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The relations among accounting conservatism, institutional investors and earnings manipulation ☆

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ABSTRACT

Most scholars have indicated corporations using accounting conservatism to reduce earnings manipulation, although certain scholars believe that firms have more incentive to increase earnings manipulation. Institutional investors play an important external monitoring role, and affect firm's earnings manipulation. Previous studies adopted accruals as an earnings manipulation proxy to detect the relationship among accounting conservatism, institutional investor shareholdings, and earnings manipulation. We further investigate the relationship among accounting conservatism, institutional investor shareholdings, and earnings manipulation by using Benford's law. Our results indicate that firms with more conservative financial reporting have less probability of engaging in earnings-manipulative activities. We also find the negative association between earnings management and institutional investor shareholdings. However, if corporate financial statements tend toward conservatism, institutional investor shareholdings could increase managers' incentive to manage earnings. Our findings have important implications for investors to make investment decisions.

1. Introduction

Earnings management increases outsider uncertainty and potentially leads to information asymmetries among firm managers, resulting in decreasing investment efficiency. In prior studies, accounting conservatism was shown to reduce the adverse effects of existing information asymmetry between outside investors and managers by restricting managerial accounting manipulation (LaFond and Watts, 2008). Accounting conservatism is a measure to limit the amount of financial statement risk. This study introduced a measure to examine the association between accounting conservatism and earnings management, and determine whether accounting conservatism reduces earnings management in the enterprise.

Numerous studies have examined the relationship between accounting conservatism and earnings manipulation. Certain scholars have provided evidence of the negative association between accounting conservatism and earnings management; however, others argue that the relation is positive. Managers also have the opportunity to misappropriate enterprise assets. Numerous factors have directly and indirectly affected the serious financial distress of recent years, resulting from a combination of complex factors, including real estate bubbles that have burst, fiscal policy selections related to government expenses and revenues, and methods enterprises used to report earnings numbers.

Outsiders doubt the reliability and neutrality of financial statements. Famous companies in the United States such as Enron, Fannie Mae and Freddie Mac, WorldCom, Arthur Andersen, and Lehman Brothers have incurred serious financial distress, in addition to the European debt crisis and the burst of Japan's stock and real estate bubble in the 1990s. The bubble burst and the subsequent collapse, which has lasted more than a decade, is known as “the lost decade.” Because of the financial crisis in Europe caused by crushing debt and bank distress, countries such as Spain, Greece, and Ireland face continuing recessions.

Companies under financial distress are likely to take different measures to relieve the stress, including window-dressing financial statements, in which managers select business accounting methods and attempt to engage in earnings manipulation to mislead outsiders regarding financial statements (Xiong, 2006). Kury (2010) argued that agents are more likely to engage in enterprise decisions or management compared with outsiders. Consequently, receiving more enterprise information could result in agency problems. Managers have incentives to enable smooth earnings growth or particularly notice publicly reported earnings, and adopt improper means for manipulating earnings and window-dressing financial statements because of personal benefit. Ewert and Wagenhofer (2011) concluded that managers

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manipulate earnings to increase short-term company market values and manipulate earnings to promote stock prices to meet analyst expectations or to maintain stock prices during financial distress.

Managers typically exaggerate profits or underestimate debts to window dress firm financial statements; thus, investors may invest in those distressed firms unwittingly, resulting in significant losses. Financial reporting reliability has recently become a severe problem. From a prior study, Ball and Shivakumar (2005) showed that accounting conservatism can be used to reduce opportunist motives for managers when disclosing optimistic results. Consequently, we explore the relation between accounting conservatism and earnings manipulation.

Institutional investor shareholdings affect the earnings manipulation in firms and involve holding or investing money in firms such as insurance firms, pension funds, and banks. Roychowdhury and Watts (2007), Farooq and Jai (2012), and Pound (1988) proposed that institutional investors have greater expertise and can monitor management at a lower cost than individual shareholders, which may reduce the level of earnings management. Accordingly, financial distress motivates us to explore the relation between accounting conservatism, institutional investor shareholdings, and earnings manipulation. Foreign and domestic scholars have recently identified data sets that follow Benford's law to detect fraudulent data. Benford's law is a regulation that demonstrates that the expected distribution of naturally occurring numbers is skewed toward one for the first digit (zero cannot be a first digit) and zero for the second digit. Durtschi et al. (2004) argued that Benford's law provides a useful tool for auditors. Because digit analysis based on Benford's law does not use amounts, all digits can be used in particular accounts. After developing its use in the financial area, several empirical studies have mentioned that it can investigate window-dressing behavior among firms (Nigrini, 2001).

Prior studies between accounting conservatism, institutional investor shareholdings, and earnings manipulation have adopted accruals as a proxy of earnings manipulation. Whether higher accounting conservatism limits earnings manipulation opportunities is important to know. This study used Benford's law to investigate the earnings management of net income numbers reported by publicly listed Taiwanese firms adopting a high degree of conservatism. Benford's law is the empirical observation that digits 1 to 9 are not equally likely to appear at digit in numbers; Benford's law has been proven to be effective in find outing unnaturally-behaving dada. Manipulated numbers usually do not follow Benford's law. This law is more scientific than other ways because of using real data sets. Such as Vocht and Kromhout (2012) thought that Benford's law is a straightforward and easy to implement analytical tool to evaluate the quality of data sets.

Accounting conservatism has two important characteristics. First, accounting conservatism is the consequence of the asymmetric verifiability requirements for recognizing profits and losses in firm financial statements. Second, assets are understated because of systematic conservative statement assets (Givoly et al., 2007; Roychowdhury and Watts, 2007). Therefore, accounting conservatism refers to a manager's tendency to require a higher degree of verification for recognizing assets than debts in financial statements. Recent studies have noted that accounting management reflects economic losses in a timelier manner than do profits that reduce earnings manipulation (LaFond and Watts, 2008; Watts, 2003).

We investigated the relation between accounting conservatism, institutional investor shareholdings, and earnings manipulation. In the context of higher accounting conservatism, we further explore the relation between investor shareholdings and earnings manipulation. Most scholars have indicated that firms could use accounting conservatism to reduce earnings manipulation; however, certain scholars believe that firms have more incentive to increase earnings manipulation. Consequently, investigating the relationship between accounting conservatism and earnings management is important to provide evidence concerning the ability of accounting conservatism to limit the manipulative earnings behaviors of managers. We argued that institutional investors have strong incentives to monitor managers by reducing their opportunistic manipulation of earnings, and could impose pressure on managers, who are likely to manage earnings toward market expectations.

