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員工分紅與股東股利分配之不對稱性：淨誘因效果或是淨侵權效果？

The Asymmetric distribution between Stock Bonus and Stock Dividends: Net Incentives or Entrenchments?

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摘要: 員工分紅在文獻上一直被認為是台灣高科技產業競爭力之一大貢獻來源。但是，公司法規定員工分紅與股東股利一樣，都屬盈餘分配之一種，而且都可以用現金或股利之模式來作為分配。過去高科技台灣公司傾向以「股票」分配員工紅利而以「現金」分配股東股利。很多股東抱怨這種「盈餘分配方式不對稱現象」是一種侵害股東權益之現象；反之，公司管理階層認為員工是公司獲利的主要動力，「盈餘分配方式不對稱現象」是為了留住員工的必須政策。本文探討此「盈餘分配方式不對稱現象」是否反應管理階層的「員工誘因理論」還是「侵權理論」。本文發現公司的未來績效的確與公司「盈餘分配不對稱」呈正向關係。本文的結果支持「盈餘分配方式不對稱現象」產生的員工誘因效果大於對股東的侵權效果。

關鍵詞: 員工分紅；公司績效；股東股利；激勵效果；侵權效果

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Abstract： Employee profit sharing stock bonus has always been regarded as the main contributor to the success of the high-tech industry in Taiwan. As profit sharing bonus and shareholder dividends are determined at the same time at the shareholder meeting under the Corporation Law in Taiwan, and can be distributed in either cash or shares, many investors question the fairness to distribute profit sharing bonus (dividends) more (less) in stocks than in cash (Chung, 2004). This study examines whether the high stock/cash proportion in employee bonus, relative to the proportion in shareholder dividends (i.e., asymmetric distribution) represents management's net incentive or entrenchment effects. Consistent with net incentive theory, the result show that firm performance, as measured by Tobin's Q and ROA, can increase with the asymmetric distribution. The results infer that the incentive effect in the asymmetric distribution dominates the entrenchment effect.

Keywords: Profit sharing bonus; Firm performance; Dividends; Incentives; Entrenchment

1. Introduction

Employee profit sharing stock bonus has always been regarded as the main contributor to the success of the high-tech industry in Taiwan, (Guo *et al.*, 2006; Lin and Chen, 2009; Jeng *et al.*, 2009). [2] It is believed that the large-scale adoption of the employee stock ownership in the profit sharing bonus has played a crucial role in the phenomenal growth of the high-tech industry in the past two

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[2] The cover story "why Taiwan matters" in Business week (May 16, 2005) has documented the success of the high-tech industry in Taiwan, which is often regarded as Silicon Valley in the East. For example, "Asustek Computer, whose China factories spit out iPods and Mini Macs for Apple; and Quanta Computer, the No. 1 global maker of notebook PCs and a key supplier to Dell (**DELL**) and Hewlett-Packard. You'll also find Taiwan Semiconductor Manufacturing Co. (**TSM**), the biggest chip foundry on the planet, an essential partner to U.S. companies such as Qualcomm and Nvidia (**NVDA**). Dozens more companies dot the Neihu-Hsinchu corridor. There's AU Optronics (**AUTO**), a big supplier of liquid-crystal display panels, and Hon Hai Precision Industry, which makes everything from PC components to Sony's (**SNE**) PlayStation 2, and which is a fast-rising rival to Flextronics International (**FLEX**), the world's biggest contract manufacturer."

decades. However, many investors are concerned that many high-tech firms distribute dividends primarily in cash and distribute employee bonus primarily in stock form (Chung, 2004). They argue that management's tendency to increase stock/cash proportion for employee bonus, relative to the stock/cash proportion for dividends (hereinafter "asymmetric distribution") is an indicator of management entrenchment because shareholders also prefer the stock dividends to cash dividends.

This study examines whether asymmetric distribution can provide incentive effects more than entrenchment effects (i.e, net incentives), or vice versa (i.e., net entrenchments). Different from the accounting treatments in the U.S.A, the number of stocks for stock dividends and stock bonus are determined and recorded based on the par value of stocks rather than the market value.[3] If the stock price of each share is much larger than the par value, shareholder (or employees) can gain more than the book value if dividends (or bonuses) are paid in the form of stocks. In Taiwan, Corporation law requires firms determine employee bonus and shareholder dividends at the same time at the board of directors meeting and shareholder meeting. In the article of each corporation, a firm should specify the distribution policy for profit sharing bonus and dividends with regard to the cash/stock proportion. As companies need to draft earnings distribution plans before submitting for the approval at the shareholder meeting, this raises a question whether asymmetric distribution can align the interests before shareholders and managers, and improve firm performance.

On one hand, asymmetric distribution can provide incentives to employees by improving shareholders' value. Cheadle (1989) argues that when the supervisions costs are likely to be higher in professional occupations, stock bonus can provide the incentives. Since high-tech industry is a knowledge-intensive and capital-intensive industry, and its task complexity is high, I expect that the

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[3] However, after January 1, 2008, Taiwanese accounting standards require firms to estimate the profit-sharing bonus expense in the financial statements before the actual distribution in the subsequent year. In addition, if the firm chooses to distribute profit-sharing bonus to employees in the form of stocks, the new rule also requires the number of shares be determined by the fair value of the shares granted as opposed to the par value of the shares.

asymmetric distribution can enhance productivity in workplaces. In addition, profit sharing bonus can lead to lower absenteeism and quit rates (Azfar and Danninger, 2001; Brown *et al.*, 1999; Wilson and Peel, 1991). Thus, asymmetric distribution, which puts more weight on stock bonus than cash bonus, can accelerate the benefits of reducing quit rates among employees. Similarly, if profit sharing bonus can encourage mutual monitoring and peer group pressure (Baker *et al.*, 1987; Fitzroy and Kraft, 1986; Kruse, 1993; Levine and Tyson, 1990), I expect that distributing bonus more in the form of stocks than cash can speed up a cooperative culture among employees, which in turn can improve firm performance.

