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1. Introduction

A separation of ownership and control gives rise to agency problems and results in information asymmetry between managers and shareholders. Shareholders demand conservative accounting to mitigate the effects of information asymmetry (LaFond and Watts, 2008). Accounting conservatism, defined as financial reporting policies or tendencies that results in the downward bias of accounting net asset value relative to economic net asset value (Ruch and Taloy, 2015), is a potential mechanism to address the agency problem (Basu, 1997; Watts, 2003; LaFond and Roychowdhury 2008; García Lara et al., 2016). This is because accounting itself has a primary function to provide information that allows contracting parties to evaluate the efficiency and effectiveness of performed obligations in contracting settings. Accounting conservatism alleviates information asymmetry and improves information quality (Kim et al., 2013).

Corporate governance is a mechanism that shareholders use to monitor firm executives in order to minimize agency costs (Caskey and Laux, 2017). One primary way of monitoring firm executives is to align executive incentives with shareholder values by offering executive compensation contracts including stock options (Jensen and Murphy, 1990; Mohan and Ainina, 2012; Bennett et al., 2017). The novel intention of such contracts is to motivate executives to work hard and to restrict their opportunism (Raffi et al., 2014). The relationship between executive remuneration and corporate governance has been well documented in the literature (e.g., Core et al., 1999; Firth et al., 2007; Baixauli-Soler and Sanchez-Marin, 2015; Deschenes et al., 2015; Ntim et al., 2017).

Accounting performance has been used as the main yardstick for executive compensation contracts in many countries. Prior studies have recognized that while accounting performance reflects the state of a firm's operations, it also gives executives incentive to overstate the firm's net asset value and earnings with a view to maximizing their personal welfares (Sun, 2014). However, the loss of investor confidence in the integrity of the accounting profession following several major financial reporting scandals has resulted in a growing concern in the literature about the quality of accounting measure used for executive compensating contracts (AL-Dhamari and Ismail, 2014; Li and Wang, 2016).

Conservatism results in an understatement of accounting value and performance relative to the market value due to an understatement of assets and revenues and/or an

overstatement of liabilities and expenses (Zhong and Li, 2016). The literature has generally shown that accounting performance information under the conservatism principle reflects the value of assets more creditable (Iatridis, 2011). Also, conservatism reduces the room of earnings manipulation and signals the potential self-interest behavior of executives timelier (Bertomeu et al., 2017). Overall, it has been argued that conservatism could improve the effectiveness of executive compensation contracts.

Various stakeholders of corporate reporting demand conservatism to reduce agency costs by mitigating information asymmetry and facilitate corporate governance. Several studies have examined the relationship between corporate governance quality and accounting conservatism, portraying a positive relation between the two (e.g., Ramalingegowda and Yu, 2012; García Lara et al., 2009). It has been argued that conservatism as a tool that a board of directors can use to monitor and control managers' investment decisions (Ball, 2001), therefore to improve a firm's investment efficiencies (Ahmed and Duellman, 2011; García Lara et al., 2016) and reduce investment risk (Kim and Zhang, 2016).

There is considerable debate on whether executive compensation contracts are designed to align executive incentives with shareholder values. Several studies attempt to use executive compensation-performance sensitivity as a magnitude of the alignment of shareholders' interests with those of executive management (e.g., Lippert and Porter, 1997; Iyengar and Zampelli, 2010). Executive compensation-performance sensitivity is commonly defined as the change in executives' compensation that is associated with a given performance of an organization that they manage (Jensen and Murphy 1990), reflecting the absolute increment to the executives' compensation associated with a given amount of firm performance increased. Jensen and Murphy (1990) argue that higher the sensitivity, as indicating a closer alignment of interests between executives and shareholders, the more efficient the compensation contract is. Earlier studies have established the relationship of executive compensation-performance sensitivity with firm risk (Core and Guay, 2002; Dai et al., 2014), risk-taking behavior (Yang and Hou, 2016; Steinbach et al., 2017) and corporate governance (Lippert and Porter, 1997; Baixauli-Soler and Sanchez-Marin, 2015; Zhou et al., 2017). The literature has also presented evidence of the influence of accounting conservative on firm risk (e.g., Kim and Zhang, 2016), manager risk-taking behavior (e.g., Kravet, 2014) and corporate governance (e.g., Ahmed and Duellman, 2007). Therefore, there are good reasons to expect that accounting conservatism could facilitate the adoption of executive compensation that is sensitive to (accounting) performance. However, a very few studies have investigated the impact of accounting conservatism on executive compensation-performance sensitivity, which provides a research gap for our study.

Our study examines the relationship between accounting conservatism and executive compensation-performance sensitivity. With data of 19144 firm-year observations

covering a period of 10 year it finds there is a significantly positive relationship between accounting conservatism and the executive compensation-performance sensitivity of Chinese listed companies, particularly for executive compensation contracts where accounting-based performance measure is used. Also, this study finds that the impact of conservatism on the executive compensation performance sensitivity is more pronounced after the implementation of China's Generally Accepted Accounting Principles (GAAP) in 2007. Further, this study reveals that the impact of conservatism on the executive compensation performance sensitivity is more evidenced when   a firm's performance is falling, when information asymmetry is more serious, when a firm is listed on the main board of China's stock exchanges, or where the degree of marketization is higher.

This paper makes two contributions to the literature. First, it provides evidence on the positive relationship between accounting conservatism and executive compensation-performance sensitivity, which advances our understanding of the positive economic outcomes of conservatism (Lafond and Watts, 2008; Kim and Pevzner, 2010; Hui et al., 2012; Ahmed and Duellman, 2013). Second, it adds to our understanding of the association between accounting conservatism and corporate governance. This study shows that conservatism reduces the agency cost and enhances the effectiveness of executive compensation contracts; both are important in assessing the benefits of conservatism and informing the debate as to the role of conservatism in corporate governance (Ahmed and Duellman, 2007; Ahmed and Duellman, 2011; Ahmed and Henry, 2012; Ruch and Taylor, 2015; Chen et al., 2017).

This paper proceeds as follows. The next section reviews the literature on accounting conservatism and executive compensation incentives and develops the hypothesis to be tested. The research design and methodology are described in Section 3 "Research Design, Data and Descriptive Statistics". This is followed by a discussion of the results in Section 4 "Results". The final section presents the conclusions.

