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現金流量基礎及盈餘基礎績效衡量指標對商譽減損認列產生

之差異

Can cash-flow-based and earnings-based measure of performance
make difference on goodwill impairment

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認列產生之差異

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本論文係王震東君 (R98722039) 在國立臺灣大學會計學
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謝辭

歷經數個月的努力，論文終於撥雲見日，轉眼間兩年研究生的生活，也隨著論文的完成即將告一段落。回想過去兩年，承蒙師長們諄諄教誨，同學們互相勉勵，使我於會計專業知識及人際關係領域有所拓展，獲益良多。今日終於完成論文撰寫，感覺如釋重負且有無限感激在心頭。

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中文摘要

過去對於 CEO 誘因支付與會計裁量性決策的文獻主要集中在探討盈餘基礎的績效衡量指標與經理人會計決策間之關連 Healy (1985)，很少研究探討紅利獎酬制度混合現金流量基礎績效衡量指標對於經理人裁量性會計決策之影響，本研究分析紅利獎酬制度中盈餘基礎及現金流量基礎績效衡量指標，對於 CEO 使用裁量性決策低估商譽減損認列的影響，具體而言本研究主要目的有二：

- 一、本研究探討紅利獎酬制度中，績效衡量指標對於 SFAS 142 所要求經理人使用會計裁量性決策，對於估計無法驗證的公平價值之間的關係，並檢視現金流量基礎及盈餘基礎績效衡量指標是否對於商譽減損產生差異。
- 二、本研究測試現金流量基礎及盈餘基礎的績效衡量指標與 CEO 低估商譽減損認列間之關連，並檢視當公司採用盈餘基礎績效衡量指標，則紅利獎酬制度中的績效衡量指標是否可能提供強烈操弄盈餘的誘因，反觀採用現金流量績效衡量指標，則是否減緩了經理人操弄盈餘的誘因。

實證結果顯示，當公司採用盈餘基礎績效衡量指標，紅利獎酬制度中的績效衡量指標確實可能提供經理人操弄盈餘誘因的誘因，以最大化經理人自身的紅利，本研究也指出當公司只有採用盈餘基礎的績效衡量指標，紅利獎酬制度中的契約誘因確實可能提供經理人較強的誘因低估商譽減損，顯示 CEO 可能使用裁量性會計決策估計無法驗證的未來現金流量，以達到自我紅利最大化，反觀現金流量基礎的績效衡量指標卻減緩經理人以裁量性會計決策操弄盈餘的誘因，顯示紅利獎酬制度中的績效衡量指標確實會對 CEO 產生不同的報導誘因。

關鍵字：CEO 誘因薪酬支付、績效衡量指標、會計裁量性、現金流量、公平價值會計

ABSTRACT

While existing researches focus on the association between earning-based performance measures in bonus plan and managers' accounting choice (Healy 1985), there is scarce research on the association of bonus plan mixed with cash-flow-based performance measure with the manager's discretionary accounting choice. I analyze the effect of the earning-based and cash-flow-based performance measures in bonus plans on CEO's discretionary decision to understate the recognition of goodwill impairment loss. Specifically, the purposes of this study can be summarized as follows:

1. This study investigates the association between the performance measures in bonus plans and the use of accounting discretion which is required by SFAS 142 to estimate the unverifiable fair value to see whether cash-flow-based and earnings-based measure of performance can make difference on goodwill impairment.
2. I test the association between the performance measures and the understatement of goodwill impairment recognition. And I examine whether the performance measures in bonus plan may provides strong incentive to manipulate earnings when earning-based performance measures are adopted while the adoption of cash-flow-based performance measures can mitigate such effect.

Empirical results show that if earning-based performance measure is used to evaluate CEO's bonus, CEO will have incentive to manipulate earnings for maximizing bonus. The contracting incentive to understate goodwill impairment is strong in firms that just include earnings-based performance measures in the bonus plan, suggesting that CEO may use discretionary accounting decision on unverifiable estimation of

future cash flow for maximizing cash bonus. In contrast, the association mitigates when cash-flow-based performance measures are adopted as performance measures, suggesting that different performance measures in bonus plans result in different reporting incentives for CEOs.

Key words: CEO Incentive Pay, Performance Measure, Accounting Discretion, Cash Flow, Fair Value Accounting

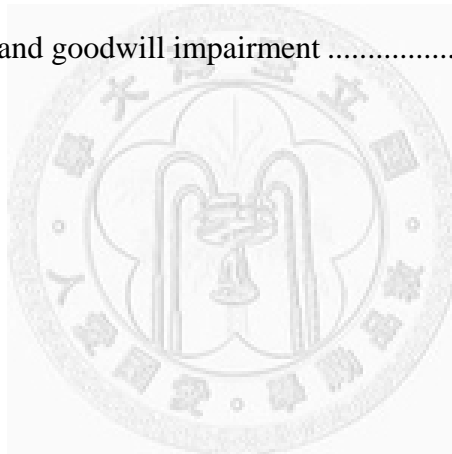


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Chapter 1 Introduction

Accounting-based performance measures are the most popular performance measures (Murphy, 1999). While several literature mainly focuses on that earnings management and the selection of accounting procedures are linked with executive compensation package (e.g., Healy, 1985; Holthausen et al., 1995; Cheng and Warfield, 2005; Carter et al., 2007), little evidence discusses on the association between cash-flow-based performance measures and CEO's discretionary accounting decision. The trend of adopting cash-flow-based incentive plan to fix the vulnerability of earnings-based performance measures is increasing. McCafferty (2004) also indicates that the reason why an increasing number of firms' performance measurement tied to cash-flow-based performance measures is that cash flow is a better performance indicator and earning is easier to manipulate than cash flow (see, also, Dreyfus, 1988; Fink, 2003; Welch and Welch, 2006). Overall, my research wants to highlight the effect of earnings-based and cash-flow-based performance measures in CEO's bonus plan on managers' accounting discretion. Watts (2003) argues that the requirement of SFAS 141 and 142 to make estimation of unverifiable fair value gives managers opportunities to manipulate earnings and the adoption of SFAS 142 might result in an increase in the possibility of fraudulent financial reporting. Moreover, Healy (1985) and Holthausen et al. (1995) indicate that CEO's bonuses are often tied to earnings and it gives CEOs incentives to manipulate earnings to maximize their bonuses. As a result, I examine the role of these performance measures plays in the recognition of goodwill impairment. Further, I argue that performance measures on bonus can motivate CEO to understate goodwill impairment loss.