On the other hand, asymmetric distribution may represent managers' self-interests to entrench shareholders' value. Stock bonuses issued to managers and staff members could potentially dilute share value and may have negative impact on shareholders' wealth. This is so-called the dilution effect. Moreover, employees' stock bonuses significantly underestimated the real 'cost' of the bonuses and overestimates firms' reported net income in Taiwan before 2008. During the period, being treated as part of profit distribution, the stocks were directly taken to retained earnings, bypassing net income and being recognized with the par value (i.e. NT$10 a share) rather than market value. Chung (2004) argues that the real cost of stock bonuses was significantly underestimated because the number of stocks issued was determined at par (i.e., NT$10 a share) rather than market value. Since stock bonus has taken up a large sum of dilution costs, companies need to reduce the dividends in the form of stocks to avoid the dilution costs from the stock dividends. This represents managers' entrenchment on shareholders' benefits.

Because of these competing perspectives, it is ultimately an empirical question whether asymmetric distribution can represent net incentive or entrenchment effects. If the entrenchment effect outweighs the incentive effect, asymmetric distribution can have a negative performance effects. Since prior studies have provided evidence in support of the positive performance effects of profit sharing bonus in Taiwan, (Guo *et al.*, 2006; Lin and Chen, 2009; Jeng *et al.*, 2009), this study expects that the positive association between employee

bonus and firm performance can decrease with asymmetric distribution. Conversely, if the incentive effect dominates entrenchment effect, this study expects that the positive association between employee bonus and firm performance can rise as the asymmetric distribution increases.

The data includes a sample of 1,799 observations consisting of high-tech publicly-traded firms in Taiwan from years 1997-2007. This study measure "asymmetric distribution" by dividing the stock/cash proportion in profit sharing bonus by the stock/cash proportion in shareholder dividends. Using market-based performance measures, TobinQ and accounting-based performance measure, ROA, to measure firm performance, the results show that "asymmetric distribution" is positively associated with future performance. This study provides evidence that firms use stock bonus to motivate employees on innovations, and incentive effects can dominate the dilution costs.

The contributions consist of three parts. First, this study contributes to compensation and dividend literature by pointing out that executive compensation should be made concurrently with shareholder dividends. Lambert *et al.* (1989) argue that dividends decrease relative to the expected level following the adoption of stock incentives because dividend payout can reduce the market value. Fenn and Liang (2001) also argue that managers with the stock incentives have the motive to alter the compositions of corporate payouts to address the free cash flow problems (Fenn and Liang, 2001). All these studies focus on how managerial stock incentives influence subsequent policies but neglect the possibility that corporate payout and employee compensation can be determined at the same time. Second, while many argues that managerial incentives can influence management decisions and mitigate various agency problems, Yermack (1995) find that the observed executive stock options in the U.S.A are not optimal. The study provides a possibility that if compensation decisions and corporate payout are not determined at the same time, compensation decision might not be optimal. Finally, this study provides important implications for high-tech industries in Taiwan that employee profit sharing bonus is an important driver of shareholders' wealth. Prior studies of stock bonus, (Guo *et al.*, 2006; Lin and Chen, 2009; Jeng *et al.*, 2009) do not consider the cross-sectional variations of stock bonus and do not

introduce a benchmark to measure the appropriate level of stock bonus. This study benchmarks the stock/cash ratio of employee bonus against the stock/cash ratio of stock dividends, and examine whether such asymmetric distribution represents a net incentive or net entrenchment effect.

The rest of the paper is structured as follows. Section 2 describes the institutional background for profit sharing bonus in Taiwan. Section 3 presents the theoretical and hypothesis developments and section 4 describes the sample and research design. Section 5 presents the primary results and section 6 concludes the study.

2. Earnings distribution for profit sharing bonus schemes and dividends in Taiwan

In Taiwan, profit-sharing bonus scheme is a common practice because provision 235 of the Company Law requires that all companies retain a percentage of net income in each year for employee profit-sharing bonus. When allocating the net profits for each fiscal year, the company shall first offset its losses in previous years, set aside 10% of the net profits as the legal capital reserve, and then set aside a percentage of the remaining balance as the profit-sharing bonus to employees and dividends to shareholders. The profit-sharing plan should be stated clearly in their respective company articles. The bonus can be set as a fixed percentage (e.g., 4%), a range (e.g., 5%-10%), or a threshold (e.g., no less than 2%). Both dividends and employee profit sharing bonus can be distributed either in cash, in the form of shares or a combination of cash and shares. The amount distributed each year should be confirmed by the resolution of the shareholder meeting. More specifically, the directors will call for a meeting to draft an earnings distribution plan in a few months after the fiscal year-end. The proposed profit distribution plan will be effective upon the approval of shareholders at the annual shareholder meeting.

For example, as of June, 2006, Au Optronics Corp specifies the following distribution policy in its article of corporation: (1) at least 5% of the earnings for profit sharing bonus to employees, (2) at most 1% of the earnings for profit

sharing remuneration to board of directors, and (3) all or a portion of the remainder is distributable as dividends to shareholders. The appropriation of AUO's net earnings for employee profit sharing bonus and shareholder dividends can be distributed in cash or/and stocks. The policy for dividend distribution considers factors such as the current and future investment environments, fund requirements, domestic and international competition, capital budgets, the benefits to shareholders and long-term financial planning.