However, certain scholars have provided evidence that investigating the positive relationship between institutional investor shareholdings and earnings management is also important among firms. Benford's law has been promoted as a tool for the auditor to easily and effectively detect fraud (Durtschi et al., 2004). Consequently, we investigated the relationship between accounting conservatism, institutional investor shareholdings, and earnings manipulation using Benford's law to explore whether financial reporting complies with Benford's law at different levels of accounting conservatism and institutional investor shareholdings. Companies adopting lower accounting conservatism recognize that revenue could contain financial statement risk, which exposes investors to risk. Therefore, we assist investors in analyzing financial statements for decision-making. To assist investors in obtaining knowledge regarding the influence of accounting conservatism on earnings manipulation, this study explores the relation between investor shareholdings and earnings manipulation. Firm managers with lower institutional investor shareholdings and defective external monitoring mechanisms have more incentive to manipulate earnings. Therefore, this study assisted investors in knowing the influence of institutional investor shareholdings on earnings manipulation.

The main purpose of this study has two aspects. First, Benford's law has been widely employed in the finance field. Scholars have agreed that Benford's law is applicable to accounting audits and when examining whether enterprises manage earnings. In recent studies, numerous scholars have employed Benford's law to investigate earnings management in enterprises. In addition, scholars have varying opinions on the relationship between accounting conservatism and earnings management. Therefore, we used Benford's law to explore the relationship between accounting conservatism and earnings management; that is, whether data deviating from Benford's law is enhanced in enterprises adopting low accounting conservatism than enterprises demonstrating high accounting conservatism. Second, compared to typical investors, institutional investors possess abundant financial resources and expertise in investing and financing. Thus, numerous scholars have conducted research to explore the relationship between institutional ownership and earnings management. Velury and Jenkins (2006) asserted that institutional ownership is positively correlated with the information quality of corporate financial reports. However, when institutional ownership exceeds a certain proportion, this factor begins to negatively affect the information quality of corporate financial reports. Unlike earlier studies, we used quartiles to distinguish the various levels of accounting conservatism and then used the median to distinguish the different levels of institutional ownership. Therefore, we examined the influence that the interaction between accounting conservatism and institutional ownership has on earnings management. Benford's law was employed to analyze whether the financial data of enterprises deviated from Benford's law when enterprises exhibited various levels of accounting conservatism and different proportions of institutional ownership.

This paper made three contributions to the literature. First, most relevant studies have explored the relationship between accounting conservatism and earnings management or the relationship between institutional ownership and earnings management by using accruals or actual earnings-management models, respectively. Recently, a growing number of scholars have been adopting Benford's law when assessing whether enterprises managed earnings. For example, Guan et al. (2006) collected 182,278 positive quarterly earnings and 103,470 negative quarterly earnings from U.S. listed companies between 1993 and 2003 as the study sample and analyzed them according to Benford's law. Benford's law has not been used by previous studies for assessing the relationship between accounting conservatism and earnings management or for assessing institutional

ownership and earnings management. Therefore, this study applied Benford's law to analyze actual financial report data and assess corporate earnings management. By analyzing each digit in the data, this study examined whether the digits deviated from the Benford's law distribution to detect earnings management.

Second, this study divided accounting conservatism into various levels based on the model established by Khan and Watts (2009). Benford's law has been adopted in previous studies to examine the influence that institutional ownership ratios has on earnings management. This study applied Benford's law differently in that this study further explored the influence that the interaction of accounting conservatism and institutional ownership has on earnings management.

Finally, this study used Benford's law to explore the relationship between accounting conservatism and earnings management. In companies demonstrating low accounting conservatism, financial statement writers are optimistic in recognizing profits and losses. However, when financial statements are being generated, high uncertainty exists regarding the company operating environment and economic conditions. Potential risk is frequently concealed by optimistic recognition, which exposes external users of financial reports to risk. By providing investors with information regarding the influence of accounting conservatism on earnings management, this paper serves as a reference for investors in analyzing financial reports and making vital decisions. In addition, this study further explored the relationship between institutional ownership and earnings management. In companies exhibiting low institutional ownership, the external supervision mechanism tends to be inadequate, which motivates managers to maximize personal profit by manipulating earnings data. This results in the phenomenon that financial reports cannot truly represent the company state of operation, causing investors to make uninformed decisions. Therefore, this study was conducted to assist investors in understanding the influence that institutional ownership has on earnings management.

2. Literature review

2.1. Accounting conservatism

Accounting conservatism is the asymmetric verification threshold for gains versus losses: the verification threshold for gains is higher (Basu, 1997). It is also referred to as prudence because it tends toward prudent reactions to the future. LaFond and Watts (2008) provide evidence consistent with conservatism being an equilibrium response to agency problems arising from asymmetric information between informed and uninformed investors. Ball et al. (2008) find that the demand of accounting conservatism is due to debt markets using cross-country data. Watts (2003) argued that accounting conservatism involves the differential verifiability required for recognizing losses versus gains. Its extreme form is the traditional accounting conservatism aphorism of “anticipate no gain, but anticipate all losses.” Chen et al. (2012) investigated the relationship between accounting conservatism and salary contracts for 2007–2020 China-listed companies. They found that improved accounting conservatism increases the sensitivity of managers' salary to return on accounting and is correlated to the market performance of the stock price. Hamdan et al. (2011) studied a sample comprising 225 listed companies on the KSE using the Basu (1997) model and the book-to-market approach to examine accounting conservatism in those sample companies. They concluded that public sector regulations of accounting standards in companies present a reasonable level of accounting conservatism. The financial statements of small companies were more conservative, and companies with lower debts were more conservative than those of higher ones.

Recent studies have predicted that accounting conservatism imposes limits on earnings management. To the extent that higher conservatism reduces earnings management, we expect a negative relationship between accounting conservatism and earnings management.

2.2. Information asymmetry and agency theory

Agency problems between managers and shareholders essentially arise from the separation of ownership and control, that is, when the identity of managers is distinct from that of shareholders (Jensen and Meckling, 1976). Hazarika et al. (2012) provided evidence that managers have incentives to distort their firms' reported financial performance to increase their compensation and gains through stock sales. Tate et al. (2010) reported that when the goals between agents and owners are inconsistent, certain agents attempt to conceal information asymmetries. The accounting conservatism literature focuses on asymmetric accounting response to good and bad news. Agency problems are caused by interest divergences between shareholders and managers. A more uncertain operation environment indicates a greater likelihood that managers have private information, resulting in asymmetric verifiability. Conservatism reduces manager incentive to manage accounting numbers, and thus, reduces information asymmetry.

2.3. Earnings management

The topic of earnings management has grown to be a concern throughout the world (Islam et al., 2011). Earnings management occurs when managers use judgment in financial reporting in structuring transactions to alter financial reports, to either mislead some stakeholders about the underlying economic performance of the economy, or to influence contractual outcomes that depend on reported accounting numbers (Healy and Wahlen, 1999). Scott (2009) states that earnings management is the choice of accounting policies, or actions affecting earnings, made so as to achieve specific managerial objectives. Watts and Zimmerman (1990) find that earnings management occurs when managers implement their discretion over the accounting numbers with or without restrictions, and that such activities can be either firm value maximizing or opportunistic.