2. Literature Review and Hypothesis Development

2.1 Accounting Conservatism and Its Roles

The most important reason for the existence of conservatism is the contracting explanation (Watts, 2003) and its potential benefits. Early in 1997, Basu pointed out that by requiring higher degree of verification to recognize good news as gains than to recognize bad news as losses, accounting conservatism can mitigate managerial opportunistic behavior. Kwon (2005) states that comparing to neutrality and fairness, accounting information based on conservatism restrains the cost of managers' next-best policy. Accounting conservatism can improve the persistence of good news (Ball and Shivakumar, 2006) and restrain the managerial short-term orientation (Lai and Taylor, 2008). Chen et al. (2017) show that accounting conservatism reduces the

noise of accounting data and curbs managerial opportunism.

A growing body of literature, as reviewed by Zhong and Li (2016), has examined the role of conservatism in alleviating the agency problem between executives and shareholders. Watts (2003) shows that accounting conservatism presents excess executive compensation by demanding higher verification standards for profits relative to losses. Ball (2001) documents that conservatism impedes the capability of executives to overstate earnings to shield negative net present value (NPV) projects, which subsequently allows shareholders to better recognize negative NPV projects and eventually mitigate overinvestment. Francis and Martin (2010) find that conservatism plays a role in restraining executives' investment decisions in negative NPV projects because losses from negative NPV projects can be recognized in a timelier manner than gains from positive NPV projects, which incentivizes executives to choose positive NPV projects. Kravet (2014) shows that accounting conservatism constrains executives' incentive to make risky investment. García Lara et al. (2016) document that conservatism mitigates under-investment as it facilitates access to debt financing and thus facilitates financing projects.

Glover and Lin (2016) review the analytical literature on management compensation in the context of executive and shareholder relations, suggesting that desirability of conservatism depends on particular features of a contracting setting between executives and shareholders. Using UK firms' data from 1984 to 1997, O'Connell (2006) finds that changes in earnings impact changes in management compensation significantly more in years with positive returns (i.e., good news) than in years with negative returns (i.e., bad news), suggesting that there is a relationship between accounting conservatives and executives compensation. LaFond and Roychowdhury (2008) find that accounting conservatism is negatively associated with managerial ownership and the declining managerial ownership increases the severity of agency problems between executives and shareholders.

Generally, the relationship between accounting conservatism and executive compensation incentives could be explained from at least two aspects. First, conservatism protects the shareholders against overcompensating executives as accounting conservatism increases the verifiability of reporting information (Watts, 2003; Hu et al., 2014). Second, as accounting conservatism reduces managerial risk-taking (Kravet, 2014; García Lara et al., 2016), compensation incentives based on conservatively reported earnings are more likely to induce executives to make better business decisions (Francis and Martin, 2010).

Previous studies have looked into the sensitivity of executive compensation/pay to firm performance (e.g., Jensen and Murphy, 1990; Lippert and Moore, 1994; Lippert and Porter, 1997; Schaefer, 1998; Dai et al., 2014; Yang and Hou, 2016; Zhou et al., 2017). Lippert and Porter (1997) suggest that the alignment of interests between the CEO and shareholders is more important in linking pay to performance sensitivity

than CEO influence over the board of directors. Zhou et al. (2017) find the board representation of non-controlling shareholders has a positive impact on executive pay-for-performance sensitivity, whereas independent directors have a negative impact on pay-for-performance sensitivity.

Cordeiro et al. (2013) find that Chinese executives are rewarded more for positive accounting performance than they are penalized for negative accounting performance. They are also rewarded more for above industry median accounting performance than they are penalized for below industry median performance. This disproportionate compensation-for-performance sensitivity also holds in a similar way for regional benchmarks. They find that the sensitivity between executive compensation and firm performance is significantly higher when absolute firm performance was positive, when firm performance exceeded the industry or regional average compared to when absolute firm performance was negative, or below the industry or regional average.

Using a large South African dataset, Ntim et al (2017) examine the fundamental question of whether CEO power and corporate governance structure can moderate the executive compensation-performance sensitivity. Ntim et al. find that CEO power and corporate governance structure have a moderating effect on the executive compensation-performance sensitivity. They reveal that the sensitivity is higher in firms with more reputable, founding and shareholding CEOs, higher ownership by directors and institutions, and independent nomination and remuneration committees, but lower in firms with larger boards, more powerful and long-tenured CEOs.

A very few studies have attempted to investigate the association between accounting conservativism and the sensitivity of executive compensation to performance. Iyengar and Zampelli (2010) study the link between conservative accounting practices and the sensitivity and find that the sensitivity of executive pay to accounting performance is higher for firms that report conservative accounting earnings. Unfortunately, their study design seriously limits the analysis of their results as they only consider discretionary accruals as the proxy for accounting conservatism (Iwasaki et al., 2015). In the accounting literature, while discretionary accruals capture the behavior of earnings management, the relationship between earnings management and accounting conservatism has not yet been fully understood (Penman and Zhang, 2002; Iwasaki et al., 2015; García Lara et al., 2017). Iwasaki et al. (2015) examine the relationship between accounting conservatism and accounting-based executive compensation contracts in Japanese firms and find a positive relationship between accounting conservatism and the pay-for-performance sensitivity. They show this positive relationship is greater for firms with poor ex-ante information environment. Their results imply that the demand for accounting conservatism is higher for firms that use more earnings-based executive compensation contracts and have more serious ex post settling up problems. However, their model has several limitations that affect the answer to the question of relationship between accounting connectivism to executive compensation to performance sensitivity. Their model only considers total cash bonus

as the proxy for executive compensation. Also, they did not separate executives from non-executives in designing their model and measuring compensation.

2.2 Research Hypotheses

Agency theory explains the problem of modern business structures by identifying the conflicts of interests between the agent and principal. For example, often in a business the agent takes advantage of the residual right to deprive the interests of the shareholders (LaPorta et al., 1999). According to the "shareholder demand" view (Cheng et al., 2017), conservatism facilitates efficient contracting between executives and shareholders (Ball, 2001; Watts, 2003). As the severity of conflicts between executives and shareholders increases, shareholders would demand more conservatism as a substitute for corporate governance mechanisms to constrain executives' opportunistic behavior (e.g., excess compensation payments and inefficient investments). Accordingly, a firm's level of accounting conservatism is expected to relate to executive compensation.