The Statement of Financial Accounting Standards 142 – Goodwill and Other Intangible Assets (SFAS 142) , effective July 2001, abandoned the systematic amortization of goodwill acquired in business combination; instead, requiring that firms use fair value estimates to review goodwill for impairment periodically and recognize goodwill impairment loss if goodwill is impaired. This statement moves the reliability of historical cost to relevance of fair value accounting. Under SFAS 142, it requires managers to assess the unverifiable fair value rather than undiscounted cash flow threshold. And it also requires the managers to define the reporting units and assign goodwill to each reporting units rather than the asset groupings required by SFAS 121. The requirements of SFAS 142 give managers opportunities to use accounting discretion to decide their reporting units and how much goodwill to allocate to each reporting unit. While SFAS 142 provides the relevant information to users of financial report, it also raises some criticisms. The main criticism is the unverifiable nature of non-financial assets and liabilities. And it gives managers opportunities to manage earnings for maximizing their bonus. The agency theory predicts that the use of discretion potential in unverifiable accounting judgment on goodwill impairment test in SFAS 142 increases potential for opportunism (Watts, 2003; Ramanna, 2008).

In this study, I argue that CEOs' bonus plan can motivate CEOs to use their discretion to understate the recognition of goodwill impairment than other forms of compensation. Gaver and Gaver (1998) and Murphy (1999) indicate that the performance measures of bonus plans are typically tied to accounting earnings. Healy (1985) and Holthausen et al. (1995) also indicate that CEOs' bonuses are often tied to earnings and the performance measures give CEOs incentives to manipulate earnings to

maximize their bonuses. And Shalev et al. (2010) mention that it can be costly or unattainable to rewrite the bonus contracts as a result of the CEOs' influence. If CEO's compensation is tied to equity-based compensation, CEO's equity-based compensation is linked to stock market price. Li et al. (2009) and Bens et al. (2007) indicate that the recognition of goodwill impairment triggers significant negative market reaction. The CEO's equity-based compensation is likely reduced as a result of the significant negative market reaction. Consequently, the earnings-based performance measures in bonus plans give stronger incentives to understate the recognition of goodwill impairment. Further, I assume that if the evaluation of CEO's bonus is based on accounting-based performance measure, it provides CEO stronger incentives to understate the recognition of goodwill impairment loss through the use of accounting discretion on unverifiable estimation of future cash flow. In contrast, Skala (1991) states: "Many financial analysts regard operating cash flow as a better gauge of corporate financial performance than net income, since it is less subject to distortion from differing accounting practices." And operating cash flow is a better performance indicator and is not easily manipulated like earnings. Cash-flow-based performance measures provide managers weaker incentives to manipulate earnings. I assume that if CEO's bonus is tied to cash-flow-based performance measures, it can mitigate CEO's incentive to understate the recognition of goodwill impairment loss.

I collect sample which reported non-zero goodwill impairment loss and paid bonus from year 2002 to 2007 to test that if firms find that goodwill is impaired, can earnings-based and cash-flow-based measures of performance make difference on goodwill impairment. I test the assumption above, and find empirical results consistent with my predictions. I find that if the evaluation of CEO's bonus is tied to

earnings-based performance measures, cash bonus is negatively associated with goodwill impairment loss. In contrast, if the evaluation of CEO's bonus is mixed with cash-flow-based performance measures, cash bonus is positively associated with goodwill impairment loss. The findings are consistent with my arguments that CEOs may use their accounting discretion in estimating unverifiable fair value to increase their bonuses. The association is mitigated when cash-flow-based performance measures are adopted as performance measures, suggesting that different performance measures in bonus plans result in different reporting incentives for CEOs. While earning-based performance measures give CEO incentive to understate the recognition of goodwill impairment loss, the bonus plan which is tied to cash-flow-based performance measures mitigate CEO's incentive to understate the recognition of goodwill impairment loss.

Overall, my research aim to highlight the effect of the earning-based and cash-flow-based performance measures in bonus plans on CEO's discretionary decision to understate the recognition of goodwill impairment loss. My study extends the literature on managers' accounting discretionary decisions and compensation contracts. While existing researches focus on the association between earning-based performance measures in bonus plan and managers' accounting choice (Healy 1985), there is scarce research on the association of bonus plan mixed with cash-flow-based performance measures with the manager's discretionary accounting choice. In my study, I associate the earnings-based and cash-flow-based performance measures with the CEO's incentive to understate the recognition of goodwill impairment loss. The results suggest that the performance measures in bonus plan may provides strong incentive to manipulate earnings when earnings-based performance measures are adopted while the adoption of cash-flow-based performance measures can mitigate such effect.

Chapter 2 Related Literature

The discussion of executives' bonus scheme mainly focuses on the influence of earning-based and cash-flow-based performance measures on the recognition of goodwill impairment loss.

2.1 Incentive Compensation

2.1.1 Earnings-Based Performance Measure

The components of CEO's compensation typically include base salary, annual bonus plan, stock options and other forms of compensation such as restricted stocks, long-term incentive plans and retirement plans (Murphy, 1999). With regard to annual bonus plan, Murphy (1999) indicates its components consist of performance measures, performance standards and pay-performance structures. Obviously, bonus scheme can motivate and give CEO incentive to pursue better firms' performance. In contrast, many researches also indicate that the bonus schemes have been considered as important factors to motivate CEO to manipulate earnings for maximizing their compensation by selecting accounting procedures and accruals. Moreover, CEO's bonuses are often tied to earnings and it gives CEO incentives to manipulate earnings to maximize their bonuses (Healy, 1985; Holthausen et al., 1995). The empirical result of Larcker et al. (2007) indicate that accounting-based compensation is positively associated with abnormal accruals and significant at the 10% level, suggesting that accounting-based performance measures provide managers stronger incentive to manipulate earnings. Kim and Yang (2009) and Murphy (1999) also indicate that the earnings per share is the frequently used performance measures for executives' annual bonus compensation. It

also provides executive strong incentive to manipulate earnings for maximizing compensation.

Several researches have been dedicated to investigate on the weights on different performance measures in the determination of executive compensation. Gibbons and Murphy (1990) report the reason why accounting plans are favorable is that the market factors that influence market price is beyond managers' control. Sloan (1993) examines the role that accounting earnings plays in CEO compensation contracts and finds that the use of accounting earnings in performance measures is one reason for preventing CEO compensation from the fluctuation in market value.

Prior empirical literature mainly focuses on that earnings management and the selection of accounting procedures are linked with executive compensation package (e.g., Healy, 1985; Holthausen et al., 1995; Cheng and Warfield, 2005; Carter et al., 2007). Healy (1985) examines the managers' accounting decisions and assumes that if earning-based performance measures are adopted to evaluate their compensation, they would select accounting procedures to maximize their compensation. He finds that if the managers' bonus contract is based on income-reporting incentives, the association between income-reporting incentives and accruals is strong. And he further points out that if earnings are far below the lower bound or beyond the upper bound, managers are more likely to choose income-decreasing discretionary accruals. And managers are more likely to choose income-increasing discretionary accruals if earnings are between the lower and upper bound. When earnings are far below the lower bound, it will give managers incentive to choose income-decreasing discretionary accruals by deferring earnings to the next period. When earnings are between the lower and upper bound, it will give managers incentive to choose income-increasing discretionary accruals by

delaying the recognition of discretionary accrued expense or increasing earnings. When earnings are beyond the upper bound, it will give managers incentive to choose income-decreasing discretionary accruals. Because managers already achieve their performance goal, they don't have incentive to manipulate earnings. Holthausen et al. (1995) extend the work of Healy (1985). They use modified Jones model to estimate discretionary accruals. Consistent with Healy (1985), they find evidence that managers manipulate earnings downward when their bonuses are at maximum. Contrary to Healy (1985), they find no evidence that managers select income-decreasing discretionary accruals when earnings are far below the lower bound because of loan covenant violations or job security.

