.01	**0.07**	**-0.22**	0.00	**0.07**	**-0.20**
SENT_BW	0.01	-0.00		**0.34**	**-0.04**	**-0.02**	**0.06**	**-0.03**	0.01	**-0.03**	0.01	0.01	0.02	-0.01	0.00	**0.07**
SENT_MICH	0.00	0.00	**0.15**		-0.02	-0.01	**0.26**	-0.02	-0.01	**0.02**	0.02	**0.09**	**0.14**	**0.05**	**0.12**	0.00
BIND_D	**-0.03**	0.00	-0.05	-0.01		**0.17**	**-0.07**	**0.28**	**0.14**	**0.11**	**0.12**	**0.04**	**0.05**	**0.23**	**0.16**	**-0.04**
BSIZE_D	-0.02	**-0.02**	-0.03	0.00	**0.26**		**-0.04**	**0.44**	**0.23**	**0.35**	**0.38**	**0.06**	**0.07**	**0.62**	**0.28**	**0.04**
DUALITY	**0.03**	0.01	0.01	**-0.08**	**0.14**	**0.05**		**0.07**	0.02	**0.06**	**0.11**	-0.02	-0.02	**0.10**	0.00	**0.04**
ACSIZE_D	**0.04**	**0.04**	-0.05	-0.01	**0.32**	**0.46**	**-0.05**		**0.11**	**0.24**	**0.22**	0.00	**0.03**	**0.33**	**0.17**	**0.04**
BIG4	**-0.04**	**-0.05**	0.02	-0.01	**0.14**	**0.24**	**0.04**	**0.12**		**0.24**	**0.13**	**0.02**	**0.03**	**0.29**	**0.15**	-0.01
TENURE_D	**0.03**	**-0.02**	-0.04	0.01	**0.13**	**0.33**	**-0.05**	**0.23**	**0.26**		**0.21**	**-0.04**	**0.05**	**0.35**	**0.11**	**0.06**
SHARE	-0.02	-0.02	0.02	0.02	**0.18**	**0.53**	**0.05**	**0.31**	**0.27**	**0.28**		**-0.09**	**0.03**	**0.57**	**0.16**	**0.05**
NOA	**-0.12**	**0.04**	0.01	**0.11**	**0.06**	**0.07**	**0.03**	0.00	**0.05**	**0.00**	**-0.09**		**-0.07**	**0.28**	**0.28**	**-0.15**
MB	-0.02	**-0.30**	0.03	**0.19**	**0.04**	**0.07**	**0.03**	0.00	**0.03**	**0.06**	**0.02**	**-0.03**		**0.05**	**0.19**	**0.25**
ASSETS	**-0.09**	0.00	-0.02	**0.05**	**0.28**	**0.62**	**-0.02**	**0.35**	**0.31**	**0.34**	**0.75**	**0.30**	**0.07**		**0.40**	**0.03**
LEV	**-0.05**	**0.08**	-0.04	**0.11**	**0.20**	**0.32**	-0.01	**0.21**	**0.17**	**0.13**	**0.33**	**0.31**	**0.05**	**0.46**		**-0.19**
ROA	**0.07**	**-0.25**	0.09	**-0.03**	**-0.05**	**0.02**	**0.02**	0.02	-0.01	**0.06**	**0.06**	**-0.17**	**0.50**	0.00	**-0.23**	

Variables are defined in Appendix. The sample period spans the years 2005-2018 and the number of observations is 9,949.
Bold correlation coefficient indicates that two-tailed *t*-test of difference from zero is significant at 0.05.
The Pearson (Spearman) correlations are lower (upper) triangle of the diagonal.

Table 4. Regression results for H1: Association between investment sentiment and the propensity of AEM.

	POSI_AEM		***POSI_AEM_K***	
	(1)	***(2)***	***(3)***	***(4)***
Intercept	0.463***	0.274*	0.457***	0.260*
	(4.03)	(1.84)	(4.00)	(1.75)
SENT_BW	0.049		0.028	
	(1.17)		(0.67)	
SENT_MICH		0.003**		0.003**
		(2.16)		(2.08)
SHARE	0.089	0.084	0.395	0.394
	(0.28)	(0.26)	(1.25)	(1.24)
NOA	-0.172***	-0.175***	-0.147***	-0.150***
	(-8.45)	(-8.57)	(-7.31)	(-7.45)
MB	-0.016***	-0.017***	-0.011***	-0.012***
	(-3.98)	(-4.25)	(-2.70)	(-2.94)
ASSETS	-0.085***	-0.085***	-0.084***	-0.083***
	(-6.64)	(-6.62)	(-6.52)	(-6.51)
LEV	0.272***	0.268***	0.163	0.153
	(2.68)	(2.64)	(1.61)	(1.51)
ROA	1.291***	1.314***	1.324***	1.336***
	(6.90)	(7.04)	(7.13)	(7.21)
Industry fixed effects	Yes	Yes	Yes	Yes
No. of observations	9,949	9,949	9,949	9,949
Pseudo-R^2 (R^2)	0.024	0.024	0.021	0.021

This table reports the estimates from the following regression

$$Prob(EM_{i,t}) = \alpha_0 + \alpha_1 SENT_{i,t-1} + \alpha_2 SHARE_{i,t-1} + \alpha_3 NOA_{i,t-1} + \alpha_4 MB_{i,t-1} + \alpha_5 ASSETS_{i,t-1} + \alpha_6 LEV_{i,t-1} + \alpha_7 ROA_{i,t-1} + \alpha_8 INDUSTY_k + \varepsilon_{i,t}$$

Here the dichotomous variables for the propensity of *AEM, POSI_AEM and POSI_AEM_K* are used for *EM* in regression in this table. *SENT_BW* and *SENT_MICH* are used for *SENT* in regression in this table. Variables are defined in Appendix. The sample period spans the years 2005-2018.

Two-tailed t-test of difference from zero is significant at: *** < 0. 01, **<0.05, *<0.1.

Table 5. Regression results for H2: Association between investor sentiment and the propensity of REM.

Panel A: Association between BW and REM.