More specifically, information asymmetry emerges once a contract between the principal and agent is signed. First, because of high supervision cost, the principal cannot directly observe the behaviors of the agent. This results in the moral hazard of the agent, which is called hidden action when the principal is not able to observe accurately how much effort the agent really puts forth as monitoring is costly and precise measures of the agent's behavior are not available. Second, because of high information seeking cost, the agent can get some information that is not observed by the principal. This leads to the moral hazard of the principal, which is called hidden information. Hidden information refers to the situation where the agent has better knowledge about the decision he/she is taking on behalf of the principal. Third, there are some uncontrolled shocks that will give executives incentives to pursuit self-interest maximization. So, how to design an executive compensation contract appears to be especially important. The literature suggests to adopt the form of incentive compatibility constraint (Varas, 2017; Xu et al., 2018). To achieve this, the contracts are often based on accounting data (Watts and Zimmerman, 1999). The common practice is that the executive pay is related to accounting performance indicators (Jensen and Murphy, 1990; Jenter and Kanaan, 2015; Li and Wang, 2016). However, accounting-based performance-related pay and compensation often provide the agent with an incentive to use private information to transfer wealth from the principal to the agent by accelerating the recognition of economic income or taking more aggressive accounting policies. In order to prevent their interests from being undermined, the principal needs to set up a more credible performance indictor to reveal the manager's incapable and inaction.

Previous research documents that conservatism can significantly decrease information asymmetry, restrain the opportunistic behavior of executives, and reduce transaction costs between all stakeholders. Ultimately, it promotes the efficiency of investment

(Ahmed and Duellman, 2013; Caskey and Laux, 2017) because of reducing the cost of debt and equity financing (Callen et al., 2016) and triggers the enhancement of firm value (Goergen and Renneboog, 2011) as conservatism accounting practice adds the value of cash holding (Louis et al., 2012). In short, accounting conservatism can help to lower shareholders' information risk, control agency costs, increase shareholders' value. Thereby, it is widely considered an effective governance mechanism (Lafond and Watts, 2008; García Lara et al., 2009; Caskey and Laux, 2017; Chen et al., 2017).

In this study, we argue that performance under accounting conservatism could mitigate the conflict between shareholders and executives through three potential mechanisms. Firstly, conservatism requires higher degree of verifiability for good news than bad news (Basu, 1997; Cheng and Lin, 2009). Cheng and Lin (2009) document that firms choose not to recognize good news unless it has been supported by their superior market performance and industry norm. With this asymmetric verifiability requirement, it can reduce managers' incentives and ability to overstate assets and earnings (García Lara et al., 2016). Secondly, because of the limited responsibility and restricted tenure, managers would be myopic and they will raise the earnings in short term, which can result in negative net cashflows in long term. However, the possibilities of earnings manipulation by managers decrease when conservative accounting information is adopted (Chen et al., 2007; Hui et al, 2009; Kravet, 2014). Thirdly, accounting information that sends out a signal about the risk of managers' behavior much earlier can guide the mangers to give up poor performance projects and to stop loss in time (Kim and Zhang, 2016). At large, the cornerstone of conservatism is to provide more credible information and reduce the noise of accounting performance data.

Altogether, it can be argued that adopting accounting conservatism, which can help to limit earnings management opportunities and improve the reliability of accounting performance measure, enables firms to tie executive compensation more closely to firm performance.   If shareholders demand conservatism as a contract governance device, the degree of conservatism is higher, the sensitivity of executive compensation-performance will be higher, implying that accounting conservatism can improve the effectiveness of executive contracts. However, there is a possibility that the governance effect of executive compensation-performance sensitivity on mitigating managerial agency problem might be substituted by accounting conservatism.

According to the optimal contracting theory, a firm's shareholders design the executive compensation contract to maximize firm performance that depends largely on the executives' effort and some random noises (Homström and Milgrom, 1991). While firm performance (such as profits) is verifiable and explicitly observable, the effort of executives is non-verifiable and difficult to monitor. The first-best contract is to compensate the manager based on his effort, which requires the shareholders to exert time and effort to monitor the manager and collect such information. When it is

costly for the shareholders to do so, explicit (but noisy) performance measures can be used to determine the manager's pay (the second-best contract). The first-best contract is strictly preferred to the second-best one because the uncertainty caused by the random noises is eliminated and the manager can be better incentivized (Gao and Li, 2015). The theory thus predicts that the use of explicit performance-based contracts is less likely when a firm adopts a higher level of accounting conservatism as it can significantly decrease information asymmetry and restrain the opportunistic behavior of executives. In other words, different levels of accounting conservatism should be associated with different extents of executive compensation-performance sensitivity. For firms with high (low) accounting conservatism there should be less (more) direct monitoring of executives and more (less) reliance on contracts that link executives' compensation to explicit performance measures.

Based on the above arguments, we hypothesize:

H: There is a positive relationship between accounting conservatism and executive compensation-performance sensitivity.

3. Research Design, Data and Descriptive Statistics

3.1 Measurement of Accounting Conservatism
This study is based on Watts' (2003) contracting explanation for conservatism. First, we need to use a metric that not only can measure the existence but also the scale of conservatism. While a number of models have been developed in the literature as shown in Table 1 to capture accounting conservatism, some of them could not apply to our study due to their limitations or the unique characteristics of China's capital market. For example, the Basu model, the modified Basu model, the net income model, the accruals-cashflow model and the earnings skewness model are not applied because these modules only measure the existence of conservatism, not the scale. The book-to-market model includes off balance items (such as growth options and synergies), which are not available in our dataset. Though the C-score model is indeed one of the best firm-year measures of accounting conservatism, it requires stricter application conditions including an efficient capital market and an effective law enforcement mechanism. The prevailing institutional backgrounds of China's capital market do not satisfy these conditions. The accumulated accruals model provides a crude way to measure the levels of accounting conservatism. It contains both conditional conservatism and unconditional conservatism. Perceiving that accruals are expected to be an asymmetric function of firm performance in which economic losses are captured by the accruals process in a timelier manner than gains, Ball and Shivakumar (2006) incorporate conditional conservatism into accruals model.

[Insert Table 1 here]

Following the accrual-based conservatism measure proposed by Ball and Shivakumar

(2006), we adopt the following model developed by Iyengar and Zampelli (2010) to estimate accounting conservatism, which are given by the residual term (ε_{it}).

$$\frac{TA_{it}}{A_{it-1}} = \alpha_0\frac{1}{A_{it-1}} + \alpha_1\frac{\Delta REV_{it}}{A_{it-1}} + \alpha_2\frac{GPPE_{it}}{A_{it-1}} + \alpha_3\frac{CF_{it}}{A_{it-1}} + \alpha_4 DCF_{it}$$
$$+ \alpha_5 DCF_{it} \times \frac{CF_{it}}{A_{it-1}} + \varepsilon_{it} \qquad (1)$$

Where TA_{it} is the total accruals of firm i in year t and TA = (net income + depreciation) - cash flows from operation; A_{it-1} is the total assets of firm i at the end of year t-1; ΔREV_{it} is the revenues of firm i in year t less revenues in year t-1; $GPPE_{it}$ is the gross property plant and equipment of firm i at the end of year t; CF_{it} is the cash flow from operations of firm i for period t. DCF_{it} is a dummy variable that equals one if CF_{it} is negative, and zero otherwise. ε_{it} is the residual, which represents accounting conservatism of firm i in year t. We use $CONS_{it}$ that is equal to ε_{it} multiplied by (-1) to represent accounting conservatism. The larger the CONS, the greater the degree of conservatism.