Existing research has focused the costs imposed by earnings-based incentives. Dechow and Sloan (1991) use a sample of 91 R&D intensive firms to examine cuts to discretionary expenditures and report that managers manipulate earnings by cutting R&D expenditures in their terminal year. They indicate that if a CEO only focuses on accounting-based earnings, the incentive that performance measures give will affect CEO's discretionary decision on short-term profitability to pursue short-run compensation by rejecting actions that reduce current earnings but increase long-term profitability such as the reduction in R&D. And they find no evidence that the reduction in R&D expenditures is associated with poor firm performance. The authors conclude that executives respond to earnings-based incentives and behave opportunistically in this context.

Prior studies have investigated the usefulness of performance measures for valuation and incentive contracting purposes separately. Bushman et al. (2006) examine the association between the valuation and incentive contracting role of accounting

earnings. They investigate linkages between the weight of performance measure on earnings in compensation package and the weight of performance measure on earnings in stock price formation. They find that in most of their specifications there is a strong positive association between the weight of performance measure on earnings in compensation package and the weight of performance measure on earnings in stock price, suggesting that the higher the value relevance of earnings, the higher the pay-sensitivity of earnings.

Banker et al. (2009) examine the association between pay-sensitivities and value relevance of earnings and cash flows and investigate the explanatory power of value-relevance of earnings and cash flows in pay-sensitivities. They find that if firms exhibit high value relevance of earnings, pay-sensitivity of earnings is higher. And the marginal pay-sensitivity of cash flows is positively associated with the incremental value relevance of cash flows. The empirical results suggest that value relevance of performance measures plays an important role in the choice of accounting performance measures for incentive contracting purposes.

Some researches examine the mix of cash bonus compensation versus equity-based compensation (Davila and Penalva, 2006; Cohen et al., 2008). Davila and Penalva (2006) examine how corporate governance affects the structure of executive compensation contracts, and in particular the implicit weights of firm performance measures on CEO compensation. They indicate that high takeover protection and the power of CEO that influence corporate governance have influence on the design of compensation contracts. They test for the effects of governance on the relation between compensation, ROA, and stock return. They find that firms with strong governance structures design compensation contracts that emphasize stock performance over

accounting performance. In contrast, firms with higher takeover protection and where the CEO has more influence on governance decision will put more weight on accounting-based performance measures in the compensation contracts than on equity-based performance measures, suggesting that CEOs exert their power that weak governance grants them to influence the design of compensation contracts. Cohen et al. (2008) examine the effects of these regulatory changes after the U.S Congress enacted the Sarbanes Oxley Act in 2002 on compensation contracts of CEOs and their effect on risk taking activities subsequent to SOX. They document an increase in cash compensation and a decrease in option-based compensation in the post-Sarbanes-Oxley era. They also document that the change in the sensitivities of CEOs' pay for performance such as equity incentives and their risk-taking activities such as risky investments subsequent to SOX are negatively associated with a reduction in stock return volatility.

2.1.2 Cash-Flow-Based Performance Measure

While accounting earnings are typically used as performance measures, Murphy (1999) indicates that cash-flow-based performance measures are also used as performance measures. McCafferty (2004) indicates that the reason why an increasing number of firms' performance measurement tied to cash-flow-based performance measures is that cash flow is a better performance indicator and earning is easier to manipulate than cash flow (see, also, Dreyfus, 1988; Fink, 2003; Welch and Welch, 2006). And the adoption of cash-flow-based incentive plan can also fix the vulnerability of earning-based performance measures. Perry and Zenner (2001) report that about 15% of firms adopted cash-flow-based performance measures in 1995. Huang et al. (2010)

report that around 19.4 percent of 165 firms in year 2005 use cash-flow-based performance measure in their bonus plans.

Operating cash flow is an important financial indicator and a crucial financing source. And operating cash flow is a cash component of earnings, it also can be expected to play an important role in managers' contracts. Skala (1991) states: "Many financial analysts regard operating cash flow as a better gauge of corporate financial performance than net income, since it is less subject to distortion from differing accounting practices." Fazzari et al. (1988) and Whited (1992) also indicate that cash flow is an important determinant over corporate financing and investment decisions. Furthermore, Natarajan (1996) states that rational shareholders can be expected to take earnings-based and cash-flow-based performance measures into account in evaluating managers' performance because finer information is favorable to coarser information that is equally costly. The results indicate that the association between earnings-based and cash-flow-based performance measures together and cash compensation is better than the association between the aggregate earnings alone and cash compensation.

Several studies mention the important role that the cash-flow-based performance measures plays in bonus plan. Nwaeze et al. (2006) examine the role that operating cash flow plays in CEO's cash compensation and find that weight of operating cash flow in performance measures is significant and positively associated with the presence of earnings and stock returns because operating cash flow presents information about a firm's performance and acts as complementary information in earnings.

Some studies examine the association between the IOS and performance measures (e.g., Smith and Watts, 1992; Gaver and Gaver, 1993; Skinner, 1993; Baber et al., 1996). Baber et al. (1996) argue that firms with high investment opportunities are

less likely to use on accounting-based incentive plans. Smith and Watts (1992), Gaver and Gaver (1993) and Skinner (1993) indicate that accounting profit are less informative with relation to managers' actions when IOS is a substantial portion of a firm's value because high IOS also results in increased depreciation which reduces current earnings. Consistent with Natarajan (1996), the results indicate that IOS is negatively associated with the weight of earnings in compensation. In contrast, Nwaeze et al. (2006) state that firms with high IOS are likely to enhance the relative contracting role of operating cash flow as a result of the investment and financing actions made by managers, which may reduce current earnings, are associated with the availability of operating cash flow. As a result, firms with high IOS may use cash-flow-based performance measures jointly with earnings-based performance measures to reduce the incentive that earnings-based performance measures give which affect CEO's discretionary decision on short-term profitability by rejecting actions that reduce current earnings but increase long-term profitability.

Banker et al. (2009) document the increasing importance of operating cash flows in incentive contracts and find that value relevance is positively associated with the pay-performance sensitivity of earnings and cash flows. Emeka (2010) investigates the choice of cash-flow-based performance measures in incentive compensation contracts and finds that growth firms and firms with low relative earnings quality are more likely to adopt cash-flow-based performance measures, while firms with financial constraints seem unwilling to adopting cash-flow-based performance measures. Overall, there is scant empirical evidence on the association between cash-flow-based performance measures and CEO's discretionary decision.