	POSI_REM ***(1)***	***POSI_REM$_{CFO}$*** ***(2)***	***POSI_REM$_{PROD}$*** ***(3)***	***POSI_REM$_{DISEXP}$*** ***(4)***
Intercept	0.949***	0.908***	0.926***	0.645***
	(8.00)	(7.60)	(7.83)	(5.55)
SENT_BW	0.015	0.094**	0.026	-0.045
	(0.36)	(2.17)	(0.62)	(-1.08)
SHARE	2.587***	0.301	2.499***	2.719***
	(7.86)	(0.90)	(7.63)	(8.29)
NOA	0.109***	-0.022	0.103***	0.13***
	(5.28)	(-1.06)	(5.07)	(6.38)
MB	-0.091***	-0.071***	-0.085***	-0.079***
	(-20.55)	(-16.09)	(-19.25)	(-19.01)
ASSETS	-0.088***	-0.032**	-0.078***	-0.079***
	(-6.73)	(-2.38)	(-6.00)	(-6.11)
LEV	1.036***	0.845***	0.855***	1.015***
	(9.96)	(8.00)	(8.28)	(9.90)
ROA	-2.382***	-5.776***	-2.544***	0.365**
	(-12.32)	(-26.81)	(-13.2)	(1.96)
Industry fixed effects	Yes	Yes	Yes	Yes
No. of observations	9,949	9,949	9,949	9,949
Pseudo-R^2 (R^2)	0.079	0.118	0.073	0.048

Panel B: Association between MICH and the propensity of REM.

	POSI_REM ***(1)***	***POSI_REM$_{CFO}$*** ***(2)***	***POSI_REM$_{PROD}$*** ***(3)***	***POSI_REM$_{DISEXP}$*** ***(4)***
Intercept	0.782***	0.680***	0.801***	0.502***
	(5.11)	(4.39)	(5.25)	(3.33)
SENT_MICH	0.002*	0.003**	0.002	0.002
	(1.73)	(2.30)	(1.27)	(1.50)
SHARE	2.584***	0.331	2.506***	2.697***
	(7.86)	(0.99)	(7.65)	(8.23)
NOA	0.106***	-0.025	0.101***	0.127***
	(5.12)	(-1.20)	(4.97)	(6.19)
MB	-0.092***	-0.072***	-0.086***	-0.08***
	(-20.59)	(-16.26)	(-19.24)	(-19.02)
ASSETS	-0.087***	-0.033**	-0.078***	-0.078***
	(-6.72)	(-2.46)	(-6.01)	(-6.04)
LEV	1.028***	0.84***	0.849***	1.004***
	(9.87)	(7.94)	(8.20)	(9.79)
ROA	-2.377***	-5.735***	-2.533***	0.35*
	(-12.32)	(-26.73)	(-13.18)	(1.89)
Industry fixed effects	Yes	Yes	Yes	Yes
No. of observations	9,949	9,949	9,949	9,949
Pseudo-R^2 (R^2)	0.079	0.118	0.073	0.048

These tables report the estimates from the following regression

$$Prob(EM_{i,t}) = \alpha_0 + \alpha_1 SENT_{i,t-1} + \alpha_2 SHARE_{i,t-1} + \alpha_3 NOA_{i,t-1} + \alpha_4 MB_{i,t-1} + \alpha_5 ASSETS_{i,t-1} + \alpha_6 LEV_{i,t-1} + \alpha_7 ROA_{i,t-1} + \alpha_8 INDUSTY_k + \varepsilon_{i,t}$$

Here the dichotomous variables for the propensity of *REM*, *POSI_REM*, *POSI_REM$_{CFO}$*, *POSI_REM$_{PROD}$* and *POSI_REM$_{DISEXP}$* are used for *EM* in regression in this table. *SENT_BW* and *SENT_MICH* are used for *SENT* in regression in this table. Variables are defined in Appendix. The sample period spans the years 2005-2018. Two-tailed t-test of difference from zero is significant at: *** < 0. 01, **<0.05, *<0.1.

Table 6. Regression results for H3a and H4a: Effects of internal corporate governance strength and external audit quality on the association between investor sentiment and the propensity of AEM.

	POSI_AEM (1)	***POSI_AEM_K (2)***		***POSI_AEM (3)***	***POSI_AEM_K (4)***
Intercept	0.701***	0.628***	***Intercept***	0.478	0.431
	(5.63)	(5.08)		(1.27)	(1.14)
SENT_BW	-0.115	-0.149	***SENT_MICH***	0.003	0.003
	(-0.71)	(-0.93)		(0.70)	(0.63)
BIND_D	-0.056**	-0.043	***BIND_D***	-0.287	-0.15
	(-2.06)	(-1.57)		(-1.42)	(-0.74)
BSIZE_D	0.096***	0.070**	***BSIZE_D***	0.299	0.405*
	(2.85)	(2.06)		(1.33)	(1.81)
DUALITY	0.088***	0.096***	***DUALITY***	0.174	0.121
	(3.30)	(3.62)		(0.87)	(0.61)
ACSIZE_D	0.193***	0.143***	***ACSIZE_D***	-0.073	-0.173
	(5.32)	(3.96)		(-0.27)	(-0.65)
BIG4	-0.081	-0.044	***BIG4***	0.015	0.026
	(-1.58)	(-0.85)		(0.04)	(0.07)
TENURE_D	0.123***	0.137***	***TENURE_D***	0.110	-0.01
	(4.38)	(4.90)		(0.53)	(-0.05)
SENT_BW× BIND_D	0.055	0.014	***SENT_MICH × BIND_D***	0.003	0.001
	(0.64)	(0.16)		(1.14)	(0.54)
SENT_BW× BSIZE_D	-0.007	0.072	***SENT_MICH × BSIZE_D***	-0.002	-0.004
	(-0.08)	(0.75)		(-0.90)	(-1.52)
SENT_BW× DUALITY	-0.053	0.008	***SENT_MICH × DUALITY***	-0.001	-0.000
	(-0.62)	(0.09)		(-0.40)	(-0.11)
SENT_BW× ACSIZE_D	0.131	0.051	***SENT_MICH × ACSIZE_D***	0.003	0.004
	(1.13)	(0.45)		(0.98)	(1.20)
SENT_BW× BIG4	0.142	0.131	***SENT_MICH × BIG4***	-0.001	-0.001
	(0.85)	(0.79)		(-0.26)	(-0.20)

Table 6—*Continued*

SENT_BW× TENURE_D	0.041 (0.47)	0.038 (0.43)	***SENT_MICH × TENURE_D***	0.000 (0.04)	0.002 (0.70)
SHARE	-0.013 (-0.04)	0.332 (1.04)	***SHARE***	0.000 (0.000)	0.359 (1.12)
NOA	-0.154*** (-7.48)	-0.129*** (-6.38)	***NOA***	-0.156*** (-7.57)	-0.132*** (-6.49)
MB	-0.015*** (-3.90)	-0.01*** (-2.63)	***MB***	-0.017*** (-4.15)	-0.011*** (-2.88)
ASSETS	-0.123*** (-8.32)	-0.117*** (-8.00)	***ASSETS***	-0.123*** (-8.36)	-0.119*** (-8.09)
LEV	0.288*** (2.82)	0.177* (1.74)	***LEV***	0.273*** (2.66)	0.168* (1.65)
ROA	1.248*** (6.63)	1.292*** (6.92)	***ROA***	1.276*** (6.79)	1.307*** (7.02)
Industry fixed effects	Yes	Yes	***Industry fixed effects***	Yes	Yes
No. of observations	9,949	9,949	***No. of observations***	9,949	9,949
Pseudo-R^2 (R^2)	0.031	0.026	***Pseudo-R^2 (R^2)***	0.032	0.026