3.2 Measurement of Accounting Performance

Previous research has pointed out that unconditional conservatism may lead to earnings management. Based on Chen and Lu (2012), we adopt the true accounting performance that is adjusted by discretionary accruals as accounting performance (Kothari et al., 2005). Using a performance-matched discretionary accrual measure enables researchers to draw more reliable inferences. True accounting performance ($TRUE\_ROA$) is calculated as:

$$\frac{TA_{it}}{A_{it-1}} = \alpha_0\frac{1}{A_{it-1}} + \alpha_1\frac{\Delta REV_{it}}{A_{it-1}} + \alpha_2\frac{GPPE_{it}}{A_{it-1}} + \alpha_3\frac{CF_{it}}{A_{it-1}} + \alpha_4 ROA_{it} + \varepsilon_{it} \qquad (2)$$

Where ROA_{it} is the after-tax net income divided by the total assets of firm i in year t. Other variables are as in Eq. (1). Eq. (2) is estimated cross-sectionally for each year with the same industry group to obtain the expected residual ε_{it}. ε_{it} in Eq. (2) multiplied by A_{it-1} is equal to the estimated value of discretionary accruals. Then the true accounting performance (TUE_ROA) is computed as:

$$TRUE\_ROA = Net\ Income - Discretionary\ Accruals \qquad (3)$$

3.3 Empirical Model

Firm performance can be assessed by using book-based and market-based measures. In this study, both measures are used to test the hypothesis. Adopting the approaches of Clarkson et al. (2011) and Huang and Kisgen (2013), we construct the following

regression models.

$$COMP_i = \alpha_0 + \alpha_1 TRUE\_ROA_i + \alpha_2 CONS_i + \alpha_3 TRUE\_ROA_i \times CONS_i + \sum \alpha_i CONTROLS_i + \sum_i YEAR_i + \sum_j INDUS_j + \varepsilon_j \qquad (4)$$

$$COMP_i = \alpha_0 + \alpha_1 RET_i + \alpha_2 CONS_i + \alpha_3 RET_i \times CONS_i + \sum \alpha_i CONTROLS_i + \sum_i YEAR_i + \sum_j INDUS_j + \varepsilon_j \qquad (5) +$$

$$\Delta COMP_i = \alpha_0 + \alpha_1 \Delta TRUE\_ROA_i + \alpha_2 CONS_i + \alpha_3 \Delta TRUE\_ROA_i \times CONS_i + \sum \alpha_i CONTROLS_i + \sum_i YEAR_i + \sum_j INDUS_j + \varepsilon_j \qquad (6)$$

$$\Delta COMP_i = \alpha_0 + \alpha_1 \Delta RET_i + \alpha_2 CONS_i + \alpha_3 \Delta RET_i \times CONS_i + \sum \alpha_i CONTROLS_i + \sum_i YEAR_i + \sum_j INDUS_j + \varepsilon_j \qquad (7) +$$

In above models, $COMP$ and $\Delta COMP$ are dependent variables, which represent for the level and change value of executive compensation. In China, listed firms disclose the sum of total compensation for the top three highest-paid managers. RET is stock return, which represents for the market-based measure of performance. Models (4) and (5) test the effect of conservatism on the correlation of executive compensation-performance. Models (6) and (7) test the effect of conservatism on the sensitivity of executive compensation-performance. We also include a set of variables to control the influence of other factors, such as firm characteristics (including size, leverage, ownership, board of directors), region, industry, and year. The measurements of these variables are summarized in Table 2.

[Insert Table 2 here]

3.4 Data

It was our intention of using data covering a 10-year period. Our data ended in 2012 as in 2013 China had major changes in its leadership and economic policies. Mr. Xi Jinping became the Country's President. The nationwide anti-corruption campaign began, which had huge influences on the behaviors of senior executives of state-owned enterprises. Most state-owned enterprises restrained the scope of

executive incentive pays and compensation. Also, in November 2013, China's leadership unveiled a blueprint for some of the most comprehensive economic and social reforms in nearly 30 years. To make data comparable and consistent, finally the data from 2003 to 2012 were used for our empirical tests.

In this study, the financial and market information was obtained from CSMAR (China Stock Market & Accounting Research) database, Wind Info website, and CNINFO website. Double-checking among statements published in different sources was performed to ensure accuracy. We deleted the firm-year observations that (1) are from the financial industries (one-digit Industry Classifying Index Code is "I"); (2) are in special treatment (ST) phase (i.e., stocks in danger of being delisted and undergoing administrative review over a certain time period. China's ST system is similar to the US Chapter 11 bankruptcy process that filters out inefficient firms and retains the efficient firms in operation through reorganization) or particular treatment (PT) phase. Under the rules of China's Securities Regulatory Commission, if a ST firm continues to suffer loss for one more year, it will be designated as a PT firm. PT firms' stocks can only be traded on Friday, with a maximum 5% upside limit to last Friday's close, but no restriction on the downside. PT firms will be de-listed if they cannot become profitable within one year; (3) have less than 12 months data for computing stock returns; (4) miss master variables. Finally, we truncate accounting items needed in the calculation of our proxies at the 1st and 99th percentile.

4. Results

4.1 Descriptive Statistics

Table 3 provides descriptive statistics for COMP (the level of executive compensation) and all control variables, while Table 4 presents descriptive statistics for accounting conservatism and accounting performance by year. The mean of CONS fluctuates during the period of the sample. $TRUE\_ROA$ and $\Delta TRUE\_ROA$ exhibit the same trend reflecting that the accounting performance wavelike rises. There are three obvious falls in 2005, 2008 and 2012.