2.2 Goodwill Impairment

Fair value accounting is often been criticized for the bias made by the management. And it may lead to inappropriate measurements in fair value and misstatements of earnings. And the opponents of fair value accounting argue that the unverifiable nature of fair value estimation allows earnings management, while proponents of fair value accounting argue that fair value accounting can reflect true economic substance and provide more relevant and useful information in decision-making than traditional historical cost. SFAS 141 requires firms to verify the fair value of identifiable net assets and allocate the unverifiable portion of purchase price into goodwill. SFAS 142 requires the estimation of future cash flows to test the subsequent goodwill impairment. Both SFAS 141 and 142 require subjective estimation made by managers. Watts (2003) argues that the requirements of SFAS 141 and 142 to make estimation of unverifiable fair value give managers opportunities to manipulate earnings and the adoption of SFAS 142 might result in an increase in the possibility of fraudulent financial reporting.

Under agency theory, it predicts that managers may use discretion in unverifiable estimates. Ramanna (2008) studies the mechanics of SFAS 142 and indicates that two firm characteristics are likely to facilitate unverifiable goodwill impairment decision: (1) the number and size of firms' reporting units; (2) the proportion of firms' unverifiable net assets. If the assumption of pooling abuse among pro-poolers is correct, it is likely that the potential for opportunism has been retained in SFAS 142 impairment tests. And he argues that the promulgation of SFAS 142 is the product of political negotiations for abolishing pooling of interest accounting and managers use discretion opportunistically to recognize goodwill impairment charges by delaying the recognition of goodwill impairment loss or taking a big bath. Consistent with agency theory, he finds the

discretionary estimation increasing under SFAS 142 which is supported by lobbying firms. In contrast, Jarva (2009) examines whether goodwill impairment under SFAS 142 is associated with future expected cash flows. He finds that goodwill write-offs lag behind the economic impairment of goodwill and no convincing evidence that firms are opportunistically avoiding impairments.

Some researches investigate the association between the timing of goodwill impairment recognition and the accounting discretion used by manager. Beatty and Weber (2006) examine the determinants of managers' goodwill impairment decisions in the initial adoption of SFAS 142 and find that both equity market concerns and contracting incentives affect managers' use of discretions by accelerating or delaying the recognition of goodwill impairment. They find that firms are more likely to accelerate the recognition of goodwill impairment (below-the-line accounting treatment) when they have a CEO with a short tenure and a high stock market reaction to income from continuing operations than net income because the market will believe that the goodwill impairment resulted from the cumulative effect of adopting SFAS 142 rather than a decline in fair value. Bens and Heltzer (2004) find that if goodwill impairment recorded as a cumulative effect of adopting SFAS 142 rather than recorded as part of income from continuing operations, the stock market reaction is significantly less negative. On the other hand, firms delay the recognition of goodwill impairment (above-the-line accounting treatment) to future periods in income from continuing operations when their debt covenants are affected by goodwill impairment, when they have earnings-based bonus plans, and when they encounter financial-based delisting requirements.

Godfrey and Koh (2009) examine whether the recognition of goodwill impairment reflect firms' underlying investment opportunities. The sample comprises 575 firm-years which reported non-zero goodwill impairment losses from the COMPUSTAT in fiscal years 2002-2004. They find that goodwill impairment loss is negatively associated with the underlying investment opportunities and indicate that the accounting discretion in impairment regime enables firms with more investment opportunities to recognize less goodwill impairment to report higher goodwill balance in accounting and managers are likely to exercise accounting discretion to reflect firms' investment opportunities. The result suggests that in the initial years of adopting the SFAS 142, managers exercise accounting discretion on goodwill impairment accounting treatment to reflect the underlying economic attributes.

Ramanna and Watts (2011) argue that the unverifiable fair values estimation required by SFAS 142 may lead managers to use their accounting discretion to defer the recognition of impairment loss. They indicate that SFAS 142 grants managers use of unverifiable discretion to assess the fair value of goodwill and the standard setters implicitly assume that the use of discretion to estimate the unverifiable fair value of goodwill convey private information on future cash flows. Under SFAS 142, managers can use their discretion to allocate goodwill to low growth reporting units to accelerate goodwill impairment or to high growth reporting units to delay impairment. They find that the unverifiable nature of fair value accounting may lead to manipulate earnings in the reporting of goodwill impairment by opportunistically delaying the recognition of goodwill impairment through the use of accounting discretion.

2.3 Hypothesis development

SFAS 142 – Goodwill and Other Intangible Assets, effective from July 2001, eliminated the systematic amortization of goodwill acquired in business combination; instead, requiring that firms use fair value estimates to review goodwill for impairment periodically and recognize goodwill impairment loss if goodwill is impaired. In issuing SFAS 142, the FASB (2001, p. 7) predicted that the standard “will improve financial reporting because the financial statements of entities that acquire goodwill and other intangible assets will [now] better reflect the underlying economics of those assets.” And the FASB believes that the adoption of SFAS 142 will help users of financial reports to evaluate the cash flows and future profitability. Although SFAS 142 provides more relevant information to users, it also comes up with an issue whether we should pursue the relevance of financial reporting at the expense of reliability. SFAS 142 provides managers with accounting discretion. It requires managers to define the reporting units and assign goodwill to each reporting units. When allocating goodwill, managers should assign goodwill to reporting units expected to benefit from the synergies of the acquisition even if the acquired assets and liabilities are not assigned to those units (See section 30–36 of SFAS 142). It gives managers flexibility in the determination of the amount of goodwill to be impaired. As a result, the determination of reporting units and the amounts allocated to these units affect whether goodwill to be impaired and the amount of impairment recognized. Furthermore, SFAS 142 also requires managers to estimate future cash flow. The initial goodwill capitalization and subsequent impairment tests are subjective valuation (Watts 2003). It increases the difficulty verifying and auditing the fair value.

Under agency theory, it predicts that the use of discretion potential in unverifiable accounting judgment on goodwill impairment test in SFAS 142 increases potential for opportunism (Watts, 2003; Ramanna, 2008). Watts (2003) indicates that SFAS 142 requires managers to use discretion on the estimation of unverifiable fair value and it gives managers opportunities to manipulate earnings because such estimations are subjective. Some researches examine the association between the timing of recognition of goodwill impairment and the accounting discretion used by manager. Beatty and Weber (2006) find that both equity market concerns and contracting incentives affect managers' use of discretions by accelerating or delaying the recognition of goodwill impairment. And Ramanna and Watts (2011) also argue that the requirement of SFAS 142 to estimate the unverifiable fair value may lead managers to use their accounting discretion to defer the recognition of impairment loss. Consequently, the unverifiable nature of fair value gives managers opportunities to use accounting discretion to manage earnings or determine the timing of the recognition of goodwill impairment.