Jorissen and Otley (2010) find that financial misrepresentation is broader than just earnings management and include the management of balance sheet numbers and disclosure management with other issues.

Dyreng et al. (2012) researched a sample of 2133 U.S. multinational firms from 1994–2009, showing that companies with foreign employments have more external earnings manipulation than do companies with subsidiaries in a country where the rule of law is strong. Ascioglu et al. (2012) investigated a sample of NYSE firms from 1996 to 2001 and found that earnings management improved the degree of information asymmetries between insiders and outsiders. They also found an association between greater earnings management and lower market liquidity.

Chekili (2012) examined 20 anonymous listed Tunisian firms from 2000 to 2009, and explored the effect of certain governance mechanisms on earnings management. The result demonstrated that the board size, the presence of exterior directors within the board, and the existence of a CEO have a strong effect on earnings manipulation. Hazarika et al. (2012) examined whether managers with earnings manipulation increase the risk of losing their jobs. The result indicated that boards tend to punish managers who manipulate earnings aggressively before their management leads to costly external consequences. Managers have more incentive to manage earnings when companies are earning small profits or suffer an unexpected loss, misleading investors regarding the true firm value.

2.4. Accounting conservatism and earnings management

Managers compiling financial statements should use more conservative measures. Because of the recent numerous listed companies in the

financial crisis, auditors may require managers to use more conservative measures to compile financial statements. Certain scholars have argued that accounting conservatism has a negative association with earnings management. Lara et al. (2012) used discretionary accruals to measure earnings management. They examined a large U.S. sample for the 1991–2010 period and found that more conservative firms have less probability of engaging in earnings management. Suzan et al. (2012) examined the conservatism level in accounting policies using a sample of 259 Jordanian manufacturing companies from 2006 to 2009, and researched its effect on earnings management. The results showed that conservatism and size are negatively related to earnings manipulation; however, performance is positively related to earnings manipulation. Therefore, managers using more conservative measures to compile financial statements reduce the degree of earnings management.

Certain scholars have reported the positive association between accounting conservatism and earnings management. Kwon et al. (2006) examined the systematic differences in the level of accounting conservatism between high-tech and low-tech firms. The result showed that a higher level of accounting conservatism in high-tech firms, and more conservative high-tech firms have a greater probability of engaging in downward earnings management than do less conservative high-tech firms. Lobo et al. (2008) found that conservative financial statements have more earnings management.

In prior studies, scholars have supported accounting conservatism, which can be used to reduce earnings management behaviors in enterprises. The basic theory of accounting conservatism is recognizing losses beforehand, but recognizing profits afterward. Managers use accounting conservatism in compiling financial statements, which could possess contained risks.

2.5. Institution investor and earnings management

Institutional investors have begun to play more important roles in corporate governance. Pound (1988) explored the relationship between investors and earnings management, and presented three alternative hypotheses: the efficient monitoring hypothesis, the strategic alignment hypothesis, and the conflict of interest hypothesis. The efficient monitoring hypothesis claims that institutional investors have greater expertise and can monitor management at a lower cost than individual shareholders, which could efficiently restrain managers' earnings management behavior. The strategic alignment hypothesis claims that institutional investors might cooperate with managers at stockholder expense, and managers have the incentive to manipulate earnings management. The conflict of interest hypothesis claims that institutional investors vote to have their shares pass through plans that are personally advantageous to their personal interests, increasing managers' earnings management behavior.

Roychowdhury and Watts (2007) advocated that high institutional investor shareholdings could reduce firm's earnings manipulation. Farooq and Jai (2012) provided evidence that companies with local or foreign institutions as the largest shareholders engage in significantly lower earnings manipulation than do other companies. In contrast, certain scholars have argued that institutional investors with higher shareholdings are associated with higher earnings management. Salehi et al. (2011) indicated that institutional investors are regarded as insider investors in firms, and showed the negative relationship between institutional investor concentration and corporate value. Therefore, institutional investor concentration reduces company value (the conflict of interest hypothesis). Although institutional investors who monitor management improve company value (the efficient monitoring hypothesis), shareholdings must reach a certain particular level. When institutional investor shareholdings exceed particular levels, managers may accept suboptimal investment decisions that are harmful to companies.

We believe that in existing corporate governance, institutional investors who have greater expertise and professional teams can monitor managers' operating situation. We therefore use the efficient monitoring hypothesis to explain the relation between institutional investor shareholdings and earnings management.

2.6. Benford's law

Benford's law is also called the digit law, named after Frank Benford, who in 1938 published the law in numerous number sets (e.g., atomic and molecular masses, physical constants, country locations, and river lengths). Thus, digit 1 should appear as the first significant digit of approximately 30.1% times, digit 2 is approximately 17.6% times, and similarly 9 should appear at approximately 4.6% times. Lin et al. (2009) investigated the effect of earnings management on non-mandatory information disclosure in Taiwan; the result indicated that zero and five in the second place of earnings numbers are the important reference points of enterprises' earnings management behavior. Guan et al. (2008) explored the annual second digit of net incomes of both active and inactive firms listed on the NYSE, the American Stock Exchange (ASE), and NASDAQ from 1950 through 2005. The result showed that administrative authority may rise or carry numbers to attract investor attention. Durtschi et al. (2004) argued that Benford's law has been promoted as an auditor tool that is easy and effective for detecting fraud, and the result showed a most effective use of digital analysis based on Benford's law. Henselmann et al. (2012) showed that Benford's law is applicable to the aggregated data of single-company annual reports, and is a useful tool in assisting investors in risk valuation within their decision-making process. Lin and Hsieh (2012) found that window dressing is a significant practice among marine firms. However, the level of window dressing among companies in the marine industry is less severe than that in companies of the entire economy.

This study used an alternative proxy for measuring earnings management. Earnings management, by its nature, is not observable to outside researchers, or even the companies' auditors. Researchers use proxies to measure the extent of earnings management under some rough assumptions, which apparently would likely draw criticisms. The most often used proxy is the accrual models of various kinds. The hypotheses of this paper have been tested using the U.S. data largely based on those accrual models. It should be noted that inferences drawn under such research design are a joint test of both incentives to manage earnings and the construct validity of the accrual model used to estimate managers' accounting discretion. Early criticism of the accrual models used to measure earnings management was expressed by Beneish (1997) and Thomas and Zhang (2000). Both studies concluded that the accrual models are of low power in detecting earnings management.

On the other hand, examining the distribution of digits in earnings numbers to identify earnings management has a number of appealing features. For example, the researchers do not have to estimate the potentially noisy abnormal accruals (Healy and Wahlen, 1999). Another appealing feature is that the researchers can identify a large set of potential earnings manipulators without invoking specific assumptions about earnings management motivation or methods (Burgstahler and Dichev, 1997).