[Insert Tables 3 and 4 here]

In our pairwise correlations tests (untabulated), as expected, we find the relationship between COMP and $TRUE\_ROA$, $\Delta COMP$ and $\Delta TRUE\_ROA$ are both significantly positive. More importantly, CONS is negatively associated with COMP, implying that conservatism has an inhibitory effect on excessive compensation. We also find the relationship between CONS and $TRUE\_ROA$ is significantly positive. Consistent with previous research (Ball and Shivakumar, 2006; Gigler, 2009), CONS is also significantly correlated with SIZE, BTM, and LEV.

4.2 Empirical Results

Table 5 presents the results of regressions that examine the role of accounting conservatism on managerial compensation. We first test whether the executive compensation contract is effective and the results are reported in Models 1 and 3. The coefficients on $TRUE\_ROA$ and $\Delta TRUE\_ROA$ are both positive (0.968 and 0.127 respectively) and significant at the 1% level, indicating that executive compensation is closely linked with accounting performance. We further include the interaction term of CONS and $\Delta TRUE\_ROA$.

In Model 4, the coefficient of $\Delta TRUE\_ROA \times$ CONS is significantly positive. This finding is consistent with our hypothesis that there is a positive relationship between accounting conservatism and executive compensation-performance sensitivity. However, the coefficient of RET of Model 5 is negative but insignificant and ΔRET of Model 6 is negative and significant at the 1% level. The findings indicate the differences between accounting performance and market performance of China listed companies. The coefficient of $\Delta RET \times$ CONS is also insignificant. The results shown in Table 5 are consistent with our hypothesis that there is a positive relationship between accounting conservatism and executive compensation-performance sensitivity, particularly for accounting-based measure of performance.

[Insert Table 5 here]

4.3 Further Tests
In this section, we address several concerns about correlated variables by extending our base model (Model 4 in Table 5) to analyze whether the relation between accounting conservatism and executive compensation differs. For brevity, we only report the results of the key variables in Table 6.

[Insert Table 6 here]

Firstly, the implementation of new China GAAP in 2007 was one of the most influential accounting reforms in the country. The GAAP relaxes the requirement for accounting conservatism. So, we split the data into a pre-reform group and a post-reform group to re-examine. The results of Model 2 in Table 6 reveal that the interaction between $\Delta TRUE\_ROA$ and CONS is positive and significant at the 5% level in the post-reform subsample but not before the reform. It reflects the demand for accounting conservatism is stronger even the requirement is relaxed after the new accounting standards. China 2007 GAAP was closely approaching toward international standards.

Secondly, as the correlation between executive compensation and performance is not always synchronous (e.g., Murphy, 2000; Bergstresser and Philippon, 2006; Bennett et al., 2017), we split the data into a good-performance group and a bad-performance

group to re-examine the relationships. As reported in Model 4 of Table 6, the coefficient of $\Delta TRUE\_ROA \times CONS$ is only significantly positive for the 'bad group', suggesting that accounting conservatism offsets the lowering of effectiveness of executive compensation contracts when firm performance is declining.

Next, if accounting conservatism is generated from information asymmetry between different interested parties, we can predict that when information asymmetry is more serious, the demand for conservatism would be greater. We use the ratio of market value to book value to capture the degree of information asymmetry as higher ratios indicate information asymmetry more serious. We split the sample into two groups (i.e., high information asymmetry and low information asymmetry). When the firm's ratio is above the average value in the same year for the industry, we consider it to be in the high group, and the low group otherwise. Consistent with this claim, we only find a positive and highly significanteffect in the high group (as shown in Model 5 of Table 6), suggesting that conservatism plays a larger role when the information environment is worse.

Besides, we also consider the special background of capital markets in China. In May 2004, the Shenzhen Stock Exchange announced the establishment of Small and Medium Enterprises board (SMEB) as a transition stage for the Growth Enterprises Market (GEM). Compared to Main-Board Market, SMEB and GEM have two major characteristics. One is that SMEB and GEM are mainly composed of small and medium-sized enterprises with high growth and high risk. The other is that small and medium-sized enterprises in China are generally family business and their largest shareholder is always both a firm's chairman and CEO. Overall, firms on the SMEB have fewer conflicts between the principal and agent, comparing to firms listed on the main boards. We speculate that the demand for conservatism as a mechanism in executive contracts is lower for firms listed on the SMEB. We split the data into the Mainboard group and the Non-mainboard group (SMEB and GEM). The results of Model 7 in Table 6 show that the interaction term is highly significant and positive in the Mainboard group while in the Non-mainboard it is positive but not significant.

Finally, this study also looks at the impact of degree of marketization on accounting conservatism. Marketization degree is a balanced result of a series of attributes of social, economic, legal, and political system in a country or region. High degree of marketization provides the more favorable environment for the contract enforcement, reflecting the more obvious effect of conservatism (Xu and Lu, 2008). Relying on a set of marketization index provided by Fan et al. (2010), we split the sample into two groups (i.e., groups of high degree of marketization versus low degree of marketization). Because the statistical year of Fan's et al (2010) research ended in 2009, thus the post-2009 index is substituted by the index in 2009. As represented in Model 9 of Table 6, the interaction effect is highly significant only in the high group, which is expected given that stronger market-oriented environment is likely to facilitate the implementation of accounting conservatism as a contracting mechanism.

4.4 Robustness Checks

As a robustness check, we rerun our analyses using alternative proxies for accounting conservatism. We use another residual estimation model specified as:

$$\frac{TA_{it}}{A_{it-1}} = \alpha_0 \frac{1}{A_{it-1}} + \alpha_1 \frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}} + \alpha_2 \frac{GPPE_{it}}{A_{it-1}} + \alpha_3 \frac{CF_{it}}{A_{it-1}} + \alpha_4 DCF_{it} + \alpha_5 \frac{CF_{it}}{A_{it-1}} + \varepsilon_{it}$$

(8)

Where REC_{it} is net receivables of firm i in year t, and $\Delta REC_{it} = REC_{it} - REC_{it-1}$. Other variables are as those in Eq. (1). Following the approach of Zhang (2008), we also use non-operating accruals as the substitute variable for accounting conservatism to redo our test. The results (un-tabulated) based on these alternative measures are largely consistent.

5. Conclusion

Accounting conservatism is a controversial topic within academic communities with considerable regulatory and practical implications. This study used a sample of data consisting of all non-financial firms listed on the Shanghai Stock Exchange and the Shenzhen Stock Exchange during the period between 2002 and 2012 to investigate whether and how accounting conservatism impacts the effectiveness of executive compensation contracts. Firstly, we find evidence that there is a positive association between executive pay and accounting-based measure of performance. More importantly, our results reveal that conservatism has a positive relation with the executive compensation-performance sensitivity, after controlling for a number of firm-specific factors and control variables. To the best of our knowledge, this is one of the first attempts at examining the relationship between accounting conservatism and executive compensation-performance sensitivity with the data from Chinese listed companies. Taken together, our analyses provide evidence to the argument that being an efficient governance mechanism, accounting conservatism can help mitigate information risk and moral risk for agency problems.