Prior researches show that CEO bonuses are usually measured by earning-based performance measures (Healy, 1985; Holthausen et al., 1995). Several researches also indicate that earnings management and the selection of accounting procedures are linked with executive compensation package (e.g., Healy, 1985; Holthausen et al., 1995; Cheng and Warfield, 2005; Carter et al., 2007). To maximize their bonuses, it gives CEO incentives to manipulate accounting earnings. Larcker et al. (2007) indicate that accounting-based compensation is positively associated with abnormal accruals, suggesting that performance measures based on accounting-based measures provide managers with incentive to manipulate earnings. As a result, I predict a negative association between the CEO's earning-based bonus and their incentives to understate

goodwill impairment loss. My first hypothesis is:

H1: Contracting incentive to understate goodwill impairment is strong in firms that just include earnings-based performance measures in the bonus plan.

Murphy (1999) shows that earnings-based performance measures are the most popular performance measures. He also indicates that cash-flow-based performance measures are also used to evaluate CEO's performance. There is an increasing trend in adopting cash-flow-based incentive plan to fix the disadvantages of earning-based performance measures. Huang et al. (2010) report that around 19.4 percent of 165 firms in year 2005 use cash-flow-based performance measure in their bonus plans. If CEO's bonus is based on cash-flow-based performance measures, CEO will be less affected by the accruals such as depreciation, amortization expenses or goodwill impairment loss. As a result, I expect the adoption of cash-flow-based performance measures can mitigate CEO's incentives to understate goodwill impairment loss. My second hypothesis is:

H2: Contracting incentive to understate goodwill impairment is mitigated in firms that include cash-flow-based performance measures in the bonus plan.

H3: The higher (lower) the interaction of bonus and cash-flow-based performance measure, the higher (lower) goodwill impairment recognized.

Chapter 3 Research Design and Sample

3.1 Sample

This study mainly investigates that if firms find that goodwill is impaired, can earnings-based and cash-flow-based measures of performance make difference on goodwill impairment. As a result, the sample in this paper comprises 576 firm-years which reported non-zero goodwill impairment loss and financial information from the COMPUSTAT in fiscal years 2002-2007. I obtain the CEO compensation data from COMPUSTAT North America's executive compensation (ExecuComp) . I hand-collect the cash-flow-based measures information from the acquirers' proxy statement.¹ The sample selection procedure is described in Table 1.

Panel A and B of Table 2 report the distribution of our sample across 2-digit SIC industries and over time. Among the entire sample, Business Services industry (2-digit SIC code 73) is the most heavily represented industries with 14.76% of the entire sample. Electronic and Electric Equipment (2-digit SIC code 36) is the second heavily represented industries with 12.85% of the entire sample. And goodwill impairment mainly focuses on the Manufacturing and Services industries. Panel B of Table 2

¹ The design of executive compensation program is mainly described in the other definitive proxy statement (DEF 14A) . I search the design of compensation program to see whether annual cash bonus is based on the cash-flow-based measure. I focus on other definitive proxy statement and proxy statements in which the term *cash flow(s)*, *operating cash*, *cash from operation*, *cash from continuing operation* is textually in any of the following identifiers, *bonus*, *incentive plan*, *short-term incentive*, *award*, *performance plan*.

reports sample distribution over time from year 2002 to 2007 and does not show any obvious clustering in time.

3.2 Research Design

3.2.1 CEO bonus plan and goodwill impairment

I construct the following regression to test H1, H2 and H3.

$$GWIM_t = \alpha_0 + \beta_1 BONUS_t + \beta_2 CASH_MEASURE_t + \beta_3 BONUS_t \times CASH_MEASURE_t + \beta_4 GW_{t-1} + \beta_5 EBIM_t + \beta_6 LOSS_t + \beta_7 BTM_{t-1} + \beta_8 DBTM_{t-1} + \varepsilon \quad (1)$$

Where

$GWIM_t$ = Goodwill impairment loss, measured as goodwill impairment loss for year t scaled by total assets at the end of year $t-1$;

$BONUS_t$ = CEO bonus, measured as CEO bonus scaled by total assets at the end of year t ;

$CASH_MEASURE_t$ = An indicator variable equals to 1 if CEO bonus plan includes cash-flow based performance measures, 0 otherwise;

GW_{t-1} = Goodwill, measured as goodwill at the end of year $t-1$ scaled by total assets at the end of year $t-2$;

$EBIM_t$ = Earnings before goodwill impairment loss, measured as income before extraordinary items plus goodwill impairment loss for the year t scaled by total assets minus goodwill at the end of t ;

$Loss_t$ = Indicator variable, coded as one if $EBIM_t$ is negative, zero otherwise;

BTM_{t-1} = Book-to-market ratio in year $t-1$, measured as book value of equity (where the book values of equity are measured before the effect of goodwill impairment, but calculated after the effect of non-goodwill impairment) scaled by market value of equity at the end of $t-1$;

$DBTM_{t-1}$ = Indicator variable, coded as one if BTM_{t-1} is greater than one, zero otherwise;

Following Ramanna and Watts (2011), the dependent variable, $GWIM_t$, is measured as a firm's goodwill impairment loss at the end of year t , scaled by beginning-of-period assets. The testing variable, $BONUS_t$, measured as the ratio of CEO's cash bonus scaled by total assets. $CASH_MEASURE_t$ is an indicator variable that equals one if the firm use the cash-flow-based measure to evaluate the CEO's performance.

3.2.2 Control variables for goodwill impairment loss

I follow findings by Ramanna and Watts (2011) and include the beginning-of-period goodwill to prior year assets, GW_{t-1} , to control the magnitude of goodwill write-offs. And I expect GW_{t-1} is positively associated with goodwill impairment loss.

I use earnings before goodwill loss, $EBIM_t$, to measure firm's performance. I expect that firms with good performance are less likely to recognize goodwill

impairment loss. In another point of view, firms with poor performance also provide managers incentive for earnings management to manipulate earnings. As a result, I expect that $EBIM_t$ is negatively associated with goodwill impairment loss. Moreover, following findings by Jarva (2009), I include a dummy variable, $Loss_t$, to indicate negative earnings. If the $EBIM_t$ is less than zero, $Loss_t$ is equal to one.

Following Jarva (2009), I include book-to-market ratio, BTM_{t-1} , to see whether the recognition of goodwill impairment loss is expected. In his findings, if book-to-market ratio is above one, goodwill impairment loss is expected. I also include a dummy variable, $DBTM_{t-1}$, to capture the effect.



Chapter 4 Empirical Results

4.1 Descriptive Statistics

Table 3 reports the descriptive statistics (Panel A) and the correlation matrix (Panel B). Subsample of firms without adopting cash-flow-based performance measures reports goodwill impairment loss, $GWIM_t$, with a mean of around 7% of beginning-of-period total assets and the median being about 2%, while the rest of sample firms adopting cash-flow-based performance measures reports $GWIM_t$ with a mean of around 5% of beginning-of-period total assets and the median being about 1%. The result indicates that subsample of firms without adopting cash-flow-based performance measures reports higher goodwill impairment than the rest of sample firms adopting cash-flow-based performance measures.