This table reports the estimates from the following regression

$$Prob(EM_{i,t}) = \beta_0 + \beta_1 SENT_{i,t-1} + \beta_2 BIND\_D_{i,t} + \beta_3 BSIZE\_D_{i,t} + \beta_4 DUALITY_{i,t} + \beta_5 ACSIZE\_D_{i,t} + \beta_6 BIG4_{i,t} + \beta_7 TENURE\_D_{i,t} + \beta_8 SENT_{i,t-1} \times BIND\_D_{i,t} + \beta_9 SENT_{i,t-1} \times BSIZE\_D_{i,t} + \beta_{10} SENT_{i,t-1} \times DUALITY_{i,t} + \beta_{11} SENT_{i,t-1} \times ACSIZE\_D_{i,t} + \beta_{12} SENT_{i,t-1} \times BIG4_{i,t} + \beta_{13} SENT_{i,t-1} \times TENURE\_D_{i,t} + \beta_{14} SHARE_{i,t-1} + \beta_{15} NOA_{i,t-1} + \beta_{16} MB_{i,t-1} + \beta_{17} ASSETS_{i,t-1} + \beta_{18} LEV_{i,t-1} + \beta_{19} ROA_{i,t-1} + \beta_{20} INDUSTY_k + \varepsilon_{i,t}$$

Here the dichotomous variables for the propensity of AEM, *POSI_AEM* and *POSI_AEM_K* are used for *EM* in regression in this table. *SENT_BW* and *SENT_MICH* are used for *SENT* in regression in this table. Variables are defined in Appendix. The sample period spans the years 2005-2018.

Two-tailed t-test of difference from zero is significant at: *** < 0. 01, **<0.05, *<0.1.

Table 7. Regression results for H3b and H4b: Effects of internal corporate governance strength and external audit quality on the association between investor sentiment and the propensity of REM.
Panel A: Effects of internal corporate governance strength and external audit quality on the association between BW and the propensity of REM.

	POSI_REM ***(1)***	***POSI_REM$_{CFO}$*** ***(2)***	***POSI_REM$_{PROD}$*** ***(3)***	***POSI_REM$_{DISEXP}$*** ***(4)***
Intercept	1.064***	0.966***	1.003***	0.643***
	(8.30)	(7.45)	(7.86)	(5.11)
SENT_BW	-0.015	-0.008	-0.057	-0.151
	(-0.09)	(-0.05)	(-0.35)	(-0.91)
BIND_D	-0.091***	-0.036	-0.081***	-0.067**
	(-3.28)	(-1.28)	(-2.94)	(-2.45)
BSIZE_D	-0.073**	-0.001	-0.052	-0.131***
	(-2.11)	(-0.04)	(-1.50)	(-3.83)
DUALITY	0.049*	0.051*	0.052*	0.064**
	(1.81)	(1.84)	(1.92)	(2.39)
ACSIZE_D	0.198***	0.148***	0.141***	0.192***
	(5.29)	(3.94)	(3.80)	(5.19)
BIG4	-0.277***	-0.098*	-0.182***	-0.223***
	(-5.16)	(-1.80)	(-3.44)	(-4.21)
TENURE_D	-0.057**	-0.064**	-0.037	-0.093***
	(-1.98)	(-2.18)	(-1.29)	(-3.28)
SENT_BW× BIND_D	0.052	0.096	0.063	0.037
	(0.59)	(1.07)	(0.72)	(0.43)
SENT_BW× BSIZE_D	-0.024	-0.079	-0.079	-0.052
	(-0.24)	(-0.79)	(-0.81)	(-0.54)
SENT_BW× DUALITY	-0.040	-0.033	-0.011	-0.058
	(-0.47)	(-0.38)	(-0.12)	(-0.68)
SENT_BW× ACSIZE_D	0.164	0.123	0.065	0.174
	(1.38)	(1.03)	(0.55)	(1.48)

Table 7, Panel A—*Continued*

SENT_BW× BIG4	0.019 (0.11)	0.085 (0.49)	0.073 (0.43)	0.135 (0.79)
SENT_BW× TENURE_D	-0.025 (-0.28)	0.003 (0.03)	0.019 (0.21)	-0.048 (-0.55)
SHARE	2.321*** (7.00)	0.121 (0.36)	2.308*** (6.99)	2.456*** (7.42)
NOA	0.103*** (4.92)	-0.022 (-1.08)	0.099*** (4.81)	0.121*** (5.87)
MB	-0.090*** (-20.39)	-0.07*** (-15.94)	-0.084*** (-19.10)	-0.078*** (-18.78)
ASSETS	-0.060*** (-4.04)	-0.026* (-1.70)	-0.06*** (-4.03)	-0.042*** (-2.85)
LEV	1.077*** (10.27)	0.854*** (8.04)	0.890*** (8.55)	1.05*** (10.16)
ROA	-2.474*** (-12.73)	-5.837*** (-26.98)	-2.615*** (-13.52)	0.29 (1.55)
Industry fixed effects	Yes	Yes	Yes	Yes
No. of observations	9,949	9,949	9,949	9,949
Pseudo-R^2 (R^2)	0.085	0.120	0.076	0.054

Panel B: Effects of internal corporate governance strength and external audit quality on the association between MICH and the propensity of REM.