Based on the above description, this study chooses to examine the distribution of digits in earnings numbers instead of using accrual models.

3. Methodology

3.1. Hypothesis development

Prior studies have examined the association between conservatism and earnings management and concur that a company adopting a

high degree of conservatism has less likelihood of engaging in earnings management. Lara et al. (2012) found a negative association between conservatism and accrual manipulation measures. Other studies have also indicated that a company has a greater likelihood of engaging in earnings management when it adopts a high degree of conservatism. Scholar opinions differ on the association between conservatism and earnings management. We thus examine the association between conservatism and earnings management. Previous studies on the association between accounting conservatism and earnings manipulation typically adopt accruals as an earnings manipulation proxy. Therefore, we investigate whether a company exhibits earnings management behavior using Benford's law and analyze actual earnings numbers offered by the income statement to determine whether the company exhibits earnings management behavior in financial statements. This study differentiate the level of C_Score from 1991 to 2012 using the quartile, and we analyze whether the frequencies of first, second, third, and fourth digits in net income of firms with high or low C_Score diverge from Benford's law. We think that managers adopting a degree of high conservatism on financial statements should account for operating risk and elevate financial statement reliability, conforming earnings numbers to Benford's law. This study is consistent with most scholar opinions. Therefore, we propose the following hypothesis:

Hypothesis 1. Firms that adopt a high degree of conservatism which net incomes from first digit to fourth digit obey Benford's law.

The alternative hypothesis posits that institutional investor shareholdings are larger than those for individual investors. Institutional investors possess more professional information and resources compared to individual investors, and are more motivated than other investors to play major roles in limiting manager earnings management behavior. Most previous studies support that higher institutional investor shareholdings efficiently reduce manager earnings management behavior. Chung et al. (2002) found that large institutional shareholdings inhibit managers from reducing or increasing reported profits toward managers' desired profit range. Therefore, in examining the association between institutional investor shareholdings and earnings management, we infer that institutional investors that own more firm shares have less probability of engaging in earnings management. We differentiate the level of company conservatism using the quartile before differentiating the level of institutional investor shareholdings by the median. Unlike previous studies, we examined the influence that the interaction between accounting conservatism and institutional ownership has on earnings management. Benford's law was employed to analyze, when accounting conservatism was high, whether the first to the fourth digits of the after-tax net income in the financial reports conformed to the Benford law probability distribution of varying institutional ownership ratios. We based the second hypothesis on this reasoning.

Hypothesis 2.

- **H2a** If firms report low conservatism and have a low proportion of institutional investor shareholdings which first digit in net incomes diverge from Benford's law.
- **H2b** If firms report low conservatism and have a low proportion of institutional investor shareholdings, second digit in net incomes diverge from Benford's law.
- **H2c** If firms report low conservatism and have a low proportion of institutional investor shareholdings, third digit in net incomes diverge from Benford's law.
- **H2d** If firms report low conservatism and have a low proportion of institutional investor shareholdings, fourth digit in net incomes diverge from Benford's law.

3.2. Research approach

3.2.1. Benford's law

First we introduce Benford's law following mathematical equation and logarithmic distribution. According to Eq. (1), P(d) is the probability of first digit (d_1) and second digit (d_2)

$$p(d_1) = \log_{10}\left(1+\frac{1}{d_1}\right) \quad d_1 = 1,2,3\ldots9 \tag{1}$$

$$p(d_2) = \sum_{k=1}^{9}\left(1+\frac{1}{10k+d_2}\right)P(d_2) \quad d_2 = 1,2,3\ldots,9. \tag{2}$$

Hill (1995) derived the joint distribution of the digits (from first digit to higher order digit)

$$p\{d_1,\ldots,d_k\} = \log_{10}\left(1+\left(\sum_{i=1}^{k} d_i 10^{k-j}\right)^{-1}\right) \quad d_1 = 1,2,3\ldots9 \quad d_i = 0,1,2\ldots9 \quad j = 1,2,3\ldots k. \tag{3}$$

Prior literatures examined whether the financial data obey Benford's law or not by Chi-square test and Z-statistic test, therefore this study examined publicly listed company in Taiwan whether net income obey Benford's law or not.

3.2.2. Chi-square test

Several statistical tests can be applied to examine whether the distribution of the financial data conforms to Benford's law, such as Chi-square test shows comparison of the expected distribution over all digits with the observed distribution in company's data set.

Higher Chi-square value represents financial data that may diverge from Benford's law. Chi-square tests is a comparison between $nP_e(d_i)$ and $nP_0(d_i)\cdot(nP_e(d_i)$: the value of each digit (d_i) observed in the study (P_e: frequency of digits observed in the study) $nP_0(d_i)$: the expected value (P_0: expected frequency) n: sum of digits

$$X = \sum_{i=1}^{9}\frac{[nP_0(d_i)-nP_e(d_i)]^2}{nP_0(d_i)} \text{ first digit} \tag{4}$$

$$X = \sum_{i=0}^{9}\frac{[nP_0(d_i)-nP_e(d_i)]^2}{nP_0(d_i)} \text{ other digit.} \tag{5}$$

Under the condition of obeying Benford's law, test statistic X is Chi-square distribution of degree of freedom = m − 1 (m: first digit could range from 1to 9, so m = 9, second digit could range from 0 to 9, so m = 10).

3.2.3. Z-statistic test

Z-statistic test is examining the significance of the divergence of the frequency from 0 to 9.

$$Z = \frac{|P_0-P_e|-\frac{1}{2n}}{\sqrt{\frac{P_0(1-P_0)}{n}}} \tag{6}$$

P_0	the observed proportion
P_e	the expected proportion based on Benford's law
n	the number of observations
1/2n	continuity correction factor, if $\lvert Pe - P_0\rvert > 1/2n$, the continuity normal distribution approximates the discrete binomial distribution, variables can be used in standard normal intervals $(1-\alpha/2)$. The critical values for the Z-statistics are a value of 2.57 for a 1% significance level.

First, this study uses Chi-square test to examine that all digits in financial statement obey Benford's law. If Chi-square value was rejected, it represents that the whole entity does not obey Benford's law. Then, we use Z-statistic test to examine the significance of the divergence of the frequency for each digit (from zero to nine), whether a single digit occurs less often or more often than it is expected according to Benford's law.

3.3. Variables measure

3.3.1. Accounting conservatism measure approach

Basu (1997) argued that accounting conservatism has higher verification in recognizing good news than bad news or losses. Beaver and Ryan (2000) defined conservatism as a book-to-market ratio between bias and lags.