Exhibit 1 Panel A illustrates AUO's appropriation from the distributable earnings of 2005; Exhibit 1 Panel B depicts the recording of the distribution in the consolidated statements of stockholders' equity for 2006. As shareholders' meeting is usually held within 6 months after the fiscal year end, the dividends and profit sharing bonus for earnings in 2005 are charged directly to retained earnings in 2006 in which the annual shareholder meeting approves these payments.

In the example, it is clear that the stock/cash ratio for dividends is 1:1 (i.e. $1,749,164:$1,749,164) in Au Optronics, but the stock/cash ratio for profit sharing bonus reaches 2.33:1 (i.e. $886,051:$379,736). This exhibits a payment asymmetry in the determination of the cash/stock forms between employee profit sharing bonus and dividends. As the article of corporations in AUO Co doesn't specify the policy for the distribution methods (i.e. cash or stock) of profit sharing bonus and dividends, board of directors have high discretion on this payment choices. Since 1980s, to attract the talented high-tech staff from Silicon Valley, many firms in the high-tech industry in Taiwan incorporate the stock ownership in the profit sharing scheme by overweighting the stock bonus relative to cash bonus (Hung, 1997). Profit sharing bonus can induce employees to exert a greater effort and to make more commitments in accomplishing its ultimate goals, thereby increasing company performance (Kruse, 1996). In addition, the use of employee ownership in the profit sharing bonus can reduce the moral hazard problem in that they have both a general interest in profit maximization, create peer group pressure to ensure high performance standards across the firm, and facilitate intellectual capital flow within the firm (Jensen and Meckling, 1976; Kruse, 1993). Many CEOs of the high-tech firms, such as Stan Shih of Acer, believe that

Exhibit 1 Illustration of AUO's earnings distribution and corresponding accounting treatments

Panel A:

Distribution of earnings 2005	
Legal reserve	1,562,699
Cash dividend	1,749,164
Stock dividend	1,749,164
Employee bonuses—cash	379,736
Employee bonuses—stock (at par)	886,051
Remuneration to directors and supervisors	21,097

Panel B:

	Capital stock				Retained earn	
	Number of shares	Amount	Capital in advance	Capital surplus	Legal reserve	Special reserve
Balance at January 1, 2006	5,830,548	58,305,471	-	57,664,144	4,964,545	201,809
Appropriation for legal reserve	-	-	-	-	1,562,699	-
Cash dividends	-	-	-	-	-	-
Stock dividends to shareholders	174,916	1,749,164	-	-	-	-
Issuance of employee stock bonus	88,605	886,051	-	-	-	-
Employees' profit sharing—cash	-	-	-	-	-	-
Remuneration to directors and supervisors	-	-	-	-	-	-
Issuance of new shares for merger	1,479,110	14,791,100	-	52,957,471	-	-
Employee stock options assumed from merger with QDI	-	-	-	76,062	-	-
Issuance of stock for employee stock option exercised	224	2,242	-	6,390	-	-
Effect of disproportionate participation in investees' capital increases, and unrealized gain or loss on financial instruments	-	-	-	(28,449)	-	-
Net income	-	-	-	-	-	-
Minority interests in net income of subsidiaries	-	-	-	-	-	-
Unrealized gain on available for sale financial assets	-	-	-	-	-	-
Unrealized loss on cash flow hedges	-	-	-	-	-	-
Foreign currency translation adjustments	-	-	-	-	-	-
Adjustments for changes in minority interests	-	-	-	-	-	-
Balance at December 31, 2006	7,573,403	75,734,028	-	110,675,618	6,527,244	201,809

employees' bonus in stock improves the competitive ability of their firms in the global economy.[4]

3. Literature Review and Hypothesis Developments

In this section we review the literature related to the incentive and entrenchment effects of stock bonus, and form the hypotheses.

3.1 Literature Review

3.1.1 Incentive Effects of Profit sharing Stock Bonus

Prior studies have found that profit sharing stock bonus can have incentive effects. First, rewarding profit sharing in stocks can induce employees to exert a greater effort or develop innovative ways to improve organizational performance (Fitzroy and Kraft, 1987; Cable and Wilson, 1989; Wadhwani and Wall, 1990; Weitzman and Kruse, 1990; Kruse, 1993; Bhargava, 1994). High-tech industry is a knowledge-intensive and capital-intensive industry, and its task complexity is high. Since the supervisions costs are likely to be higher in professional occupations (Cheadle, 1989), stock bonus can enhance productivity in workplaces where supervision of employees is costly and employee shirking is a concern. (Shih, 2002). Second, as compared with fixed cash payment, stock bonus can reduce agency problems between the owners and the employees (Blasi *et al.*, 1996; Kruse, 1993). It can improve employee attitude, reduce turnover among employees (e.g., Coyle-Shapiro *et al.*, 2002), and lead to lower absenteeism and quit rates (Azfar and Danninger, 2001; Brown *et al.*, 1999; Wilson and Peel, 1991). Jensen and Meckling (1976) believe that the agency problem reduces as management ownership rises, because of the convergence-of-interest hypothesis. Thus, market value increases with management ownership. Finally, it can also encourage mutual monitoring and peer group pressure (Baker *et al.*, 1987; Fitzroy

[4] Shih (2002), Chairman of Acer Inc., indicated that the employee bonus plan improves the development of high-tech industry in Taiwan. Taso (2002), Chairman of United Microelectronics Corp, expressed that the unique employee stock bonus plan in Taiwan is one of the main factors that contribute to the competitive ability of the company and it could significantly improve firm's operating performance.

and Kraft, 1986; Kruse, 1993; Levine and Tyson, 1990). This can also generate a cooperative culture among employees and enhance firm performance.