	POSI_REM ***(1)***	***POSI_REM$_{CFO}$*** ***(2)***	***POSI_REM$_{PROD}$*** ***(3)***	***POSI_REM$_{DISEXP}$*** ***(4)***
Intercept	0.810**	2.092***	1.145***	0.390
	(2.06)	(5.17)	(2.93)	(1.00)
SENT_MICH	0.003	-0.014***	-0.002	0.003
	(0.56)	(-2.97)	(-0.52)	(0.63)
BIND_D	-0.478**	-0.326	-0.512**	-0.287
	(-2.32)	(-1.56)	(-2.50)	(-1.41)
BSIZE_D	0.241	0.335	0.182	-0.019
	(1.05)	(1.44)	(0.80)	(-0.08)
DUALITY	0.383*	-0.262	0.222	0.252
	(1.88)	(-1.26)	(1.10)	(1.25)
ACSIZE_D	-0.327	0.460	-0.093	-0.296
	(-1.19)	(1.66)	(-0.34)	(-1.09)
BIG4	-0.183	-1.380***	-0.555	-0.140
	(-0.47)	(-3.45)	(-1.44)	(-0.36)
TENURE_D	-0.127	-0.300	0.191	0.033
	(-0.60)	(-1.39)	(0.91)	(0.16)
SENT_MICH× BIND_D	0.005*	0.004	0.005**	0.003
	(1.88)	(1.40)	(2.11)	(1.09)
SENT_MICH× BSIZE_D	-0.004	-0.004	-0.003	-0.001
	(-1.38)	(-1.43)	(-1.03)	(-0.49)
SENT_MICH× DUALITY	-0.004	0.004	-0.002	-0.002
	(-1.62)	(1.56)	(-0.83)	(-0.91)
SENT_MICH× ACSIZE_D	0.006*	-0.004	0.003	0.006*
	(1.90)	(-1.16)	(0.84)	(1.78)
SENT_MICH× BIG4	-0.001	0.016***	0.005	-0.001
	(-0.22)	(3.25)	(1.00)	(-0.22)

Table 7, Panel B—*Continued*

SENT_MICH× TENURE_D	0.001 (0.32)	0.003 (1.07)	-0.003 (-1.12)	-0.002 (-0.61)
SHARE	2.401*** (7.23)	0.074 (0.22)	2.384*** (7.21)	2.485*** (7.50)
NOA	0.102*** (4.87)	-0.026 (-1.24)	0.100*** (4.84)	0.120*** (5.77)
MB	-0.091*** (-20.4)	-0.072*** (-16.1)	-0.085*** (-19.1)	-0.079*** (-18.8)
ASSETS	-0.062*** (-4.15)	-0.025 (-1.63)	-0.061*** (-4.10)	-0.042*** (-2.84)
LEV	1.056*** (10.0)	0.836*** (7.84)	0.874*** (8.39)	1.024*** (9.89)
ROA	-2.446*** (-12.6)	-5.83*** (-27.0)	-2.594*** (-13.4)	0.276 (1.48)
Industry fixed effects	Yes	Yes	Yes	Yes
No. of observations	9,949	9,949	9,949	9,949
Pseudo-R^2 (R^2)	0.085	0.121	0.076	0.054

These tables report the estimates from the following regression

$$Prob(EM_{i,t}) = \beta_0 + \beta_1 SENT_{i,t-1} + \beta_2 BIND\_D_{i,t} + \beta_3 BSIZE\_D_{i,t} + \beta_4 DUALITY_{i,t} + \beta_5 ACSIZE\_D_{i,t} + \beta_6 BIG4_{i,t} + \beta_7 TENURE\_D_{i,t} + \beta_8 SENT_{i,t-1} \times BIND\_D_{i,t} + \beta_9 SENT_{i,t-1} \times BSIZE\_D_{i,t} + \beta_{10} SENT_{i,t-1} \times DUALITY_{i,t} + \beta_{11} SENT_{i,t-1} \times ACSIZE\_D_{i,t} + \beta_{12} SENT_{i,t-1} \times BIG4_{i,t} + \beta_{13} SENT_{i,t-1} \times TENURE\_D_{i,t} + \beta_{14} SHARE_{i,t-1} + \beta_{15} NOA_{i,t-1} + \beta_{16} MB_{i,t-1} + \beta_{17} ASSETS_{i,t-1} + \beta_{18} LEV_{i,t-1} + \beta_{19} ROA_{i,t-1} + \beta_{20} INDUSTY_k + \varepsilon_{i,t}$$

Here the dichotomous variables for the propensity of *REM, POSI_REM, POSI_REM$_{CFO}$, POSI_REM$_{PROD}$* and *POSI_REM$_{DISEXP}$* are used for *EM* in regression in this table. *SENT_BW* and *SENT_MICH* are used for *SENT* in regression in this table. Variables are defined in Appendix. The sample period spans the years 2005-2018.

Two-tailed t-test of difference from zero is significant at: *** < 0. 01, **<0.05, *<0.1.

Table 8. Regression results for additional test I: Effect of macroeconomic factors on the propensity of AEM.

	POSI_AEM	
	(1)	***(2)***
Intercept	0.430***	0.232
	(3.26)	(1.31)
SENT_BW	0.046	
	(0.88)	
SENT_MICH		0.003*
		(1.81)
INF	-0.493	0.040
	(-0.68)	(0.04)
IPG	0.209	0.373
	(0.12)	(0.24)
GRGDP	1.917	-0.503
	(1.02)	(-0.17)
SHARE	0.078	0.090
	(0.24)	(0.28)
NOA	-0.173***	-0.175***
	(-8.47)	(-8.54)
MB	-0.016***	-0.017***
	(-4.08)	(-4.18)
ASSETS	-0.085***	-0.085***
	(-6.56)	(-6.58)
LEV	0.271***	0.266***
	(2.67)	(2.61)
ROA	1.294***	1.306***
	(6.88)	(6.94)
Industry fixed effects	Yes	Yes
No. of observations	9,949	9,949
Pseudo-R^2 (R^2)	0.024	0.025

This table reports the estimates from the following regression
$Prob(EM_{i,t}) = \alpha_0 + \alpha_1 SENT_{i,t-1} + \alpha_2 INF_{t-1} + \alpha_3 IPG_{t-1} + \alpha_4 GRGDP_{t-1} + \alpha_5 SHARE_{i,t-1} + \alpha_6 NOA_{i,t-1} + \alpha_7 MB_{i,t-1} + \alpha_8 ASSETS_{i,t-1} + \alpha_9 LEV_{i,t-1} + \alpha_{10} ROA_{i,t-1} + \alpha_{11} INDUSTY_k + \varepsilon_{i,t}$
Here *POSI_AEM* is used for *EM* in regression in this table. *SENT_BW* and *SENT_MICH* are used for *SENT* in regression in this table. Variables are defined in Appendix. The sample period spans the years 2005-2018.
Two-tailed t-test of difference from zero is significant at: *** < 0. 01, **<0.05, *<0.1.

Table 9. Regression results for additional test I: Effect of macroeconomic factors on the propensity of REM.