Beaver and Ryan (2005) differentiated between conditional and unconditional conservatism. Under conditional conservatism, book value is written under sufficiently adverse circumstances, whereas unconditional conservatism affects the asymmetric response of earnings to positive and negative share returns. Basu (1997) indicated that asymmetric timeliness of earnings measure cannot be estimated for firm samples. Therefore, we refer to Khan and Watts (2009) to provide evidence on estimating a firm-year measure of financial reporting conservatism.

(a) C-Score measure approach (Basu, 1997)

$$\frac{EPS_{i,t}}{P_{i,t-1}} = \beta_0 + \beta_1 D_{i,t} + \beta_2 R_{i,t} + \beta_3 D_{i,t} R_{i,t} + \varepsilon \tag{7}$$

where $EPS_{i,t}$ is earnings per share of company i, $P_{i,t-1}$ is the beginning of the period stock price, $R_{i,t}$ is the stock returns of company i, and D_t is a dummy variable equal to 1 when $R<0$ and $R=0$; otherwise, β_2 is the good news timeliness measurement, $\beta_2+\beta_3$ is total bad news timeliness, β_3 is the timeliness measure for bad news over good news, or conservatism, $\beta_3>0$ is conservatism, and ε is the residual.

Basu (1997) cannot be estimated for firm samples, and to estimate conservatism at the firm–year level, Khan and Watts (2009) developed the Basu (1997) model to estimate the annual good news timeliness (G_Score) and the annual bad news timeliness (C_Score).

$$\begin{aligned}\frac{EPS_{i,t}}{P_{i,t-1}} &= \beta_{0,t} + \beta_{1,t} D_{i,t} + \left(\mu_{0,t} + \mu_{1,t} size_{i,t} + \mu_{2,t} MB_{i,t} + \mu_{3,t} leverage_{i,t}\right) R_{i,t} \\ &+ D_{i,t} R_{i,t} \left(\lambda_{0,t} + \lambda_{1,t} size_{i,t} + \lambda_{2,t} MB_{i,t} + \lambda_{3,t} leverage_{i,t}\right) + \delta_{1,t} size_{i,t} \\ &+ \delta_{2,t} MB_{i,t} + \delta_{3,t} leverage_{i,t} + \delta_{4,t} D_{i,t} size_{i,t} \\ &+ \delta_{5,t} D_{i,t} MB_{i,t} + \delta_{6,t} D_{i,t} leverage_{i,t} + \varepsilon_{i,t}\end{aligned} \tag{8}$$

where $EPS_{i,t}$ is the earnings per share of company i, $P_{i,t-1}$ is the beginning of period stock price, $R_{i,t}$ is the stock returns of company i, and D_t is a dummy variable equal to 1 when $R<0$ and $R=0$; otherwise, R_t is fiscal year return.

Size is log (market value of equity), leverage is debts/market value of equity, and MB is market value of equity/book value. Eqs. (9) and (10) are firm–year measures of the C-Score and G-Score, respectively.

$$C_{Score\,i,t} = \beta_3 = \hat{\lambda}_{0,t} + \hat{\lambda}_{2,t} MB_{i,t} + \hat{\lambda}_{3,t} leverage_{i,t} \tag{9}$$

$$G_{Score\,i,t} = \beta_2 = \hat{\mu}_{1,t} + \hat{\mu}_{2,t} MB_{i,t} + \hat{\mu}_{3,t} leverage_{i,t}. \tag{10}$$

Lai and Taylor (2008) proved the C-Score to be an effective accounting conservatism measurement by Australia data. Therefore, the C-Score can be used to explore whether managers in a company adopt a high degree of conservatism lower earnings manipulation. We first differentiate the level of company conservatism by using the quartile. We then examine whether more conservative firms with certain digits in the income numbers conform to Benford's law. We argue that accounting conservatism can correct excessive optimistic reports and increase account information reliability as a mechanism to protect investors, creditors, and so on.

3.3.2. Institutional investor shareholding measure approach

We differentiate the level of company conservatism using the quartile before differentiating the level of institutional investor shareholdings by the median. We investigate the high or low proportion of institutional investor shareholdings to observe whether the firm frequencies of first, second, third, and fourth digits in net income have a significant difference compared with the probability distribution given by Benford's law.

3.4. Sampling and data

Table 1 is the samples of differentiate the level of company's conservatism, and the data set contains all 61,459 observations, from which this study deducts 13,738 observations with negative and missing values, totaling 47,721 observations.

Table 2 is the samples of differentiate the level of institutional investors' shareholdings. The data regarding institutional ownership were collected from the financial database of the *Taiwan Economic Journal*. The data concerned the institutional ownership of listed companies between 1996 and 2012 (17 fiscal years). An institutional ownership ratio of zero and missing values were excluded from the 47,721 total values, yielding an effective sample of 43,214 observed values.

4. Empirical results

This study examines the two hypotheses. The frequency of the first digit to the fourth digit of the net income of each quarter from 1991 to 2012 is compared with the probability distribution given in Benford's law. Tables 3–7 show that in the longitudinal axis, we differentiate individual digits 0–9 of net income values into three groups:0–2, 3–6, and 7–9.

4.1. Test of Hypothesis 1

This study separates conservatism by a quartile, and compares the lowest conservatism ($C\text{-}Score_{it} < Q_1$) companies with the highest conservatism ($Q_3 < C\text{-}Score_{it}$) ones. On the other hand, this study examines whether companies with higher degree of conservatism have fewer earnings manipulation behaviors than companies with lower degree of conservatism. This study focuses on the empirical evidence of companies with a low degree of conservatism. The observations of the first to third digit show that chi-square values are significant, indicating that the first digit to third digit diverge from Benford's law. The chi-square value of the fourth digit is non-significant, indicating that the fourth digit obeys Benford's law. Because certain firms may have emphasized reference points other than the first (left-most) digit, Table 3 also shows the digit distribution in other net income places after taxes.

Table 1
The samples of differentiate the level of company's conservatism.

Net income is positive values.	
Divide into groups	Samples
Lowest conservatism ($C\_Score_{it} < Q_1$)	11,931
Low conservatism ($Q_1 < C\_Score_{it} < Q_2$)	11,930
High conservatism ($Q_2 < C\_Score_{it} < Q_3$)	11,930
Highest conservatism ($Q_3 < C\_Score_{it}$)	11,930
Total	47,721

Table 2
The samples of differentiate the level of institutional investors' shareholdings.