Thus, stock bonus can promote worker productivity by encouraging work effort, cooperation, and sharing of ideas (Conte and Svejnar, 1990; Kruse, 1992, 1993).

3.1.2 Entrenchment Effects of Profit Sharing Stock Bonus

As senior management has substantial influence over their pay, entrenchment effect refers to bonus being paid in excess of the level that would be optimal for shareholders. Many studies provide evidence that compensation is in excess and unrelated to firm performance. While managerial incentives can influence management decisions and mitigate various agency problems, Yermack (1995) find that the observed executive stock compensation in the U.S.A are not optimal. Bertrand and Mullainathan (2001) shows that executive pay responds as much to luck as to general performance. They interpret their results as evidence in support of managers benefiting at the expense of shareholders. Bebchuk, Fried, and Walker (2002) argues that the absence of stock compensation which filter out general market increases and the near-uniform use of at-the-money options in compensation is consistent with the rent extraction perspective. Baber, Janakiraman, and Kang (1988) also argue that outside directors lack the economic incentives to curb excessive compensation (Baker, Jensen, and Murphy, 1987). Compensation committees do not play a proper job as they usually serve at the discretion of CEOs (Shivdasani and Yermack, 1999).

In addition, stock bonuses issued to managers and staff members could potentially dilute share value and may have negative impact on shareholders' wealth. This is so-called the dilution effect. As employees' stock bonuses were not reported in the income statement, Dean and Unimonen (2002) argue that the unique accounting and reporting practice could severely damage the reliability and transparency of accounting information in Taiwan because Investors would have to make their own adjustments on stock bonus when valuing a firm in Taiwan. As a consequence, it is likely that investors cannot fully understand the implications

of stock bonus, resulting in stock bonus being overpaid. Thus, stock bonus can generate entrenchment effects, which may be detrimental to firm performance.

3.1.3 Net Effects of Profit Sharing Stock Bonus in Taiwan

In Taiwan, prior studies have provided evidence in support of the positive performance effects of profit sharing bus in Taiwan, in support of a net incentive effect, (Guo *et al.*, 2006; Lin and Chen, 2009; Jeng *et al.*, 2009). However, these studies do not consider the cross-sectional variations of stock bonus and do not introduce a benchmark to measure the appropriate level of stock bonus. It is likely that stock bonus has net incentive effects up to a certain level, above which the entrenchment effects can outweigh the incentive effects. Thus, to fulfill the gap, this study benchmarks the stock/cash ratio of employee bonus against the stock/cash ratio of stock dividends, and examine whether such asymmetric distribution represents a net incentive or net entrenchment effect.

3.2 Hypothesis Developments

Since asymmetric distribution relates to the tendency of stock/cash proportion for bonus being higher than that that for dividends, asymmetric distribution can also have two offsetting effects on firm performance: an incentive effect and an entrenchment effect. Thus, the extent to which the net effect between incentive and entrenchment effect of asymmetric distribution affects firm performance can only be empirically tested.

As asymmetric distribution refers to the tendency to issue more stock bonus than cash bonus, relative to the corresponding ratio for dividends, it is also motivated by the incentive theory of stock bonus. Cheadle (1989) argues that when the supervisions costs are likely to be higher in professional occupations, stock bonus can provide the incentives. Since high-tech industry is a knowledge-intensive and capital-intensive industry, and its task complexity is high, I expect that the asymmetric distribution can enhance productivity in workplaces. In addition, profit sharing bonus can lead to lower absenteeism and quit rates (Azfar and Danninger, 2001; Brown *et al.*, 1999; Wilson and Peel, 1991). Thus, asymmetric distribution, which puts more weight on stock bonus

than cash bonus, can accelerate the benefits of reducing quit rates among employees. Similarly, if profit sharing bonus can encourage mutual monitoring and peer group pressure (Baker *et al.*, 1987; Fitzroy and Kraft, 1986; Kruse, 1993; Levine and Tyson, 1990), I expect that distributing bonus more in the form of stocks than cash can speed up a cooperative culture among employees, which in turn can improve firm performance.

On the other hand, managers may have high incentives determine asymmetric distribution by allocating the firm's resources in their own best interest, which may conflict with the interests of outside shareholders. Prior literature has found some evidence supporting management's entrenchment in dividend policy strategies (Berger *et al.*, 1997). Executive directors may distribute stock bonus beyond the optimal point, in order to increase their own compensation. La porta *et al.* (1999) also finds that investors in poor legal protection countries cannot use their legal powers to extract dividends from firms, and receive less dividend payouts than firms in better legal protection countries. Thus, dividend payout policy can become a vehicle for managers in high-tech industry to maximize their own compensation.

Thus, my hypotheses are non-directional as the net effect is an empirical question. If the incentive effect of asymmetric distribution dominations the entrenchment effects, I expect that asymmetric distribution can achieve higher financial performance. Since prior studies have provided evidence in support of the positive performance effects of profit sharing bus in Taiwan, (Guo *et al.*, 2006; Lin and Chen, 2009; Jeng *et al.*, 2009), the positive relationship between firm performance and employee stock bonus can increase with asymmetric distribution. Thus, I form H1a as follows:

> ***H1a: If the incentive effect in asymmetric distribution outweighs its entrenchment effects, positive association between firm performance and employee stock bonus can increase with asymmetric distribution.***

On the other hand, if the tendency towards stock/cash distribution reflects managers' flexibility at the board meeting to misallocate earnings distributions, it

is expected that firm performance for these firms should be lower than the other firms. Based on the findings in support of the positive performance effects of profit sharing bus in Taiwan, (Guo *et al.*, 2006; Lin and Chen, 2009; Jeng *et al.*, 2009), this study expects that the positive relationship between firm performance and employee stock bonus can decrease with asymmetric distribution if entrenchment effect dominates its incentive effect. H1b is formed as follows:

H1b: If the entrenchment effect in asymmetric distribution outweighs its incentive effects, the positive association between firm performance and employee stock bonus can decrease with asymmetric distribution.