	POSI_REM	
	(1)	***(2)***
Intercept	1.124***	0.804***
	(8.26)	(5.18)
SENT_BW	0.070	
	(1.31)	
SENT_MICH		0.003
		(1.63)
INF	1.434*	1.180
	(1.95)	(1.08)
IPG	-5.923***	-3.141
	(-3.36)	(-1.33)
GRGDP	-0.770	-1.112
	(-0.40)	(-0.36)
SHARE	2.695***	2.653***
	(8.12)	(8.00)
NOA	0.106***	0.107***
	(5.14)	(5.16)
MB	-0.093***	-0.093***
	(-20.8)	(-20.7)
ASSETS	-0.093***	-0.091***
	(-7.07)	(-6.90)
LEV	1.036***	1.034***
	(9.94)	(9.90)
ROA	-2.406***	-2.350***
	(-12.4)	(-12.1)
Industry fixed effects	Yes	Yes
No. of observations	9,949	9,949
Pseudo-R^2 (R^2)	0.080	0.080

This table reports the estimates from the following regression
$Prob(EM_{i,t}) = \alpha_0 + \alpha_1 SENT_{i,t-1} + \alpha_2 INF_{t-1} + \alpha_3 IPG_{t-1} + \alpha_4 GRGDP_{t-1} + \alpha_5 SHARE_{i,t-1} + \alpha_6 NOA_{i,t-1} + \alpha_7 MB_{i,t-1} + \alpha_8 ASSETS_{i,t-1} + \alpha_9 LEV_{i,t-1} + \alpha_{10} ROA_{i,t-1} + \alpha_{11} INDUSTY_k + \varepsilon_{i,t}$
Here *POSI_REM* is used for *EM* in regression in this table. *SENT_BW* and *SENT_MICH* are used for *SENT* in regression in this table. Variables are defined in Appendix. The sample period spans the years 2005-2018.
Two-tailed t-test of difference from zero is significant at: *** < 0. 01, **<0.05, *<0.1.

Table 10. Regression results additional test I: Effects of internal corporate governance strength and external audit quality on the association between investor sentiment and the propensity of AEM under the control of macroeconomic factors.

	POSI_AEM (1)		***POSI_AEM (2)***
Intercept	0.670***	***Intercept***	0.439
	(4.79)		(1.13)
SENT_BW	-0.110	***SENT_MICH***	0.003
	(-0.66)		(0.72)
BIND_D	-0.055**	***BIND_D***	-0.288
	(-2.01)		(-1.42)
BSIZE_D	0.097***	***BSIZE_D***	0.293
	(2.86)		(1.30)
DUALITY	0.089***	***DUALITY***	0.165
	(3.33)		(0.82)
ACSIZE_D	0.194***	***ACSIZE_D***	-0.067
	(5.35)		(-0.25)
BIG4	-0.081	***BIG4***	0.032
	(-1.57)		(0.09)
TENURE_D	0.122***	***TENURE_D***	0.107
	(4.34)		(0.52)
SENT_BW× BIND_D	0.056	***SENT_MICH × BIND_D***	0.003
	(0.64)		(1.14)
SENT_BW× BSIZE_D	-0.006	***SENT_MICH × BSIZE_D***	-0.002
	(-0.06)		(-0.87)
SENT_BW× DUALITY	-0.055	***SENT_MICH × DUALITY***	-0.001
	(-0.65)		(-0.36)
SENT_BW× ACSIZE_D	0.131	***SENT_MICH × ACSIZE_D***	0.003
	(1.13)		(0.96)
SENT_BW× BIG4	0.131	***SENT_MICH × BIG4***	-0.001
	(0.79)		(-0.31)
SENT_BW× TENURE_D	0.042	***SENT_MICH × TENURE_D***	0.000
	(0.48)		(0.05)
INF	-0.38	***INF***	0.09
	(-0.52)		(0.10)
IPG	0.055	***IPG***	0.410
	(0.03)		(0.25)
GRGDP	1.832	***GRGDP***	-0.266
	(0.97)		(-0.09)
SHARE	-0.038	***SHARE***	0.000
	(-0.12)		(0.000)
NOA	-0.156***	***NOA***	-0.157***
	(-7.53)		(-7.59)
MB	-0.016***	***MB***	-0.017***
	(-4.01)		(-4.12)

Table 10—*Continued*

ASSETS	-0.122*** (-8.22)	***ASSETS***	-0.123*** (-8.27)
LEV	0.285*** (2.78)	***LEV***	0.277*** (2.70)
ROA	1.249*** (6.60)	***ROA***	1.267*** (6.70)
Industry fixed effects	Yes	***Industry fixed effects***	Yes
No. of observations	9,949	***No. of observations***	9,949
Pseudo-R^2 (R^2)	0.031	***Pseudo-R^2 (R^2)***	0.031

This table reports the estimates from the following regression
$Prob(EM_{i,t}) = \beta_0 + \beta_1 SENT_{i,t-1} + \beta_2 BIND\_D_{i,t} + \beta_3 BSIZE\_D_{i,t} + \beta_4 DUALITY_{i,t} + \beta_5 ACSIZE\_D_{i,t} + \beta_6 BIG4_{i,t} + \beta_7 TENURE\_D_{i,t} + \beta_8 SENT_{i,t-1} \times BIND\_D_{i,t} + \beta_9 SENT_{i,t-1} \times BSIZE\_D_{i,t} + \beta_{10} SENT_{i,t-1} \times DUALITY_{i,t} + \beta_{11} SENT_{i,t-1} \times ACSIZE\_D_{i,t} + \beta_{12} SENT_{i,t-1} \times BIG4_{i,t} + \beta_{13} SENT_{i,t-1} \times TENURE\_D_{i,t} + \alpha_{14} INF_{t-1} + \alpha_{15} IPG_{t-1} + \alpha_{16} GRGDP_{t-1} + \beta_{17} SHARE_{i,t-1} + \beta_{18} NOA_{i,t-1} + \beta_{19} MB_{i,t-1} + \beta_{20} ASSETS_{i,t-1} + \beta_{21} LEV_{i,t-1} + \beta_{22} ROA_{i,t-1} + \beta_{23} INDUSTY_k + \varepsilon_{i,t}$
Here *POSI_AEM* is used for *EM* in regression in this table. *SENT_BW* and *SENT_MICH* are used for *SENT* in regression in this table. Variables are defined in Appendix. The sample period spans the years 2005-2018.
Two-tailed t-test of difference from zero is significant at: *** < 0. 01, **<0.05, *<0.1.

Table 11. Regression results additional test I: Effects of internal corporate governance strength and external audit quality on the association between investor sentiment and the propensity of REM under the control of macroeconomic factors.