Net income is positive values.	
Divide into groups	Samples
Lowest conservatism ($C\_Score_{it} < Q_1$), low institutional investors' shareholdings	5402
Lowest conservatism ($C\_Score_{it} < Q_1$), high institutional investors' shareholdings	5402
Low conservatism ($Q_1 < C\_Score_{it} < Q_2$), low institutional investors' shareholdings	5404
Low conservatism ($Q_1 < C\_Score_{it} < Q_2$), high institutional investors' shareholdings	5399
High conservatism ($Q_2 < C\_Score_{it} < Q_3$), low institutional investors' shareholdings	5405
High conservatism ($Q_2 < C\_Score_{it} < Q_3$), high institutional investors' shareholdings	5398
Highest conservatism ($Q_3 < C\_Score_{it}$), low institutional investors' shareholdings	5404
Highest conservatism ($Q_3 < C\_Score_{it}$), high institutional investors' shareholdings	5400
Total	43,214

Table 3 shows the distributions of each group (1 to 3) appearing in the first through fourth places of positive net income. The first number in each cell of the table represents the proportion predicted by Benford's law. The second number in each cell of the table represents the deviation rate of the expected proportion based on the difference between the actual and expected proportion of Benford's law. The final number in each cell of the table represents the Z statistic value.

We first examine the digit distribution in the second of net incomes after taxes. Our result shows that the first group proportion (0 to 2) as the second digit, expected to be 34.24% of the sample, is actually higher by 3.74%, showing a systematic lack of the third group (7 to 9). Both deviations are statistically significant. Earnings management is not limited to cases with nine in the second, third, and fourth digits. Certain firms tended to manipulate earnings when these places were filed with eights or even sevens. The earnings management behaviors occasionally did not stop at zero in the place next to the reference point. Ones and twos often served as the stopping point in the third and fourth places of net incomes.

Consistent with our expectations, there are significantly more zeros, ones, and twos, and fewer sevens, eights, and nines. The first group deviation (0 to 2) in the third place (2.63%) also shows a lack in the third group (7 to 9), with a significant deviation, suggesting that earnings management behavior also focuses on the third digit as a reference point. However, companies adopting a high degree of conservatism manipulate earnings in the second place only. Our result shows that the proportion of the first group (0 to 2) as the second digit, expected to be 3.54%, shows a systematic lack in the third group (7 to 9).

Our results confirm our expectation that firms adopting a low degree of conservatism are more likely to engage in earnings management. While firms adopt a low degree of conservatism, in which earnings numbers are not limited to the second digit, management also uses the third digit of earnings. Investors or customers occasionally emphasize the second digit, but it is not intuitive that the third digit is also important. Finally, conservative accounting leads to lower earnings management, which is consistent with the result given by Lara et al. (2012), who found a negative association between conservatism and accrual manipulation measures.

4.2. Test of Hypothesis 2

Hypothesis 2 examines whether firms where institutional investors own more firm shares have less probability of engaging in earnings management. We first look at the empirical evidence of firms reporting less conservatively and with a low proportion of institutional investor shareholdings. Table 4 reports more zeros, ones, and twos than expected in the second and third digits, and fewer sevens, eights, and nines than expected in second and third digits. The proportion of the first group (0 to 2) in the second digit is 5.32% more than expected. The proportion of the third group (7 to 9) in the second digit is 6.85% less than expected. The proportion of the first group (0 to 2) in the third digit is 3.84% more than expected. The proportion of the third group (7 to 9) in the third digit is 6.04% less than expected. Firms that report less conservatively and have a high proportion of institutional investor shareholdings have no tendency to manipulate earnings in the second through the fourth digits of net income. The result confirms our expectations. The degree of window dressing among firms with a high proportion of institutional investor shareholdings is less severe than firms with a low proportion of institutional investor shareholdings. Table 5 reports the same condition; institutional investors in firms adopting a low degree of conservatism and having a high proportion of institutional investors shareholdings effectively reduce earnings management.

The results are consistent with our expectations; institutional investors play an important role in monitoring managers to reduce earnings manipulation, suggesting that institutional investors benefit from

Table 3
Net income (season) lowest conservatism and highest conservatism.

	Lowest conservatism				Highest conservatism			
	First digit	Second digit	Third digit	Fourth digit	First digit	Second digit	Third digit	Fourth digit
First group	47.712	34.239	30.413	30.042	47.712	34.239	30.413	30.042
	−2.943	3.744	2.630	−0.818	−6.993	3.541	0.876	0.049
	3.061[a]	2.941[a]	1.889[b]	0.576	7.287[a]	2.781[a]	0.622	0.024
Second group	36.798	39.469	39.994	40.000	36.798	39.469	39.994	40.000
	2.064	−0.893	1.536	0.830	6.219	−0.770	−1.031	0.082
	1.711[b]	0.778	1.361	0.731	5.173[a]	0.670	0.909	0.062
Third group	15.490	26.292	29.593	29.958	15.490	26.292	29.593	29.958
	4.160	−3.535	−4.779	−0.288	6.767	−3.455	0.493	−0.158
	1.933[b]	2.296[c]	3.374[a]	0.196	3.152[a]	2.244[c]	0.339	0.101
Chi-square	9.999[a]	10.022[a]	11.700[a]	0.598	53.273[a]	9.145[c]	0.869	0.013
Samples	11,931	11,931	11,931	11,921	11,930	11,929	11,907	11,648

Note: The first number each cell of the table represents is the proportion predicted by Benford's law. The second number each cell of the table represents is the deviation rate of expected proportion base on the difference between the actual and expected proportion of Benford's law. The final number each cell of the table represents is Z-statistic value.

[a] Level of significance is 1% ($Z > 2.57$).

[b] Level of significance is 10% ($Z > 1.64$).

[c] Level of significance is 5%.

Table 4
Net income (season) lowest conservatism, low institutional investors' shareholdings and lowest conservatism, high institutional investors' shareholdings.

	Lowest conservatism, low institutional investors' shareholdings				Lowest conservatism, high institutional investors' shareholdings			
	First digit	Second digit	Third digit	Fourth digit	First digit	Second digit	Third digit	Fourth digit
First group	47.712	34.239	30.413	30.042	47.712	34.239	30.413	30.042
	−5.098	5.321	3.840	−1.133	−1.218	2.239	1.953	0.927
	3.566[a]	2.807[a]	1.851[b]	0.531	0.842	1.173	0.934	0.431
Second group	36.798	39.469	39.994	40.000	36.798	39.469	39.994	40.000
	2.021	−0.052	1.552	0.936	1.518	−1.412	1.505	0.667
	1.119	0.017	0.917	0.547	0.837	0.824	0.889	0.386
Third group	15.490	26.292	29.593	29.958	15.490	26.292	29.593	29.958
	10.903	−6.850	−6.044	−0.113	0.147	−0.795	−4.042	−1.820
	3.412[a]	2.992[a]	2.865[a]	0.040	0.027	0.334	1.911[b]	0.860
Chi-square	17.458[a]	11.901[a]	8.782[c]	0.399	0.842	1.442	3.728	0.771
Samples	5402	5402	5402	5397	5402	5402	5402	5399

Note: The first number each cell of the table represents is the proportion predicted by Benford's law. The second number each cell of the table represents is the deviation rate of expected proportion base on the difference between the actual and expected proportion of Benford's law. The final number each cell of the table represents is Z-statistic value.
[a] Level of significance is 1% (Z > 2.57).
[b] Level of significance is 10% (Z > 1.64).
[c] Level of significance is 5%.

effective monitoring of managerial actions, which reduces earnings management. From the valuation perspective, Chung et al. (2002) argued that institutional investors efficiently reduce manager earnings manipulation, which is similar to the efficient monitoring hypothesis by Pound (1988).