Subsample of firms without adopting cash-flow-based performance measures reports $BONUS_t$ with a mean of around 0.16% of total assets, while the rest of sample firms adopting cash-flow-based performance measures reports $BONUS_t$ with a mean of around 0.1% of total assets. About 19% of my sample firms adopt cash-flow-based performance measures in determination of cash bonus.

My sample firms exhibit large variation in the amount of reported goodwill, GW_{t-1} , with a standard deviation of 5.8306 in subsample of firms without adopting cash-flow-based performance measures, while the rest of sample firms adopting cash-flow-based performance measures is just 0.2618. And the average beginning-of-period goodwill to prior year assets is about 73% in subsample of firms without adopting cash-flow-based performance measures, while the rest of sample firms

adopting cash-flow-based performance measures is just 28%. The results suggest that beginning-of-period goodwill is a huge part of prior year assets in the subsample of firms without adopting cash-flow-based performance measures, while the result of the rest of sample firms adopting cash-flow-based performance measures doesn't report such a huge difference. The possible reason for the difference might be that when earnings-based performance measures are used to evaluate CEO's performance, the proportion of acquisition price allocated to goodwill increases, while the association is mitigated if the cash-flow-based performance measures are adopted in CEO bonus plan (Shalev et al., 2010), suggesting that earnings-based performance measures provide stronger incentives than cash-flow-based performance measures for CEO to overstate goodwill in the purchase price allocation.

The average earnings before goodwill impairment loss, $EBIM_t$, is about -12% in subsample of firms without adopting cash-flow-based performance measures, while the rest of sample firms adopting cash-flow-based performance measures is just -3%, suggesting that firms that recognize goodwill impairment loss are generally with poor profitability. The average $Loss_t$ is about 45% in subsample of firms without adopting cash-flow-based performance measures, while the rest of sample firms adopting cash-flow-based performance measures is just 34%.

The book-to-market ratio, BTM_{t-1} , exhibits large variation with a standard deviation of 3.0139 in subsample of firms without adopting cash-flow-based performance measures, while the rest of sample firms adopting cash-flow-based performance measures is just 0.7523. The book-to-market ratio, BTM_{t-1} , presents a mean of around 59% in subsample of firms without adopting cash-flow-based

performance measures, while the rest of sample firms adopting cash-flow-based performance measures is 83%. The average $DBTM_{t-1}$ is about 23% in subsample of firms without adopting cash-flow-based performance measures, while the rest of sample firms adopting cash-flow-based performance measures is 25%.

For variables that concurrently enter into our model, the highest correlation coefficient reported in Panel B of Table 3 is -0.896 (0.000) for Pearson correlations. But the diagnostic tests report the highest VIF is 6.475. If the VIF is less than ten, it is unlikely to cause a multicollinearity problem. As a result, this result is less likely to lead to multicollinearity.

4.2 Main Findings

In column (1) of table 4, $BONUS_t$ is added to the regression. $BONUS_t$ is negatively associated with $GWIM_t$. It is not statistically significant, but close to 10% level. I further separate the entire sample into two subsamples on $CASH_MEASURE_t$ in column (2) and (3). In column (2), the estimation of the regression is for the subsample of which $BONUS_t$ is measured without cash-flow-based measures. Consistent with the H1, $BONUS_t$ is negatively associated with $GWIM_t$ and significant at the 10% level, indicating that if earnings-based performance measures are adopted to evaluate CEO's bonus, the more goodwill impairment loss recognized, the less cash bonus paid to CEO. The agency theory also predicts that the use of discretion potential in unverifiable accounting judgment on goodwill impairment test in SFAS 142 increased potential for opportunism (Watts, 2003; Ramanna, 2008). It will also give CEO incentives to understate the recognition of goodwill impairment by using

discretionary estimation of unverifiable fair value to maximize bonus.

In column (3), the estimation of the regression is for the rest of the sample firms of which bonus is measured with cash-flow-based measures. Consistent with H2, $BONUS_t$ is positively associated with $GWIM_t$ and significant at the 10% level, indicating that if cash-flow-based measures are used to evaluate CEO's performance, CEO's cash bonus will be less affected by accruals such as goodwill impairment loss than those without cash-flow-based measures. While earnings-based performance measures motivate CEO to understate the recognition of goodwill impairment, such incentives are mitigated when cash-flow-based performance measures are adopted.

In column (4), I add $CASH_MEASURE_t$ and $BONUS_t \times CASH_MEASURE_t$ to the estimation of regression for the entire sample. Consistent with H3, $BONUS_t \times CASH_MEASURE_t$ is positively associated with $GWIM_t$ and significant (10.771, t-stat= 1.733) at the 10% level, suggesting that the adoption of cash-flow-based performance measures mitigates CEO's incentive to understate the recognition of goodwill impairment. $BONUS_t$ is also negatively associated with $GWIM_t$ at the 10% level. The results imply that the CEO's discretion on the accounting choice is affected by the performance measurement. If performance measures are tied to earning-based performance measures, it will give CEO incentive to recognize less goodwill impairment loss while the cash-flow-based performance measures mitigate the incentive.

In column (1) \cdot (2) \cdot (3) of Table 4, GW_{t-1} is positively associated with $GWIM_t$ at the 1% level, suggesting that the level of capitalized goodwill is positively associated with the amount recognized as goodwill impairment. $EBIM_t$ is negatively associated

with $GWIM_t$ and significant at the 1% level in column (1) and (2). Consistent with my expectation, firms with better performance are likely to recognize less goodwill impairment loss. $Loss_t$ is positively associated $GWIM_t$ and significant at the 1% level in column (1) and (2), suggesting that firms with poor performance also provide managers incentives for earnings management to manipulate earnings. Consistent with the finding of Healy (1985), if earnings are far below the lower bound, managers are more likely to choose income-decreasing discretionary accruals by deferring earnings to the next period. BTM_{t-1} and $DBTM_{t-1}$ are positively associated with $GWIM_t$ column (1) 、(2) 、(3) but not significant.