4. Sample and Research Design

4.1 Sample

All accounting and finance data for Taiwanese high-tech listed companies for the years 1997 – 2007 is collected from Taiwan Economic Journal database. Panel A of Table 1 shows that my original selection process started with 2,517 observations. 531 observations are removed for firms that do not distribute employee bonus and dividends; 77 observations are deleted if firms have missing value for corporate governance and outliers for the top and bottom 1% of each variable. This leaves a total sample size for this study of 1,799 firm-year observations.

4.2 Model Specification

4.2.1 The Link between Profit Sharing Bonus and Subsequent Performance

As prior studies have provided evidence in support of the positive performance effects of profit sharing bus in Taiwan, (Guo *et al.*, 2006; Lin and Chen, 2009; Jeng *et al.*, 2009), equation (1) and (2) are constructed to ensure my results are comparable with prior studies.

$$TOBINQ_t = \alpha_0 + \alpha_1 TOBINQ_{t-1} + \alpha_2 BONUS_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV + \alpha_5 RD_{t-1t} + \varepsilon_t \quad \textbf{(1)}$$

$$ROA_t = \alpha_0 + \alpha_1 ROA_{t-1} + \alpha_2 BONUS_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV + \alpha_5 RD_{t-1t} + \varepsilon_t \quad \textbf{(2)}$$

Panel B of Table 1 depicts the coverage of high-tech industries. The high-tech industry covers six sub-industries by the industry definitions of Taiwan Stock Exchange. TSE_24 is the industry for semiconductor and IC (integrated circuits) firms; TSE_25 is the computer-related industry; TSE_26 is LCD-related industry; TSE_27 is communication industry; TSE_28 is printed circuit board (PCB) industry; TSE_29 is 3C retailing and electronic equipments; TSE_30 is software-related industry; TSE_31 is other optoelectronics industry.

Table 1
Sample Selection and Distribution

Panel A :Sample Selection

	Firm-year observations
High-tech firms listed on the Taiwan Stock Exchange from year 1997 to year 2007.	2,517
Less: firms that do not distribute bonus and dividends	(531)
Less: firms that have missing value for corporate governance variables	(77)
Less: outliers (in the top and bottom 1% of each variables)	(110)
Total observations for the estimation	1,799

Panel B: High-tech Industry Coverage

Industry	Freq.
TSE_24: [IC substrate, Diodes, power supply, foundry, IC tester, RAM, IC design , IC mask, IC lead frame, electric equipments]	267
TSE_25: Home appliances and computer related (notebook, pc, motherboard, graphical board, tv card, post terminal, server, monitor, scanner, pc peripherials, storage device, CDROM, case, components, modem, 3C retail)	341
TSE_26: [LED, solar cells, LCD, LCD materials, monitoring systems, camera]	215
TSE_27: Communications [Flexible print circuit, connector, network card, mobile, communication device, telecommunication, network service, satellite, stereo/speaker]	143
TSE_28: printed circuit board, FR-4, passive components, crystal	414
TSE_29: 3C retailing, component agents and other electric equipments	136
TSE_30: software and system integrations	92
TSE_31: other optoelectronics	191
	1,799

Where $TOBINQ_t$ is measured as the market value of common stock equity plus book value of liabilities, divided by the book value of total assets of the firm at the end of the fiscal year; ROA_t is return on shareholders' equity at year t; $BONUS_{t-1}$ is the bonus ratio, defined as the market value of total employee bonus divided by total distributable net income at year t; $SIZE_t$ is the natural logarithm of total assets at year t ; RD_t is R&D intensity at year t , which is defined as R&D expenditures divided by net sales; LEV_t is total liabilities to total assets.

Following prior studies (Guo *et al.*, 2006; Lin and Chen, 2009; Jeng *et al.*, 2009), the performance measure as measured by market-based performance ($TOBINQ_t$) and accounting-based indicator (ROA_t) is regressed on employee profit sharing bonus and a set of control variables (Morck *et al.*, 1988; McConnel and Servaes, 1990; Cho, 1998; Woidtke, 2002; Yeh *et al.*, 2001). To control for the sub-industry impacts, I separate TOBINQ (ROA) into an industry component based on the median industry TOBINQ (ROA) and a firm-specific component (i.e., $ATOBINQ_t$ ($AROA_t$)) and use firm-specific performance as the measure for firm performance. Further, the coefficient on $BONUS_{t-1}$ is the variable of interests which captures the sensitivity of profit sharing bonus to firm performance. Finally, several commonly used control variables are included. Firm performance in the previous year is included to address the causality issue and expect a positive relationship between RD_t and firm performance, because R&D proxies for a firm's investment (Morck *et al.*, 1988; Woidtke, 2002; Yeh *et al.*, 2001). I also expect a positive association between size and firm performance as larger firms have better disclosure, more liquid trading, and more diversified activities leading to lower risks (Morck *et al.*, 1988; Woidtke, 2002; Yeh *et al.*, 2001). Following Yermack (1995), fixed effect model is used to control for firm effects as characteristics such as management skill. Finally, TobinQ and ROA in year t+1 are also examined because the future performance effects are likely to take some time to realize.