Table 6 shows the distribution of each group appearing in the second, third, and fourth place of net incomes. We use Table 6 results to test the hypothesis of this article. We first examine the empirical results of firms reporting high conservatism and having a low proportion of institutional investor shareholdings.

The chi-square values of the second, third, and fourth digits are non-significant, indicating that they comply with Benford's law, and that managers have less motivation to manipulate earnings in the second, third, and fourth digits. However, if firms report high conservatism and have a high proportion of institutional investor shareholdings, the table shows systematically more zeros, ones, and twos in the second place of firm net incomes. The proportion of the first group (0 to 2) as the second digit of the sample, expected to be 34.24%, is actually higher by 5.15%, and reveals a systematic lack of the third group (7 to 9). Both deviations are statistically significant. We observe an abnormally high occurrence of the second digit in the first group (0 to 2) and an abnormally low occurrence of the second digit (3 to 6). Our result indicates more zeros, ones, and twos than expected in the third digit of net incomes, and fewer threes, fours, fives, and sixes than expected in the third digit of net incomes. The proportion of the first group (0 to 2) in the third digit is 5.70% more than expected. The proportion of the second group (3 to 6) in the third digit is 4.24% less than expected.

This result suggests that firms choose more conservative accounting and have a high proportion of institutional investor shareholdings, which tend to manipulate earnings numbers. Table 7 shows the same conditions, in which the degree of earnings management among firms reporting more conservative accounting and a lower proportion of institutional investor shareholdings are less severe than are firms having a high proportion of institutional investor shareholdings. If firms report the highest conservatism and have a low proportion of institutional investor shareholdings, our observations of the first digit show that chi-square value is significant, indicating that the first digit diverges from Benford's law. The chi-square value of the second, third and fourth digits are non-significant, indicating that the second, third and fourth digits obey Benford's law.

If firms report the highest conservatism and have a high proportion of institutional investor shareholdings, our observations of the first and second digits show that chi-square values are significant, indicating that the first and second digits diverge from Benford's law. The chi-square values of the third and fourth digits are non-significant, indicating that the third and fourth digits obey Benford's law. The proportion of the

Table 5
Net income (season) low conservatism, low institutional investors' shareholdings and low conservatism, high institutional investors' shareholdings.

	Low conservatism, low institutional investors' shareholdings				Low conservatism, high institutional investors' shareholdings			
	First digit	Second digit	Third digit	Fourth digit	First digit	Second digit	Third digit	Fourth digit
First group	47.712[a]	34.239	30.413	30.042	47.712	34.239	30.413	30.042
	−0.673[b]	0.850	1.630	2.744	−5.395	−0.463	2.882	3.125
	0.459	0.436	0.777	1.305	3.773[c]	0.231	1.385	1.488
Second group	36.798	39.469	39.994	40.000	36.798	39.469	39.994	40.000
	7.163	0.661	−1.383	−1.595	12.195	0.613	−0.504	−0.910
	4.004[c]	0.378	0.816	0.942	6.823[c]	0.350	0.288	0.531
Third group	15.490	26.292	29.593	29.958	15.490	26.292	29.593	29.958
	−14.942	−2.099	0.193	−0.621	−12.353	−0.317	−2.281	−1.918
	4.684[c]	0.906	0.077	0.284	3.867[c]	0.124	1.071	0.906
Chi-square	29.009[c]	0.853	0.856	1.830	49.803[c]	0.134	2.249	2.351
Samples	5404	5404	5403	5391	5399	5399	5398	5384

Note: The first number each cell of the table represents is the proportion predicted by Benford's law. The second number each cell of the table represents is the deviation rate of expected proportion base on the difference between the actual and expected proportion of Benford's law. The final number each cell of the table represents is Z-statistic value.
[a] Level of significance is 10% (Z > 1.64).
[b] Level of significance is 5%.
[c] Level of significance is 1% (Z > 2.57).

Table 6
Net income (season) high conservatism, low institutional investors' shareholdings and high conservatism, high institutional investors' shareholdings.

	High conservatism, low institutional investors' shareholdings				High conservatism, high institutional investors' shareholding			
	First digit	Second digit	Third digit	Fourth digit	First digit	Second digit	Third digit	Fourth digit
First group	47.712[a]	34.239	30.413	30.042	47.712	34.239	30.413	30.042
	8.925	5.154	2.988	1.930	11.396	6.697	5.703	0.572
	6.254[b]	2.720[b]	1.437	0.912	7.984[b]	3.536[b]	2.755[b]	0.260
Second group	36.798	39.469	39.994	40.000	36.798	39.469	39.994	40.000
	−10.605	−2.405	−0.624	0.289	−12.956	−2.325	−4.238	−2.605
	5.935[b]	1.414	0.360	0.159	7.249[b]	1.365	2.528[c]	1.545
Third group	15.49	26.292	29.593	29.958	15.49	26.292	29.593	29.958
	−2.297	−3.102	−2.228	−2.320	−4.323	−5.231	−0.134	2.904
	0.704	1.347	1.047	1.097	1.341	2.280[c]	0.0487	1.377
Chi-square	43.355[b]	7.517[c]	2.344	1.48	68.355[b]	13.325[b]	9.218[b]	2.869
Samples	5405	5405	5402	5372	5398	5398	5397	5375

Note: The first number each cell of the table represents is the proportion predicted by Benford's law. The second number each cell of the table represents is the deviation rate of expected proportion base on the difference between the actual and expected proportion of Benford's law. The final number each cell of the table represents is Z-statistic value.
[a] Level of significance is 10% (Z > 1.64).
[b] Level of significance is 1% (Z > 2.57).
[c] Level of significance is 5%.

first group (0 to 2) in the second digit is 4.82% more than expected. The proportion of the third group (7 to 9) in the second digit is 4.91% less than expected. The result is similar to Salehi et al. (2011) for the Taiwanese sample, that institutional investor concentration may reduce company value. Our result suggests that institutional investors in companies adopting a high degree of conservatism could use shareholdings to request that corporate managers vote that their shares pass through plans that benefit individual interests at the expense of stockholders.