	POSI_REM (1)		***POSI_REM (2)***
Intercept	1.195*** (8.31)	***Intercept***	0.933*** (2.32)
SENT_BW	0.026 (0.15)	***SENT_MICH***	0.002 (0.41)
BIND_D	-0.100*** (-3.55)	***BIND_D***	-0.483*** (-2.33)
BSIZE_D	-0.074*** (-2.14)	***BSIZE_D***	0.226 (0.98)
DUALITY	0.058*** (2.14)	***DUALITY***	0.392* (1.91)
ACSIZE_D	0.200*** (5.33)	***ACSIZE_D***	-0.321 (-1.17)
BIG4	-0.261*** (-4.85)	***BIG4***	-0.156 (-0.40)
TENURE_D	-0.061*** (-2.12)	***TENURE_D***	-0.14 (-0.66)
SENT_BW× BIND_D	0.046 (0.52)	***SENT_MICH× BIND_D***	0.005* (1.87)
SENT_BW× BSIZE_D	-0.026 (-0.26)	***SENT_MICH× BSIZE_D***	-0.004 (-1.32)
SENT_BW× DUALITY	-0.042 (-0.49)	***SENT_MICH× DUALITY***	-0.004 (-1.64)
SENT_BW× ACSIZE_D	0.159 (1.33)	***SENT_MICH× ACSIZE_D***	0.006* (1.88)
SENT_BW× BIG4	0.032 (0.19)	***SENT_MICH× BIG4***	-0.001 (-0.27)
SENT_BW× TENURE_D	-0.025 (-0.28)	***SENT_MICH× TENURE_D***	0.001 (0.38)
INF	1.173 (1.58)	***INF***	1.139 (1.22)
IPG	-5.508*** (-3.08)	***IPG***	-2.215 (-1.34)
GRGDP	0.116 (0.06)	***GRGDP***	-0.823 (-0.27)
SHARE	2.431*** (7.26)	***SHARE***	2.483*** (7.41)
NOA	0.100*** (4.77)	***NOA***	0.100*** (4.77)
MB	-0.093*** (-20.7)	***MB***	-0.092*** (-20.5)

Table 11—*Continued*

ASSETS	-0.066*** (-4.37)	***ASSETS***	-0.065*** (-4.32)
LEV	1.084*** (10.3)	***LEV***	1.068*** (10.1)
ROA	-2.491*** (-12.8)	***ROA***	-2.467*** (-12.6)
Industry fixed effects	Yes	***Industry fixed effects***	Yes
No. of observations	9,949	***No. of observations***	9,949
Pseudo-R^2 (R^2)	0.085	***Pseudo-R^2 (R^2)***	0.086

This table reports the estimates from the following regression
$Prob(EM_{i,t}) = \beta_0 + \beta_1 SENT_{i,t-1} + \beta_2 BIND\_D_{i,t} + \beta_3 BSIZE\_D_{i,t} + \beta_4 DUALITY_{i,t} + \beta_5 ACSIZE\_D_{i,t} + \beta_6 BIG4_{i,t} + \beta_7 TENURE\_D_{i,t} + \beta_8 SENT_{i,t-1} \times BIND\_D_{i,t} + \beta_9 SENT_{i,t-1} \times BSIZE\_D_{i,t} + \beta_{10} SENT_{i,t-1} \times DUALITY_{i,t} + \beta_{11} SENT_{i,t-1} \times ACSIZE\_D_{i,t} + \beta_{12} SENT_{i,t-1} \times BIG4_{i,t} + \beta_{13} SENT_{i,t-1} \times TENURE\_D_{i,t} + \alpha_{14} INF_{t-1} + \alpha_{15} IPG_{t-1} + \alpha_{16} GRGDP_{t-1} + \beta_{17} SHARE_{i,t-1} + \beta_{18} NOA_{i,t-1} + \beta_{19} MB_{i,t-1} + \beta_{20} ASSETS_{i,t-1} + \beta_{21} LEV_{i,t-1} + \beta_{22} ROA_{i,t-1} + \beta_{23} INDUSTY_k + \varepsilon_{i,t}$
Here *POSI_REM* is used for *EM* in regression in this table. *SENT_BW* and *SENT_MICH* are used for *SENT* in regression in this table. Variables are defined in Appendix. The sample period spans the years 2005-2018.
Two-tailed t-test of difference from zero is significant at: *** < 0. 01, **<0.05, *<0.1.

Table 12. Regression results for additional test II: Effect of SOX on the propensity of AEM.

	POSI_AEM	
	(1)	***(2)***
Intercept	0.644***	0.382***
	(7.23)	(2.91)
SENT_BW	-0.004	
	(-0.22)	
SENT_MICH		0.003***
		(2.77)
SOX	-0.118***	-0.072***
	(-5.00)	(-2.77)
SHARE	0.612**	0.620**
	(2.46)	(2.49)
NOA	-0.121***	-0.124***
	(-8.98)	(-9.17)
MB	-0.008***	-0.009***
	(-3.14)	(-3.44)
ASSETS	-0.094***	-0.093***
	(-9.70)	(-9.65)
LEV	0.170**	0.159**
	(2.36)	(2.20)
ROA	1.322***	1.312***
	(10.4)	(10.3)
Industry fixed effects	Yes	Yes
No. of observations	17,549	17,549
Pseudo-R^2 (R^2)	0.023	0.023

This table reports the estimates from the following regression
$Prob(EM_{i,t}) = \alpha_0 + \alpha_1 SENT_{i,t-1} + \alpha_2 \text{SOX} + \alpha_3 SHARE_{i,t-1} + \alpha_4 NOA_{i,t-1} + \alpha_5 MB_{i,t-1} + \alpha_6 ASSETS_{i,t-1} + \alpha_7 LEV_{i,t-1} + \alpha_8 ROA_{i,t-1} + \alpha_9 INDUSTY_k + \varepsilon_{i,t}$
Here *POSI_AEM* is used for *EM* in regression in this table. *SENT_BW* and *SENT_MICH* are used for *SENT* in regression in this table. Variables are defined in Appendix. The sample period spans the years 1996-2018.
Two-tailed t-test of difference from zero is significant at: *** < 0. 01, **<0.05, *<0.1.

Table 13. Regression results for additional test II: Effect of SOX on the propensity of REM.