4.2.2 The Association between Asymmetric Distribution and Subsequent Performance

This study first develops the measure of *"the asymmetric distribution"* ($ASYM_{t-1}$).

$$ASYM_{t-1} = \frac{BS_{t-1}}{DS_{t-1}} = \frac{stock\ bonus\_par_{t-1}/cash\ bonus_{t-1}}{stock\ dividends\_par_{t-1}/cash\ dividends_{t-1}}$$

Where $ASYM_{t-1}$ is measured by the ratio of stock/cash proportion in employee bonus relative to stock/cash proportion in dividends; BS_{t-1} is the stock/cash proportion in employee bonus; DS_{t-1} is the stock/cash proportion in dividends.

$ASYM_{t-1}$ is interacted with $BONUS_{t-1}$ in equation (1) and (2). Equation (3) and (4) are formed as follows:

$$TOBINQ_t = \alpha_0 + \alpha_1 TOBINQ_{t-1} + \alpha_2 BONUS_{t-1} + \alpha_3 DISP_{t-1} + \alpha_4 DISP_{t-1} \times BONUS_{t-1} + \alpha_5 SIZE_t + \alpha_6 LEV + \alpha_7 RD_{t-1t} + \varepsilon_t \quad (3)$$

$$ROA_t = \alpha_0 + \alpha_1 ROA_{t-1} + \alpha_2 BONUS_{t-1} + \alpha_3 DISP_{t-1} + \alpha_4 DISP_{t-1} \times BONUS_{t-1} + \alpha_5 SIZE_t + \alpha_6 LEV + \alpha_7 RD_{t-1t} + \varepsilon_t \quad (4)$$

Note that the variable of interests in equation (3) and (4) is $DISP_{t-1} \times BONUS_{t-1}$. If the asymmetric distribution represents a net incentive effect, the coefficient on $DISP_{t-1} \times BONUS_{t-1}$ should be positive; conversely, if the asymmetric distribution represents an entrenchment effect, the coefficient on $DISP_{t-1} \times BONUS_{t-1}$ is negative.

5. Empirical Results

5.1 Descriptive Statistics

Table 2 reports descriptive statistics of main variables. The mean (median) values for $TOBINQ_t$ is 1.564 (1.298) respectively and the mean (median) values for ROA_t is 0.122 (0.109) respectively. $ATOBINQ_t$ and $AROA_t$ is the industry-adjusted performance measure at year t, calculated as the difference between $TOBINQ_t$ (ROA_t) and the median value for the industry. $BONUS_{t-1}$ is bonus ratio, calculated as the market value of profit sharing bonus divided by total distributable net income at year t-1. The mean (median) value for $BONUS_{t-1}$ is 25.4% (19.7%) of a company's reported earnings.

BS_{t-1} (DS_{t-1}) is the proportion of stock bonus (stock dividends) to cash bonus (cash dividends) at year t and the mean and median values for BS_{t-1} (DS_{t-1}) is 0.722 (0.546) and 0.80 (0.50), respectively. $ASYM_{t-1}$ is the ratio of BS_{t-1} and

Table 2
Descriptive Statistics

variable	N	mean	std	p25	p50	p75
$TOBINQ_t$	1,799	1.564	0.954	0.967	1.298	1.815
$ATOBINQ_t$	1,799	0.269	0.889	-0.276	0.037	0.506
ROA_t	1,799	0.122	0.071	0.072	0.109	0.155
$AROA_t$	1,799	0.02	0.071	-0.03	0.007	0.055
$BONUS_{t-1}$	1,799	0.254	0.243	0.118	0.197	0.317
BS_{t-1}	1,799	0.72	0.31	0.5	0.8	1
DS_{t-1}	1,799	0.546	0.304	0.286	0.5	0.8
$ASYM_{t-1}$	1,799	2.138	2.652	1	1.243	2
RD_t	1,799	0.036	0.04	0.01	0.024	0.045
$SIZE_t$	1,799	15.177	1.26	14.289	14.952	15.779
LEV_t	1,799	0.364	0.14	0.256	0.363	0.47
$FMDM_{t-1}$	1,799	0.216	0.412	0	0	0
$BDSZ_{t-1}$	1,799	6.468	1.55	5	7	7
$BDSH_{t-1}$	1,799	0.223	0.11	0.143	0.201	0.287
$BLKSH_{t-1}$	1,799	0.14	0.09	0.073	0.129	0.19
$INDST_{t-1}$	1,799	0.152	0.164	0	0	0.286
$INST_{t-1}$	1,799	0.019	0.03	0	0.005	0.027
$FINST_{t-1}$	1,799	0.001	0.005	0	0	0
$DUAL_{t-1}$	1,799	0.354	0.478	0	0	1
MGR_SHARE_{t-1}	1,799	0.023	0.032	0.002	0.009	0.032

Note : [a] All firms are listed on the Taiwan Stock Exchange from 1997 to 2007 and all the data are collected from the Taiwan Economic Journal (TEJ) database.