Secondly, we also find that accounting conservatism plays a larger role after the implementation of new China GAAP, when the performance is reducing, when the information asymmetry is more serious, when the firm is listed on the mainboard, or where the degree of marketization is high. The results provide an explanation for internal demand for conservatism among China's listed firms and add evidence on the economic consequences of conservatism. Both explanation and evidence help enhance our understanding of the benefits of accounting conservatism.

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Table 1: A Summary of accounting conservatism measurement methods

Model	Literature	Traits
Basu Model	Basu (1997)	Most common; require higher capital market effectiveness.
Modified Basu Model	Roychowdhury and Watts (2007)	Asymmetric timeliness over different horizons.
	Khan and Watts (2009); Ball et al. (2013)	Add some characteristics of firms such as size, leverage, market to book value ratio.
Net income Model	Ball and Shivakumar (2006)	Measure the sustainability and reversal of accounting income; no need of market indicators.
Accruals-cash flow Model	Ball and Shivakumar (2006)	No need of market indicators.
C-score	Khan and Watts (2009)	A firm-year measure of accounting conservatism.
Accumulated accruals Model	Givoly and Hayn (2000); Beatty et al. (2008)	No need of market indicators.
Residual Model	Ball and Shivakumar (2006); Iyengar and Zampelli (2010)	Based on Jones model, no need of market indicators.
Earnings skewness Model	Ball et al. (2000); Zhang (2008)	Simple, but much rougher.
Book-to-market Model	Feltham and Ohlson (1995); Stober (1996)	Simple, but contains future growth option.
	Feltham and Ohlson (1995 & 1996)	Cannot value operating asset and finance asset, and some non-accounting information is hard to measure.
	Beaver and Ryan (2000)	It distinguishes the variation of book-to-market ratio into bias and lags.

Table 2: Variable measurement

	Variables	Measurement
Dependent variables	*Executive compensation*	
	COMP	The natural log of the sum of total compensation for the three highest-paid managers
	$\Delta COMP$	$COMP_t$-$COMP_{t-1}$
Independent variables	*Accounting performance*	
	ROA	Return on assets, after-tax net income divided by total assets
	ΔROA	ROA_t-ROA_{t-1}
	Market performance	
	RET	Stock returns, the buy-hold returns based on monthly returns for a fiscal yea
	ΔRET	RET_t-RET_{t-1}
Control variables	*Financial characteristics*	
	SIZE	Firm size, the natural log of total assets
	LEV	Leverage, total debt divided by total assets
	BTM	Maturity of development, the book value divided by the market value
	Ownership characteristics	
	NATURE	Equals to 1 if the firm is state-owned, and 0 otherwise
	FIRST	Percentage of shares held by the largest shareholder
	DMH	Equals to 1 if executives hold shares and 0 otherwise

MH	Percentage of shares held by managers, MH=log(1+the number of shares held by managers/total shares)
SEPAR	The separation degree of ownership and control right, see Claessens et al. (2000)
LP	Equals to 1 if the firm is listed on the Shanghai Stock Exchange and 0 if the firm is listed on the Shenzhen Stock Exchange
BH	Equals to 1 if the firm is issuing B or H shares and 0 otherwise.
Board of directors characteristics	
DUAL	Equals to 1 if CEO and board chair is the same person, and 0 otherwise
BOARD	The number of the board of directors
IBOARD	Number of independent directors as a percentage of total board members
AGE	The average age of managers
GENDER	Equals to 1 if the manager is male and 0 if female
TENURE	The years the manager has been on the position, if he/she is hired for the first year, TRNURE = 0，and so forth
EDU	The average educational level of the top three managers, equals to 1 if it is equal or less than technical secondary school, equals to 2 if it is junior college, equals to 3 if it is undergraduate, equals to 3 if it is postgraduate, and equals to 4 if it is a doctoral student (some managers are currently registered as a part-time doctoral student) and doctorial graduate.
Region characteristics	
COMPETE	Equals to 0 if it belongs to an uncompetitive industry, which contains B03, C08, C42, D01, F01, F09, F31, G40, S, T, P, and Q, and 1 otherwise. The industry classifications are based on the approach of Aharony et al. (2000) and the 2001 standards of the China Securities Regulatory Commission.
LAW	Equals to 1 if it is in the industry with higher risk of litigation, which includes A and L and 0 otherwise
CENT*	Equals to 1 if it is registered in central China
WEST*	Equals to 1 if it is registered in western China
EAST*	Equals to 1 if it is registered in eastern China (*see Wang and Fan, 2004)

Table 3: Descriptive statistics for COMP and all control variables

variables	N	Mean	Median	Std. Dev.	Mix	Max
COMP	14389	12.415	12.458	0.862	10.168	14.466
ΔCOMP	13266	0.155	0.099	0.389	-1.023	1.589
RET1	14387	0.239	-0.039	0.878	-0.600	4.410
ΔRET1	13328	-0.007	-0.012	1.275	-4.572	4.272
RET2	14387	0.058	-0.035	0.498	-1.052	2.596
ΔRET2	13328	0.005	0.016	0.746	-2.887	2.700
SIZE	14512	21.498	21.366	1.186	18.847	25.144
LEV	14511	0.487	0.490	0.237	0.047	1.492
BTM	14512	1.679	1.311	1.080	0.748	7.487
FIRST	14503	37.867	35.920	15.777	9.090	75.000
DMH	14512	0.537	1	0.499	0	1
MH	14481	0.025	0	0.079	0	0.423
SEPER	13527	5.485	0	8.058	0	53.424
NATURE	14431	0.600	1	0.490	0	1
LP	14439	0.517	1	0.500	0	1
BH	14474	0.079	0	0.270	0	1
DUAL	14381	0.170	0	0.376	0	1
BOARD	14357	9.265	9	1.945	3	19
IBOARD	14357	0.357	0.333	0.054	0	0.800
AGE	14392	47.262	47.357	3.295	35.846	61.200
GENDER	14403	0.853	0.867	0.103	0	1
TENURE	14403	1.196	1	1.001	0	10.455
EDU	8448	3.352	3.333	0.596	1	5
COMPETE	14512	0.912	1	0.283	0	1
LAW	14512	0.029	0	0.167	0	1
EAST	14512	0.565	1	0.496	0	1
CENT	14512	0.159	0	0.366	0	1
WEST	14512	0.180	0	0.384	0	1

N denotes number of firm/year observations. RET1 and RET2 are stock returns, the buy-hold based on monthly returns for a fiscal year. RET 2 is after-market adjustment. Other variables are defined in Table 1. ***, **, and * represent significance at the 1%,5%, and 10% level, respectively.