	POSI_REM	
	(1)	***(2)***
Intercept	0.840***	0.603***
	(7.48)	(3.88)
SENT_BW	-0.021	
	(-0.94)	
SENT_MICH		0.002**
		(2.08)
SOX	0.091***	0.14***
	(2.91)	(4.23)
SHARE	2.575***	2.549***
	(9.31)	(9.21)
NOA	0.127***	0.124***
	(7.81)	(7.60)
MB	-0.083***	-0.084***
	(-24.5)	(-24.5)
ASSETS	-0.101***	-0.099***
	(-8.93)	(-8.79)
LEV	1.266***	1.253***
	(14.7)	(14.5)
ROA	-1.835***	-1.844***
	(-12.4)	(-12.5)
Industry fixed effects	Yes	Yes
No. of observations	17,549	17,549
Pseudo-R^2 (R^2)	0.079	0.080

This table reports the estimates from the following regression

$$Prob(EM_{i,t}) = \alpha_0 + \alpha_1 SENT_{i,t-1} + \alpha_2 SHARE_{i,t-1} + \alpha_3 NOA_{i,t-1} + \alpha_4 MB_{i,t-1} + \alpha_5 ASSETS_{i,t-1} + \alpha_6 LEV_{i,t-1} + \alpha_7 ROA_{i,t-1} + \alpha_8 INDUSTY_k + \varepsilon_{i,t}$$

Here *POSI_REM* is used for EM in regression in this table. *SENT_BW* and *SENT_MICH* are used for *SENT* in regression in this table. Variables are defined in Appendix. The sample period spans the years 1996-2018.

Two-tailed t-test of difference from zero is significant at: *** < 0. 01, **<0.05, *<0.1.

Table 14. Regression results for additional test II: Effects of internal corporate governance strength and external audit quality on the association between investor sentiment and the propensity of AEM under the control of SOX.

	POSI_AEM (1)		***POSI_AEM (2)***
Intercept	0.862*** (8.46)	***Intercept***	0.330 (0.67)
SENT_BW	-0.030 (-0.29)	***SENT_MICH***	0.005 (1.03)
BIND_D	-0.082* (-1.79)	***BIND_D***	0.008 (0.02)
BSIZE_D	0.091*** (3.55)	***BSIZE_D***	0.412** (2.57)
DUALITY	0.085*** (4.04)	***DUALITY***	0.221 (1.56)
ACSIZE_D	0.020 (0.46)	***ACSIZE_D***	0.713 (1.64)
ACIND_D	0.007 (0.18)	***ACIND_D***	-0.064 (-0.14)
BIG4	-0.092** (-2.06)	***BIG4***	-0.293 (-0.93)
TENURE_D	0.121*** (5.52)	***TENURE_D***	-0.002 (-0.01)
SOX	-0.193*** (-2.73)	***SOX***	0.662 (1.06)
SENT_BW× BIND_D	0.091* (1.82)	***SENT_MICH × BIND_D***	-0.000 (-0.07)
SENT_BW× BSIZE_D	-0.013 (-0.35)	***SENT_MICH × BSIZE_D***	-0.004** (-2.03)
SENT_BW× DUALITY	-0.039 (-1.13)	***SENT_MICH × DUALITY***	-0.002 (-1.01)
SENT_BW× ACSIZE_D	-0.036 (-0.76)	***SENT_MICH × ACSIZE_D***	-0.007 (-1.63)
SENT_BW× ACIND_D	-0.007 (-0.13)	***SENT_MICH × ACIND_D***	0.001 (0.12)
SENT_BW× BIG4	0.013 (0.13)	***SENT_MICH × BIG4***	0.002 (0.63)
SENT_BW× TENURE_D	0.061* (1.77)	***SENT_MICH × TENURE_D***	0.002 (0.92)
SENT_BW× SOX	0.123 (0.59)	***SENT_MICH × SOX***	-0.009 (-1.30)
BIND_D× SOX	0.021 (0.39)	***BIND_D× SOX***	-0.216 (-0.42)

Table 14—*Continued*

ACSIZE_D× SOX	0.130*** (2.67)	***ACSIZE_D× SOX***	-0.524 (-1.11)
ACIND_D× SOX	0.046 (0.61)	***ACIND_D× SOX***	-0.274 (-0.41)
SENT_BW× BIND_D× SOX	-0.001 (-0.01)	***SENT_MICH × BIND_D× SOX***	0.002 (0.38)
SENT_BW× ACSIZE_D× SOX	0. 100 (1.07)	***SENT_MICH × ACSIZE_D× SOX***	0.007 (1.33)
SENT_BW× ACIND_D× SOX	-0.149 (-0.70)	***SENT_MICH× ACIND_D× SOX***	0.004 (0.56)
SHARE	0.571** (2.28)	***SHARE***	0.652*** (2.60)
NOA	-0.105*** (-7.66)	***NOA***	-0.108*** (-7.85)
MB	-0.008*** (-2.89)	***MB***	-0.009*** (-3.32)
ASSETS	-0.127*** (-11.7)	***ASSETS***	-0.129*** (-11.8)
LEV	0.147** (2.02)	***LEV***	0.136* (1.87)
ROA	1.250*** (9.78)	***ROA***	1.265*** (9.89)
Industry fixed effects	Yes	***Industry fixed effects***	Yes
No. of observations	17,549	***No. of observations***	17,549
Pseudo-R^2 (R^2)	0.031	***Pseudo-R^2 (R^2)***	0.031

This table reports the estimates from the following regression

$$Prob(EM_{i,t}) = \beta_0 + \beta_1 SENT_{i,t-1} + \beta_2 BIND\_D_{i,t} + \beta_3 BSIZE\_D_{i,t} + \beta_4 DUALITY_{i,t} + \beta_5 ACIND\_D_{i,t} + \beta_6 ACSIZE\_D_{i,t} + \beta_7 BIG4_{i,t} + \beta_8 TENURE\_D_{i,t} + \beta_9 \text{SOX} + \beta_{10} SENT_{i,t-1} \times BIND\_D_{i,t} + \beta_{11} SENT_{i,t-1} \times BSIZE\_D_{i,t} + \beta_{12} SENT_{i,t-1} \times DUALITY_{i,t} + \beta_{13} SENT_{i,t-1} \times ACIND\_D_{i,t} + \beta_{14} SENT_{i,t-1} \times ACSIZE\_D_{i,t} + \beta_{15} SENT_{i,t-1} \times BIG4_{i,t} + \beta_{16} SENT_{i,t-1} \times TENURE\_D_{i,t} + \beta_{17} SENT_{i,t-1} \times \text{SOX} + \beta_{18} BIND\_D_{i,t} \times \text{SOX} + \beta_{19} ACIND\_D_{i,t} \times \text{SOX} + \beta_{20} SENT_{i,t-1} \times ACSIZE\_D_{i,t} + \beta_{21} SENT_{i,t-1} \times BIND\_D_{i,t} \times \text{SOX} + \beta_{22} SENT_{i,t-1} \times ACIND\_D_{i,t} \times \text{SOX} + \beta_{23} SENT_{i,t-1} \times ACSIZE\_D_{i,t} \times \text{SOX} + \beta_{24} SHARE_{i,t-1} + \beta_{25} NOA_{i,t-1} + \beta_{26} MB_{i,t-1} + \beta_{27} ASSETS_{i,t-1} + \beta_{28} LEV_{i,t-1} + \beta_{29} ROA_{i,t-1} + \beta_{30} INDUSTY_k + \varepsilon_{i,t}$$

Here *POSI_AEM* is used for *EM* in regression in this table. *SENT_BW* and *SENT_MICH* are used for *SENT* in regression in this table. Variables are defined in Appendix. The sample period spans the years 1996-2018.