[b] $TOBINQ_t$ is profitability at year t, defined as the sum of market value of common stock, the liquidation value of preferred stock and total debts divided by total assets; $ATOBINQ_t$ is industry-adjusted TOBINQ, calculated as the difference between TOBINQ and the median value for industry TOBINQ. ROA_t is return on shareholders' assets at year t; $AROA_t$ is industry-adjusted ROA, the difference between ROA and the median value for ROA. $BONUS_{t-1}$ is the bonus ratio, defined as market value of total employee bonus divided by total distributable net income at year t-1; $Assets_t$ is total assets at year t in New Taiwan Dollars. $SIZE_t$ is the natural logarithm of total assets at year t; LEV_t is total liabilities to total assets; RD_t is R&D intensity at year t, defined as R&D expenditures divided by net sales; $ASYM_{t-1}$ is asymmetric distribution of stock/cash distribution as measured by the ratio of stock/cash proportion in employee bonus relative to stock/cash proportion in dividends; BS_{t-1} is the stock/cash proportion in employee bonus; DS_{t-1} is the stock/cash proportion in dividends. $FMDM_{t-1}$ equals to one if the firm is a family-controlled firm, and zero otherwise; $BDSZ_{t-1}$ is board size in seat number; $BDSH_{t-1}$ is the shareholding by board

of directors; $BLKSH_{t-1}$ is outside blockholder shareholding; $INDST_{t-1}$ is the percentage of independent board member; $INST_{t-1}$ indicates the percentage of stocks by domestic financial institutions; $FINST_{t-1}$ is the percentage of stocks by foreign financial institutions; $DUAL_{t-1}$ equals to one when the CEO serves as chair of the board and zero otherwise; MGR_SHARE_{t-1} is the shareholdings by managers.

Table 3
Correlation Table

Var.	$TobinQ_t$	$ATOBINQ_t$	ROA_t	$AROA_t$	$BONUS_{t-1}$	$SIZE_t$	LEV_t	RD_t	$ASYM_{t-1}$
$TOBINQ_t$	1.00	0.92	0.51	0.32	0.42	-0.04	-0.47	0.37	0.07
	.	(0.00)	(0.00)	(0.00)	(0.00)	(0.10)	(0.00)	(0.00)	(0.00)
$ATOBINQ_t$	0.97	1.00	0.47	0.31	0.37	-0.09	-0.42	0.25	0.09
	(0.00)	.	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ROA_t	0.50	0.47	1.00	0.40	0.36	-0.01	-0.35	0.18	0.03
	(0.00)	(0.00)	.	(0.00)	(0.00)	(0.59)	(0.00)	(0.00)	(0.31)
$AROA_t$	0.46	0.47	0.98	1.00	0.33	-0.07	-0.32	0.12	0.02
	(0.00)	(0.00)	(0.00)	.	(0.00)	(0.01)	(0.00)	(0.00)	(0.47)
$BONUS_{t-1}$	0.37	0.34	0.24	0.11	1.00	0.14	-0.12	0.25	0.16
	(0.00)	(0.00)	(0.00)	(0.00)	.	(0.00)	(0.00)	(0.00)	(0.00)
$SIZE_t$	-0.01	-0.06	-0.01	0.05	0.07	1.00	0.17	-0.14	0.11
	(0.59)	(0.02)	(0.79)	(0.07)	(0.00)	.	(0.00)	(0.00)	(0.00)
LEV_t	-0.39	-0.36	-0.35	-0.21	-0.10	0.14	1.00	-0.44	-0.05
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	.	(0.00)	(0.04)
RD_t	0.32	0.24	0.17	0.14	0.24	-0.15	-0.42	1.00	0.08
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	.	(0.00)
$ASYM_{t-1}$	0.08	0.09	-0.02	0.02	0.04	0.17	-0.09	0.06	1.00
	(0.00)	(0.00)	(0.49)	(0.34)	(0.17)	(0.00)	(0.00)	(0.02)	.

Note: [a] This table reports both Pearson (top) and Spearman (bottom) correlations, with p-values are reported in parenthese.

[b] The overall sample size is 1,799. All firms are listed on the Taiwan Stock Exchange from 1997 to 2007 and all the data are collected from the Taiwan Economic Journal (TEJ) database. $TOBINQ_t$ is profitability at year t, defined as the sum of market value of common stock, the liquidation value of preferred stock and total debts divided by total assets; $ATOBINQ_t$ is industry-adjusted TOBINQ, calculated as the difference between TOBINQ and the median value for industry TOBINQ. ROA_t is return on shareholders' assets at year t; $AROA_t$ is industry-adjusted ROA, the difference between ROA and the median value for ROA. $BONUS_{t-1}$ is the bonus ratio, defined as market value of total employee bonus divided by total distributable net income at year t-1; $SIZE_t$ is the natural logarithm of total assets at year t; LEV_t is total liabilities to total assets; RD_t is R&D intensity at year t, defined as R&D expenditures divided by net sales; $ASYM_{t-1}$ is asymmetric distribution as measured by the ratio of stock/cash proportion in employee bonus relative to stock/cash proportion in dividends

DS_{t-1}, and the mean (median) value for $ASYM_{t-1}$ is 2.138 (1.243). It is quite clear that board of directors tend to distribute profit sharing bonus in the form of shares as opposed to the cash distribution for shareholder dividends. Further, R&D expenditure takes around 3.6% of net sales. The median values of size ($SIZE_t$) and leverage (LEV_t) is 14.95 and 0.36, indicating that the size for the high-tech industry is generally not large and the financial risk is generally quite low.

Table 3 reports the Pearson product-moment between the variables. The market value for employee bonus ($BONUS_{t-1}$) is positively correlated with the subsequent-year firm performance measures, $TOBINQ_t$, $ATOBINQ_t$, ROA_t, $AROA_t$.. $ASYM_{t-1}$ is positively associated with $TOBINQ_t$ and $ATOBINQ_t$, consistent with incentive hypothesis. I also examine variance inflation factors (VIF) to check for multicollinearity and find that the values are less than 3, well below the conventional cutoff value of 10 that indicates excessive multicollinearity. Hence, multicollinearity is not a concern in our tests.