Table 4: Descriptive Statistics for CONS, TRUE_ROA and ΔTRUE_ROA

Year	CONS			TRUE_ROA			ΔTRUE_ROA		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
2003	-0.00033	-0.00296	0.053	0.026	0.028	0.097			
2004	0.00016	-0.00170	0.053	0.023	0.028	0.102	-0.004	-0.004	0.121
2005	-0.00031	-0.00313	0.056	0.012	0.023	0.104	-0.013	-0.011	0.113
2006	0.00008	-0.00180	0.057	0.027	0.028	0.099	0.013	0.005	0.109
2007	-0.00031	0.00018	0.065	0.049	0.043	0.107	0.021	0.013	0.122
2008	-0.00033	-0.00321	0.066	0.033	0.029	0.108	-0.016	-0.014	0.121
2009	-0.00014	-0.00125	0.061	0.040	0.034	0.105	0.005	0.003	0.124
2010	0.00001	0.00000	0.061	0.055	0.053	0.098	0.015	0.014	0.116
2011	0.00022	-0.00075	0.060	0.053	0.052	0.093	-0.000	-0.004	0.108
2012	-0.00209	-0.00259	0.053	0.047	0.045	0.083	-0.007	-0.014	0.105
Total	-0.00021	-0.00162	0.059	0.038	0.038	0.101	0.002	-0.000	0.117

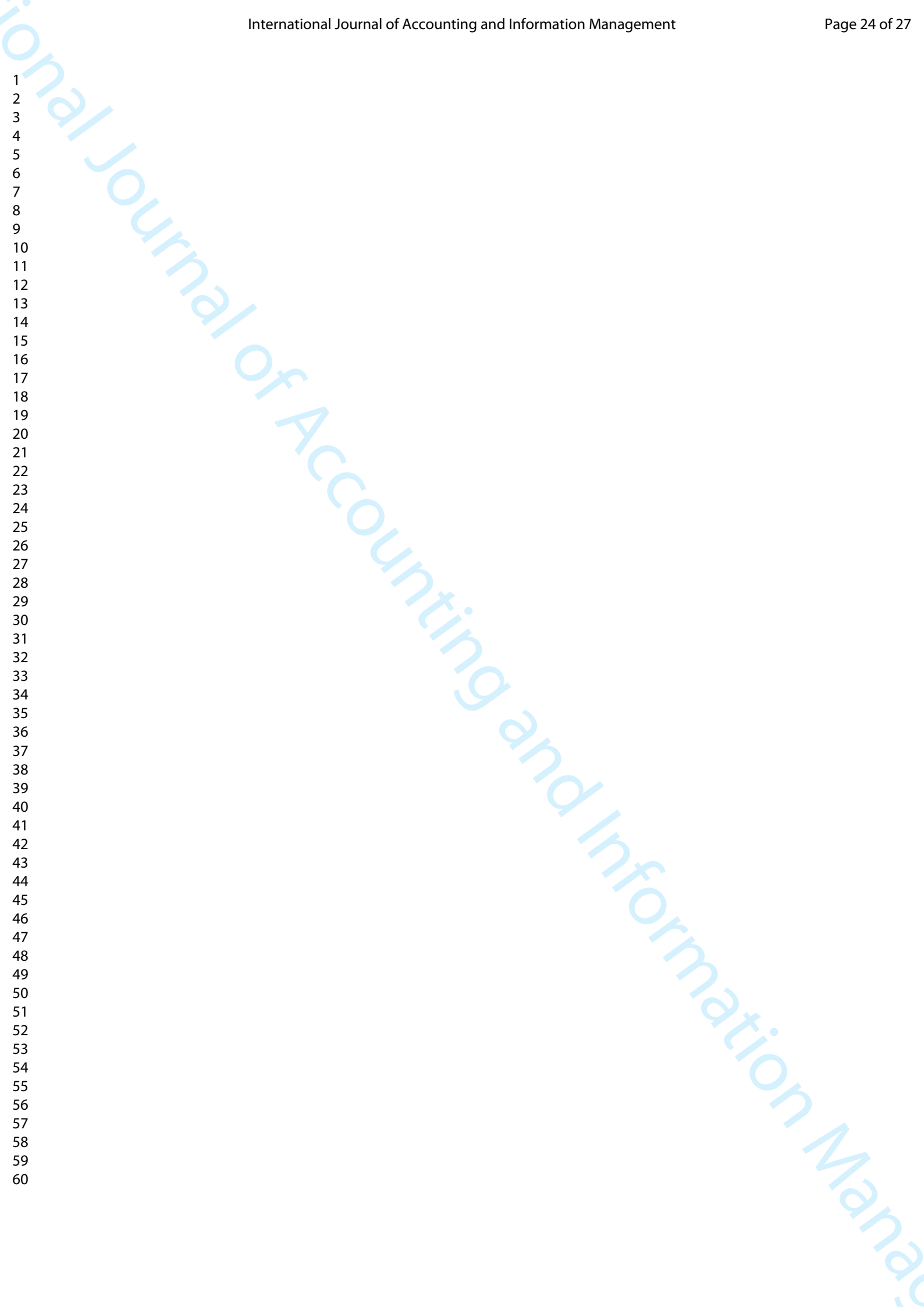*Note: All variables are defined in Table 1.*

Table 5: Results for the impact of accounting conservatism on the effectiveness of executive compensation contracts