4.3 Conclusions

In this study, I examine the association between the performance measures in bonus plan and managers' discretionary accounting decision in SFAS 142 to see whether cash-flow-based and earnings-based measure of performance can make difference on goodwill impairment. Larcker et al. (2007) indicate that accounting-based compensation is positively associated with abnormal accruals, suggesting that performance measures based on accounting-based measures provide managers incentive to manipulate earnings. Under the requirement of SFAS 142, it requires managers to use unverifiable estimation of future cash flows. The estimation of unverifiable fair value is hard to verify and audit and it depends on the managers' subjective judgment. The unverifiable nature of fair value also gives managers opportunities to use accounting discretion to manage earnings or determine the timing of the recognition of goodwill impairment. Consistent with my expectation, if earnings-based performance measures are adopted to evaluate CEO's performance, CEO will have incentive to manipulate earnings for maximizing bonus. The contracting incentive to understate goodwill

impairment is strong in firms that just include earnings-based performance measures in the bonus plan, suggesting that CEO may use discretionary accounting decision on the unverifiable fair value estimation for maximizing cash bonus. In contrast, the association is mitigated when cash-flow-based performance measures are adopted as performance measures, suggesting that different performance measures in bonus plans result in different reporting incentives for CEOs. Consistent with Murphy (1999), CEO's reporting incentive is not only affected by pay-performance structure but also affected by performance measures.

While several literature investigates the association of the pay-performance structure in bonus plan and discretionary accounting decision (Healy, 1985; Holthausen et al., 1995), I associate the earnings-based and cash-flow-based performance measures with the CEO's incentive to understate the recognition of goodwill impairment loss. I find that the performance measures also play an important role in fair value measurement. The results suggest that the performance measures in bonus plan may provide strong incentive to manipulate earnings when earning-based performance measures are adopted while the adoption of cash-flow-based performance measures can mitigate such effect. And the type of performance measures may also affect CEOs' judgment when CEOs use their discretion to estimate the unverifiable fair value in SFAS 142.

4.4 Limitation of This Thesis

Many researches have proposed the organization development of business life cycles of which the concept is adapted from biological sciences (Hanks et al., 1993). Adizes (1989) indicates that organizations grow through ten life-cycle stages: courtship, infancy, go-go, adolescence, prime, stable, aristocracy, early, bureaucracy and death. The courtship and infancy are in the start-up stage. At the start-up stage, he indicates that firms face mainly two risks: investment risk and management risk. Large portion of cash may be spent on capital expenditure. As a result, if firms use cash-flow-based performance measures to evaluate CEOs' performance, the CEOs' performance may not be fairly reflected through such performance measures. However, I don't take the design of performance measures at start-up stage into account in my study. As a result, future research can further take it into account.

In this study, I investigate whether the inclusion of cash-flow-based performance measures in bonus plans can mitigate the managers' incentives to understate the recognition of goodwill impairment. If earnings-based performance measures are mixed with cash-flow-based performance measures, the different weights on the two performance measures may have different impact on the recognition of goodwill impairment. As a result, future researches can further investigate the impact of different weights on earnings-based and cash-flow-based performance measures on CEOs' judgment when CEOs use their discretion to estimate the unverifiable fair value in SFAS 142.

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Appendix: variable definitions

Type	Variables	Definition
Dependent Variable	$GWIM_t$	= Goodwill impairment loss, measured as goodwill impairment loss for year t scaled by total assets at the end of $t-1$;
Testing Variables	$BONUS_t$	= CEO bonus, measured as CEO bonus scaled by total assets at the end of year t ;
	$CASH_MEASURE_t$	= An indicator variable equals to 1 if CEO bonus plan includes cash-flow based performance measures, 0 otherwise;
Control Variables	GW_{t-1}	= Goodwill, measured as goodwill at the end of year $t-1$ scaled by total assets at the end of year $t-2$;
	$EBIM_t$	= Earnings before goodwill impairment loss, measured as income before extraordinary items plus goodwill impairment loss for the year t scaled by total assets minus goodwill at the end of t ;
	$Loss_t$	= Indicator variable, coded as one if $EBIM_t$ is negative, zero otherwise;
	BTM_{t-1}	= Book-to-market ratio in year $t-1$, measured as book value of equity (where the book values of equity are measured before the effect of goodwill impairment, but calculated after the effect of non-goodwill impairment) scaled by market value of equity at the end of $t-1$;
	$DBTM_{t-1}$	= Indicator variable, coded as one if BTM_{t-1} is greater than one, zero otherwise;

Table 1: Sample selection procedures

This table presents the sample selection procedures.

	Number	of
	impairment data	
Firms reported goodwill impairment between 2002 and 2007 from COMPUSTAT, where the companies are publicly traded companies.	2077	
Less Missing financial and market information	910	
Less Companies without cash bonus	553	
Goodwill impairment loss data remaining	614	
Less Companies didn't specify the performance measurement of cash bonus	38	
Goodwill impairment loss data remaining	576	

Table 2: Sample distribution across industries

This table presents the sample with goodwill impairment loss from 2002 to 2007. Panel A reports the sample distribution across industries coded by sic code and Panel B reports the sample distribution from 2002 to 2007.

Panel A: Industry distribution

Two-digit Sic code	Industry acronym	Number of firms	Percentage of samples
Agriculture, Forestry, And Fishing			
01	Agricultural Production Crops	1	0.17%
07	Agricultural Services	1	0.17%
	subtotal		0.35%
Mining			
10	Metal Mining	3	0.52%
12	Coal Mining	2	0.35%
13	Oil And Gas Extraction	5	0.87%
	subtotal		1.74%
Construction			
15	Building Construction	5	0.87%
16	Heavy Construction	1	0.17%
17	Construction Special Trade Contractors	3	0.52%
	subtotal		1.56%
Manufacturing			
20	Food And Kindred Products	10	1.74%
21	Tobacco Products	3	0.52%
22	Textile Mill Products	1	0.17%
23	Apparel and Other Textile Products	5	0.87%
24	Lumber And Wood Products, Except Furniture	3	0.52%
25	Furniture And Fixtures	4	0.69%
26	Paper And Allied Products	2	0.35%
27	Printing, Publishing, And Allied Industries	17	2.95%
28	Chemicals And Allied Products	45	7.81%
30	Rubber And Miscellaneous Plastics Products	5	0.87%
31	Leather And Leather Products	2	0.35%
32	Stone, Clay, Glass, And Concrete Products	4	0.69%
33	Primary Metal Industries	12	2.08%
34	Fabricated Metal Products	11	1.91%
35	Industrial Machinery and Equipment	30	5.21%
36	Electrical and Electric Equipment	74	12.85%
37	Transportation Equipment	8	1.39%
38	Instruments and Related Products	25	4.34%
39	Miscellaneous Manufacturing Industries	6	1.04%
	subtotal		46.35%
Transportation, Communications, Electric, Gas, And Sanitary Services			
42	Motor Freight Transportation And Warehousing	2	0.35%
44	Water Transportation	1	0.17%
47	Transportation Services	1	0.17%
48	Communications	41	7.12%
49	Electric, Gas, And Sanitary Services	3	0.52%
	subtotal		8.33%
Wholesale Trade			
50	Wholesale Trade-durable Goods	9	1.56%
51	Wholesale Trade-non-durable Goods	10	1.74%
	subtotal		3.30%