Two-tailed t-test of difference from zero is significant at: *** < 0. 01, **<0.05, *<0.1.

Table 15. Regression results for additional test II: Effects of internal corporate governance strength and external audit quality on the association between investor sentiment and the propensity of REM under the control of SOX.

	POSI_REM (1)		***POSI_REM (2)***
Intercept	1.011***	***Intercept***	0.056
	(9.55)		(0.11)
SENT_BW	0.017	***SENT_MICH***	0.009*
	(0.16)		(1.71)
BIND_D	0.034	***BIND_D***	0.139
	(0.73)		(0.29)
BSIZE_D	-0.023	***BSIZE_D***	-0.245
	(-0.88)		(-1.50)
DUALITY	0.029	***DUALITY***	0.213
	(1.35)		(1.47)
ACSIZE_D	-0.032	***ACSIZE_D***	0.227
	(-0.74)		(0.51)
ACIND_D	-0.002	***ACIND_D***	-0.053
	(-0.04)		(-0.12)
BIG4	-0.294***	***BIG4***	-0.385
	(-6.31)		(-1.17)
TENURE_D	-0.035	***TENURE_D***	-0.155
	(-1.55)		(-1.03)
SOX	-0.189***	***SOX***	1.036
	(-2.62)		(1.63)
SENT_BW× BIND_D	0.113**	***SENT_MICH × BIND_D***	-0.000
	(2.18)		(-0.06)
SENT_BW× BSIZE_D	0.016	***SENT_MICH × BSIZE_D***	0.003
	(0.40)		(1.40)
SENT_BW× DUALITY	-0.045	***SENT_MICH × DUALITY***	-0.002
	(-1.28)		(-1.32)
SENT_BW× ACSIZE_D	0.025	***SENT_MICH × ACSIZE_D***	-0.003
	(0.53)		(-0.60)
SENT_BW× ACIND_D	-0.058	***SENT_MICH × ACIND_D***	0.000
	(-1.14)		(0.01)
SENT_BW× BIG4	-0.050	***SENT_MICH × BIG4***	0.001
	(-0.51)		(0.28)
SENT_BW× TENURE_D	0.045	***SENT_MICH × TENURE_D***	0.001
	(1.27)		(0.83)
SENT_BW× SOX	-0.128	***SENT_MICH × SOX***	-0.013*
	(-0.60)		(-1.78)
BIND_D× SOX	-0.105*	***BIND_D× SOX***	-0.272
	(-1.93)		(-0.52)
ACSIZE_D× SOX	0.179***	***ACSIZE_D× SOX***	0.129
	(3.57)		(0.27)

Table 15—*Continued*

ACIND_D× SOX	0.206*** (2.67)	***ACIND_D× SOX***	-0.177 (-0.26)
SENT_BW× BIND_D× SOX	-0.060 (-0.60)	***SENT_MICH × BIND_D× SOX***	0.001 (0.18)
SENT_BW× ACSIZE_D× SOX	0.038 (0.40)	***SENT_MICH × ACSIZE_D× SOX***	0.000 (0.03)
SENT_BW× ACIND_D× SOX	0.173 (0.80)	***SENT_MICH× ACIND_D× SOX***	0.005 (0.68)
SHARE	2.515*** (9.70)	***SHARE***	2.558*** (9.85)
NOA	0.090*** (6.47)	***NOA***	0.083*** (5.97)
MB	-0.086*** (-28.4)	***MB***	-0.087*** (-28.6)
ASSETS	-0.079*** (-7.14)	***ASSETS***	-0.078*** (-6.98)
LEV	1.269*** (16.8)	***LEV***	1.254*** (16.6)
ROA	-1.793*** (-13.7)	***ROA***	-1.819*** (-13.9)
Industry fixed effects	Yes	***Industry fixed effects***	Yes
No. of observations	17,549	***No. of observations***	17,549
Pseudo-R^2 (R^2)	0.081	***Pseudo-R^2 (R^2)***	0.081

This table reports the estimates from the following regression
$Prob(EM_{i,t}) = \beta_0 + \beta_1 SENT_{i,t-1} + \beta_2 BIND\_D_{i,t} + \beta_3 BSIZE\_D_{i,t} + \beta_4 DUALITY_{i,t} + \beta_5 ACIND\_D_{i,t} + \beta_6 ACSIZE\_D_{i,t} + \beta_7 BIG4_{i,t} + \beta_8 TENURE\_D_{i,t} + \beta_9 \text{SOX} + \beta_{10} SENT_{i,t-1} \times BIND\_D_{i,t} + \beta_{11} SENT_{i,t-1} \times BSIZE\_D_{i,t} + \beta_{12} SENT_{i,t-1} \times DUALITY_{i,t} + \beta_{13} SENT_{i,t-1} \times ACIND\_D_{i,t} + \beta_{14} SENT_{i,t-1} \times ACSIZE\_D_{i,t} + \beta_{15} SENT_{i,t-1} \times BIG4_{i,t} + \beta_{16} SENT_{i,t-1} \times TENURE\_D_{i,t} + \beta_{17} SENT_{i,t-1} \times \text{SOX} + \beta_{18} BIND\_D_{i,t} \times \text{SOX} + \beta_{19} ACIND\_D_{i,t} \times \text{SOX} + \beta_{20} SENT_{i,t-1} \times ACSIZE\_D_{i,t} + \beta_{21} SENT_{i,t-1} \times BIND\_D_{i,t} \times \text{SOX} + \beta_{22} SENT_{i,t-1} \times ACIND\_D_{i,t} \times \text{SOX} + \beta_{23} SENT_{i,t-1} \times ACSIZE\_D_{i,t} \times \text{SOX} + \beta_{24} SHARE_{i,t-1} + \beta_{25} NOA_{i,t-1} + \beta_{26} MB_{i,t-1} + \beta_{27} ASSETS_{i,t-1} + \beta_{28} LEV_{i,t-1} + \beta_{29} ROA_{i,t-1} + \beta_{30} INDUSTY_k + \varepsilon_{i,t}$
Here *POSI_REM* is used for *EM* in regression in this table. *SENT_BW* and *SENT_MICH* are used for *SENT* in regression in this table. Variables are defined in Appendix. The sample period spans the years 1996-2018.
Two-tailed t-test of difference from zero is significant at: *** < 0. 01, **<0.05, *<0.1.