Our findings indicate that companies adopting a high degree of conservatism engage in significantly less earnings management. However, high institutional investor shareholding resulting in voting that shares pass through suboptimal risky projects that benefit individual interests could increase earnings manipulation in companies. This result is consistent with the conflict of interest hypothesis by Pound (1988) and Salehi et al. (2011), and provides evidence of the negative relationship between institutional investor concentration and corporate value. Bushee (1988) also found that a large proportion of institutional investor ownership could produce a significant trading increase and the possibility that managers reduce R&D to reverse earnings decline.

5. Summary and conclusion

The results indicated that enterprises demonstrating the lowest accounting conservatism were highly motivated to manage enterprise earnings. Both the second and third digits of the after-tax net income deviated from Benford's law. Therefore, in addition to the second digit, the third digit was a vital indicator of enterprise earnings management. These results agreed with the findings of Skuosen et al. (2004), Lin and Su (2011), and Lin et al. (2009). Of the 1871 listed companies in Tokyo's stock market, Skuosen et al. (2004) collected 37,900 data regarding annual earnings from 1974 to 1997 as the study sample. They observed manipulation by rounding up the first digit with the numbers 9, 7, and 8. The study also divided Japanese listed companies into nine categories to analyze the second earnings digits. Their results indicated that manipulation by rounding up frequently occurred for 0 but rarely for 9. The study also observed the 0, 1, 5, 8, and 9 in the second to fourth digits and found that the third and fourth digits were significant indicators of corporate earnings manipulation. Lin and Su (2011) stated that possible manipulation existed regarding Taiwan's net income data that were voluntarily disclosed, and that earnings manipulation occurred not only at the second digits, but also at the third and fourth digits. Lin et al. (2009) found that among Taiwan's listed companies, enterprise non-operating income is typically manipulated at the third and fourth digits.

The empirical results of this study indicated that compared with companies demonstrating the lowest accounting conservatism and high institutional ownership ratios, companies with the lowest accounting conservatism and a low institutional ownership ratio possess

Table 7
Net income (season) highest conservatism, low institutional investors' shareholdings and highest conservatism, low institutional investors' shareholdings.

	Highest conservatism, low institutional investors' shareholdings				Highest conservatism, low institutional investors' shareholdings			
	First digit	Second digit	Third digit	Fourth digit	First digit	Second digit	Third digit	Fourth digit
First group	47.712[a]	34.239	30.413	30.042	47.712	34.239	30.413	30.042
	−7.073	1.769	1.739	0.214	−7.508	4.819	−0.504	0.913
	4.953[b]	0.924	0.829	0.087	5.257[b]	2.541[c]	0.230	0.420
Second group	36.798	39.469	39.994	40.000	36.798	39.469	39.994	40.000
	5.805	−0.136	−2.562	1.319	6.085	−0.907	0.386	−2.055
	3.242[b]	0.067	1.522	0.768	3.398[b]	0.524	0.218	1.205
Third group	15.490	26.292	29.593	29.958	15.490	26.292	29.593	29.958
	7.995	−2.099	1.676	−1.976	8.672	−4.914	−0.004	1.828
	2.497[c]	0.906	0.783	0.923	2.710[b]	2.141[c]	0.002	0.854
Chi-square	24.948[b]	1.209	2.361	0.990	28.172[b]	7.897[c]	0.074	1.552
Samples	5404	5404	5394	5268	5400	5400	5390	5281

Note: The first number each cell of the table represents is the proportion predicted by Benford's law. The second number each cell of the table represents is the deviation rate of expected proportion base on the difference between the actual and expected proportion of Benford's law. The final number each cell of the table represents is Z-statistic value.
[a] Level of significance is 10% (Z > 1.64).
[b] Level of significance is 1% (Z > 2.57).
[c] Level of significance is 5%.

enhanced motivation to manage their earnings. In addition, in companies demonstrating the lowest accounting conservatism and low institutional ownership ratios, the first to third digits in their data all clearly deviated from Benford's law: The second and third earnings digits had clearly been manipulated by rounding. Concerning companies possessing the lowest accounting conservatism and a high institutional ownership ratio, the first to fourth digits all conformed to Benford's law and no earnings management occurred. In companies exhibiting low accounting conservatism, institutional investors protected personal interests by monitoring the company managers, thus lowering the level of company earnings management. In companies showing high accounting conservatism, high institutional ownership ratios increased earnings management. Regarding companies that possessed high accounting conservatism and a high institutional ownership ratio, the first to third digits all deviated from Benford's law and manipulation by rounding occurred. When companies generate financial reports based on high accounting conservatism, institutional investors can influence company decisions because they own more shares than typical investors do. If shareholding is too concentrated, institutional investors who own a high proportion of shares can be motivated to increase personal profit by sacrificing the interests of minority shareholders. Thus, earnings management occurs, thereby decreasing earnings quality. The result is consistent with Bushee (1988) and Salehi et al. (2011). Companies compile financial reports according to the conservatism principle, but high ownership concentration of institutional investors may increase earnings manipulation in companies because of individual interests.

Previous studies have primarily explored the correlation between accounting conservatism and earnings management or the correlation between institutional ownership and earnings management. By contrast, we explored corporate accounting conservatism at different levels to assist investors in understanding the influence that various accounting conservatism levels have on corporate earnings management. Institutional ownership ratios were then divided into different levels to explore their various influences on company earnings management. Our results can serve as a reference for investors. In addition, this study adopted Benford's law to assess the degree of earnings management in companies. Previous studies have typically focused on measurements obtained using discretionary accruals, emphasized earnings management tools and motivations, or used regression analysis to assess company earnings management. Conversely, we analyzed the actual earnings data contained in the income statements to assess the earnings management level at each digit in the data, thereby yielding highly accurate assessments of corporate earnings management conditions. Companies should cautiously select accounting measures. A primary aim of conservatism is a truthful response in which managers adopt moderate conservatism when compiling financial reports. Evaluating certain assets and liabilities so that managers adopt conservative methods to ensure that assets are not overvalued and that liabilities are not undervalued is a difficult task.

Our study findings show that institutional investors in companies adopting a low degree of conservatism can effectively monitor managers because of the size of their shareholdings; therefore, these companies do not engage in earnings management. However, institutional investors in companies with conservative financial statements increase manager incentives to manage earnings, and cannot effectively monitor managers. Therefore, if a company adopts a low degree of conservatism, investors should invest in companies with high investor shareholdings. However, if a company adopts a high degree of conservatism, investors should invest in companies with a lower level of institutional investor shareholdings.

The effect of institutional investor monitoring abilities on diverse industries differs; thus, scholars should consider differentiating industries before investigating the relation between institutional investor shareholdings and earnings manipulation in diverse industries. The digit gap on financial statements is wide because companies differ in size. We mainly investigated net income on income statements. Future studies could consider deleting extreme values and using other items on the financial statement, such as sales revenue and net income before tax. Scholars could also consider the balance sheet using Benford's law to examine whether numbers in the financial report comply with Benford's law.

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