Two-digit Sic code	Industry acronym	Number of firms	Percentage of samples
Retail Trade			
52	Building Materials, Hardware, Garden	3	0.52%
53	General Merchandise Stores	3	0.52%
54	Food Stores	3	0.52%
55	Automotive Dealers And Gasoline Service Stations	1	0.17%
56	Apparel And Accessory Stores	4	0.69%
57	Home Furniture, Furnishings, And Equipment Stores	2	0.35%
58	Eating And Drinking Places	13	2.26%
59	Miscellaneous Retail	4	0.69%
	subtotal		5.73%
Finance, Insurance, And Real Estate			
60	Depository Institutions	25	4.34%
61	Non-depository Credit Institutions	2	0.35%
62	Security And Commodity Brokers, Dealers, Exchanges, And Services	3	0.52%
63	Insurance Carriers	3	0.52%
64	Insurance Agents, Brokers, And Service	3	0.52%
65	Real Estate	1	0.17%
67	Holding And Other Investment Offices	2	0.35%
	subtotal		6.77%
Services			
70	Hotels, Rooming Houses, Camps, And Other Lodging Places	1	0.17%
72	Personal Services	3	0.52%
73	Business Services	85	14.76%
75	Automotive Repair, Services, And Parking	2	0.35%
78	Motion Pictures	3	0.52%
79	Amusement And Recreation Services	9	1.56%
80	Health Services	23	3.99%
82	Educational Services	2	0.35%
87	Engineering, Accounting, Research, Management, And Related Services	15	2.60%
	subtotal		24.83%
Public Administration			
99	Nonclassifiable Establishments	6	1.04%
Total		576	100.00%

Panel B: Sample distribution over time

Year	Number of firms	Percentage of firms
2002	113	20%
2003	101	18%
2004	93	16%
2005	128	22%
2006	78	14%
2007	63	11%
Total	576	100%

Table 3: Descriptive statistics

This table presents the descriptive statistics of the entire sample, subsample of firms without cash measurement, and the rest of sample firms with cash measurement.

Variables are defined in the appendix.

Panel A: Descriptive statistics

Variables	All (N = 576)		No Cash_Measure (N = 467)		With Cash_Measure (N = 109)	
	Mean (SD)	Median	Mean (SD)	Median	Mean (SD)	Median
$GWIM_t$	0.0700 (0.1764)	0.0193	0.0744 (0.1899)	0.0216	0.0507 (0.0975)	0.0134
$BONUS_t$	0.0015 (0.0073)	0.004	0.0016 (0.0080)	0.0005	0.0010 (0.0027)	0.0003
$CASH_MEASURE_t$	0.1892 (0.3920)	-	-	-	-	-
GW_{t-1}	0.6463 (5.2532)	0.0193	0.7322 (5.8306)	0.1839	0.2781 (0.2618)	0.2356
$EBIM_t$	-0.0999 (0.6416)	0.0104	-0.1162 (0.7044)	0.0073	-0.0302 (0.2117)	0.0215
$LOSS_t$	0.4253 (0.4948)	-	0.4454 (0.4975)	-	0.3394 (0.4757)	-
BTM_{t-1}	0.6373 (2.7343)	0.6250	0.5924 (3.0139)	0.5859	0.8297 (0.7523)	0.6812
$DBTM_{t-1}$	0.2309 (0.4218)	-	0.2270 (0.4193)	-	0.2477 (0.4337)	-

Panel B: Correlation matrix (n = 576)

This table reports pair-wise Pearson correlations between the main variables. For each variable-pair, the first row indicates correlation coefficient and the second row reports p-value in parentheses. Correlation coefficients that are in bold are significant at 10% level.

	GWIM _t	BONUS _t	CASH_MEASURE _t	GW _{t-1}	EBIM _t	LOSS _t	BTM _{t-1}	DBTM _{t-1}
GWIM _t	1.000							
BONUS _t	0.117 (0.002)	1.000						
CASH_MEASURE _t	-0.053 (0.103)	-0.033 (0.213)	1.000					
GW _{t-1}	0.207 (0.000)	0.008 (0.423)	-0.034 (0.208)	1.000				
EBIM _t	-0.200 (0.000)	-0.896 (0.000)	0.053 (0.104)	-0.033 (0.215)	1.000			
LOSS _t	0.265 (0.000)	0.114 (0.003)	-0.084 (0.022)	0.089 (0.016)	-0.301 (0.000)	1.000		
BTM _{t-1}	0.032 (0.218)	-0.014 (0.366)	0.034 (0.207)	-0.001 (0.489)	0.017 (0.342)	0.033 (0.217)	1.000	
DBTM _{t-1}	0.068 (0.052)	0.031 (0.232)	0.019 (0.322)	-0.032 (0.225)	-0.031 (0.232)	0.220 (0.000)	0.244 (0.000)	1.000

Variable are defined in Appendix.

Table 4: CEO bonus plan and goodwill impairment

This table presents the estimates of goodwill impairment loss predicted by the following model.

$$GWIM_t = \alpha_0 + \beta_1 BONUS_t + \beta_2 CASH_MEASURE_t + \beta_3 BONUS_t \times CASH_MEASURE_t + \beta_4 GW_{t-1} + \beta_5 EBIM_t + \beta_6 LOSS_t + \beta_7 BTM_{t-1} + \beta_8 DBTM_{t-1} + \varepsilon$$

In column (1), the dependent variable is regressed with bonus and control variables. In column (2), the estimation of the regression is for the subsample of which bonus is measured without cash-flow-based measures. In column (3), the estimation of the regression is for the rest of the samples of which bonus is measured with cash-flow-based measures. In column (4), the estimation of the regression is with the interaction of $BONUS_t$ and $CASH_MEASURE_t$ for the entire sample. Variables are defined in the appendix. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels (two-tailed).

Variables	Expected sign	(1)	(2)	(3)	(4)
		All	Without Cash Measure	With Cash Measure	All
Constant		0.034*** (3.351)	0.035*** (2.893)	-0.006 (-0.361)	0.039*** (3.574)
$BONUS_t$	-	-3.723 (-1.612)	-4.545* (-1.752)	7.676* (1.710)	-4.536* (-1.927)
$CASH_MEASURE_t$					-0.021 (-1.133)
$BONUS_t \times CASH_MEASURE_t$	+				10.771* (1.733)
GW_{t-1}	+	0.006*** (4.664)	0.006*** (4.200)	0.118*** (3.700)	0.006*** (4.653)
$EBIM_t$	-	-0.077*** (-2.790)	-0.083*** (-2.701)	-0.049 (-0.749)	-0.084*** (-3.019)
$LOSS_t$	+	0.063*** (3.850)	0.070*** (3.580)	0.019 (0.844)	0.058*** (3.538)
BTM_{t-1}	+	0.001 (0.575)	0.002 (0.556)	0.001 (0.088)	0.001 (0.560)
$DBTM_{t-1}$	+	0.011 (0.609)	0.002 (0.103)	0.031 (1.153)	0.008 (0.477)
N		576	467	109	576
Adjusted R^2		11.6%	11.7%	23.6%	11.8%