Variables	Accounting performance: TURE_ROA				Market performance: RET	
	Level model		Change model		Level model	Change model
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	3.529 ***	3.828***	-0.368**	-0.236	3.393***	0.220
	（15.22）	（16.49）	(-2.19)	(-1.4)	(14.56)	(1.59)
PERFOR	0.968 ***	1.111***	0.127***	0.179***	-0.010	-0.020***
	（11.18）	（12.51）	(2.67)	(3.64)	(-0.59)	(-2.98)
CONS		-1.401***		-0.587***	-1.188***	-0.512***
		（9.44）		(-5.95)	(-8.11)	(-5.91)
PERFOR×CONS		-1.173		1.176*	-0.534	-0.120
		(-1.24)		(1.72)	(-1.52)	(-0.94)
SIZE	0.331***	0.314***	0.027***	0.019***	0.337***	0.008
	（34.89）	（32.35）	(4.18)	(3.00)	(34.87)	(1.41)
LEV	-0.286***	-0.128***	-0.046*	0.013	-0.282***	-0.005
	(-7.06)	(-2.96)	(-1.73)	(0.47)	(-6.57)	(-0.20)
BTM	0.047***	0.035***	0.008	0.004	0.062***	0.002
	（5.03）	（3.71）	(1.45)	(0.73)	(6.56)	(0.33)
FISRT	-0.004***	-0.005***	0.001	0.000	-0.005***	0.001*
	(-7.90)	(-8.67)	(1.5)	(1.2)	(-8.02)	(1.85)
DMH	0.036**	0.035**	0.000	0.001	0.039**	0.010
	（2.04）	（2.03）	(-0.01)	(0.05)	(2.24)	(0.91)
MH	0.637***	0.571***	-0.030	-0.055	0.612***	0.024
	（5.30）	（4.79）	(-0.31)	(-0.57)	(5.07)	(0.33)
NATURE	-0.052**	-0.041**	-0.011	-0.007	-0.040*	0.006
	(-2.52)	(-2.00)	(-0.80)	(-0.5)	(-1.93)	(0.51)
SEPER	0.003***	0.003***	0.000	0.000	0.003***	0.000
	（2.91）	（2.76）	(0.21)	(0.08)	(3.03)	(0.31)
LP	-0.096***	-0.095***	0.002	0.003	-0.099***	0.013
	(-5.36)	(-5.36)	(0.14)	(0.27)	(-5.53)	(1.26)
BH	0.122***	0.137***	-0.012	-0.005	0.135***	-0.009
	（4.18）	（4.71）	(-0.63)	(-0.28)	(4.57)	(-0.52)
DUAL	0.054**	0.056**	0.034**	0.034**	0.055**	0.024*
	（2.44）	（2.54）	(2.23)	(2.22)	(2.46)	(1.81)
BOARD	0.026***	0.024***	-0.005	-0.005*	0.024***	0.000
	（5.48）	（5.12）	(-1.57)	(-1.71)	(5.13)	(0.17)
IBOARD	0.282*	0.299*	0.016	0.023	0.278*	0.058
	（1.80）	(1.93)	(0.15)	(0.22)	(1.77)	(0.62)
AGE	0.009***	0.010***	-0.002	-0.002	0.010***	-0.006***
	（3.27）	(3.64)	(-1.18)	(-0.98)	(3.43)	(-3.28)
GENDER	0.154*	0.135***	0.003	-0.004	0.099	0.041
	（1.80）	（1.59）	(0.06)	(-0.06)	(1.15)	(0.81)
TENURE	0.075***	0.074***	-0.006	-0.007	0.075***	-0.021
	（9.15）	（9.08）	(-1.02)	(-1.23)	(9.17)	(-4.35)
EDU	0.153***	0.158**	-0.005	-0.004	0.162***	-0.009
	（10.86）	（11.26）	(-0.58)	(-0.46)	(11.39)	(-1.07)
COMPETE	0.209***	0.176***	0.026	0.012	0.191***	0.002
	（5.05）	（4.26）	(0.93)	(0.42)	(4.57)	(0.07)
LAW	-0.177**	-0.162***	0.026	0.029	-0.165**	0.062
	(-2.49)	(-2.30)	(0.52)	(0.59)	(-2.30)	(1.48)
EAST	0.178 ***	0.175***	-0.031	-0.030	0.189***	-0.022
	（6.49）	（6.42）	(-1.60)	(-1.57)	(6.86)	(-1.34)
CENT	-0.109***	-0.116***	0.023	0.021	-0.101***	0.022
	(-3.39)	(-3.64)	(1.03)	(0.94)	(-3.12)	(1.12)
WEST	-0.120***	-0.123***	0.021	0.02165	-0.108***	0.015
	(-3.75)	(-3.87)	(0.97)	(0.99)	(-3.34)	(0.79)

INDUS/YEAR	Yes	Yes	Yes	Yes	Yes	Yes
N	6747	6747	5214	5214	6733	6653
F	119.75	118.77	3.33	3.96	112.32	4.39
Adj. Rsq.	46.81%	47.58%	2.18%	2.87%	46.23%	2.58%

All variables are defined in Table 1.　***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.

Table 6: Further Tests

Variables	Model 1 Pre-reform (2004-2006)	Model 2 Post-reform (2007-2012)	Model 3 Performance Good	Model 4 Performance Bad	Model 5 Information asymmetry High	Model 6 Information asymmetry Low	Model 7 Listed board Mainboard	Model 8 Listed board Non-mainboard	Model 9 Marketization High	Model 10 Marketization Low
Intercept	-0.108	-0.135	-0.215	-0.317	-0.250	-0.212	-0.161	-0.086	-0.343	-0.190
	（-0.31）	（0.70）	(-0.88)	（-1.35）	（-0.85）	（-0.92）	（-0.59）	（0.62）	(-1.54)	（-0.73）
ΔTRUE_ROA	0.239**	0.161***	0.159**	-0.032	0.111	0.226***	0.238***	0.354***	0.170**	0.180**
	（2.34）	（2.86）	(2.07)	（-0.43）	（1.44）	（3.47）	（2.94）	（6.07）	（2.55）	（2.51）
CONS	-0.581***	-0.593***	-0.466***	0.478***	-0.595***	-0.547***	-0.557***	-0.518***	-0.617***	-0.581***
	（-2.60）	（-5.35）	(-2.92)	（-3.27）	（-3.94）	（-4.00）	（-3.53）	（-4.50）	(-4.29)	(-4.12)
ΔTRUE_ROA ×CONS	-0.444	1.576**	0.667	1.782*	2.417**	0.436	2.888***	1.056	2.225**	0.464
	（-0.28）	（2.09）	(0.62)	（1.71）	（2.35）	（0.45）	（2.68）	（1.32）	（2.27）	（0.48）
CONTROLS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
INDUS/YEAR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1481	3733	2517	2697	1869	3345	1753	3723	2465	2749
F	1.69	3.50	2.10	2.31	2.51	2.47	2.68	3.01	2.15	2.41
Adj. Rsq.	2.04%	3.18%	2.22%	2.46%	4.03%	2.23%	4.32%	2.48%	2.24%	2.45%

Note: All variables are defined in Table 1. ***, **, and * represent significance at the 1%, 5%, and 10% level