5.2 Regression Results

5.2.1 The Association between Firm Performance and Profit Sharing Bonus

Table 4 first presents regression estimate (1) that links firm performance to profit sharing bonus. Firm performance is regressed on the profit sharing bonus ($BONUS_{t-1}$) along with control variables. $BONUS_{t-1}$ is positively associated with firm performance for both market-based performance measure, $TOBINQ_t$ and accounting-based performance measure, ROA_t. As the results using *TOBINQ* and *ROA* at time t are qualitatively similar to the results using *TOBINQ* and *ROA* at time t+1, I will only discuss the results for performance measured at time t.

Using $TOBINQ_t$ ($ATOBINQ_t$) as a performance measure, Panel A shows that the coefficient on $BONUS_{t-1}$ is 1.239 (1.036), significant at the 1% level. Using ROA_t ($AROA_t$) as a performance measure, Panel B also shows that the coefficient on $BONUS_{t-1}$ is 0.058 (0.056), significant at the 1% level. Controlling for the industry effects in the regression does not change the results. This suggests that profit sharing bonus overall can improve firm performance and valuation. Among

the other control variables, R&D is positively associated with firm performance measure, and leverage and size are negatively associated with firm performance.

Table 4
Firm Performance and Employee Profit Sharing Bonus

Panel A Tobin's Q and employee bonus

$$TOBINQ_t = \alpha_0 + \alpha_1 TOBINQ_{t-1} + \alpha_2 BONUS_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV + \alpha_5 RD_{t-1t} + \varepsilon_t \quad (1)$$

	$TOBINQ_t$	$TOBINQ_{t+1}$	$ATOBINQ_t$	$ATOBINQ_{t+1}$
INTERCEPT	2.151	2.792	0.869	0.843
	(8.88)***	(9.64)***	(3.56)***	(2.99)**
$TOBINQ_{t-1}$	0.351	0.343	0.296	0.292
	(9.78)***	(9.75)***	(8.41)***	(8.33)***
$BONUS_{t-1}$	1.239	1.170	1.036	1.034
	(7.26)***	(7.02)***	(6.86)***	(6.71)***
$SIZE_t$	-0.042	-0.076	-0.018	-0.014
	(-2.65)**	(-4.49)***	(-1.20)	(-0.82)
LEV_t	-1.613	-1.555	-1.650	-1.741
	(-9.90)***	(-9.72)***	(-11.10)***	(-11.65)***
RD_t	1.750	0.162	0.602	0.888
	(2.60)**	(0.24)	(0.93)	(1.32)
Control for Industry	Yes	Yes	Yes	Yes
N	1,799	1,799	1,799	1,799
adj. R^2	0.355	0.379	0.299	0.299

Panel B Return on Assets (ROA) and employee bonus

$$ROA_t = \alpha_0 + \alpha_1 ROA_{t-1} + \alpha_2 BONUS_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV + \alpha_5 RD_{t-1t} + \varepsilon_t \quad (2)$$

	ROA_t	ROA_{t+1}	$AROA_t$	$AROA_{t+1}$
INTERCEPT	0.140	0.174	0.108	0.122
	(7.14)***	(8.30)***	(5.43)***	(5.68)***
ROA_{t-1}	0.365	0.347	0.362	0.359
	(13.56)***	(12.95)***	(12.19)***	(12.06)***
$BONUS_{t-1}$	0.058	0.053	0.056	0.054
	(3.99)***	(3.85)***	(3.96)***	(3.86)***
$SIZE_t$	-0.001	-0.004	-0.003	-0.004
	(-0.77)	(-3.14)**	(-2.40)*	(-2.77)**
LEV_t	-0.134	-0.133	-0.131	-0.135
	(-10.77)***	(-10.54)***	(-10.43)***	(-10.38)***
RD_t	-0.061	-0.148	-0.137	-0.154
	(-1.14)	(-2.72)**	(-2.60)**	(-2.80)**
Control for Industry	Yes	Yes	Yes	Yes
N	1,799	1,799	1,799	1,799
adj. R^2	0.307	0.327	0.284	0.284

Note : [a] The overall sample size is 1,799. All firms are listed on the Taiwan Stock Exchange from 1997 to 2007 and all the data are collected from the Taiwan Economic Journal (TEJ) database.

[b] $TOBINQ_t$ is profitability at year t, defined as the sum of market value of common stock, the liquidation value of preferred stock and total debts divided by total assets; $ATOBINQ_t$ is industry-adjusted TOBINQ, calculated as the difference between TOBINQ and the median value for industry TOBINQ. ROA_t is return on shareholders' assets at year t; $AROA_t$ is industry-adjusted ROA, the difference between ROA and the median value for ROA. $BONUS_{t-1}$ is the bonus ratio, defined as market value of total employee bonus divided by total distributable net income at year t-1; $SIZE_t$ is the natural logarithm of total assets at year t; LEV_t is total liabilities to total assets; RD_t is R&D intensity at year t, defined as R&D expenditures divided by net sales.

[c] *t* statistics in parentheses. $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

5.2.2 The Association between Firm Performance and Profit Sharing Bonus with Respect to the Asymmetric Distribution.

Table 5 presents regression estimates of firm performance and profit sharing bonus ($BONUS_{t-1}$) with respect to $ASYM_{t-1}$, along with the interaction terms between $ASYM_{t-1}$ and profit sharing bonus ($BONUS_{t-1}$). The estimated coefficient of the interaction term is significantly positive at the 1% level. Using $TOBINQ_t$ ($ATOBINQ_t$) as firm performance, Panel A reports that the coefficient on $DISP_{t-1} \times BONUS_{t-1}$ is 0.104 (0.096), significant at the 1% level. Similarly, using $TOBINQ_{t+1}$ ($ATOBINQ_{t+1}$) as firm performance, the coefficient on $DISP_{t-1} \times BONUS_{t-1}$ is 0.100 (0.098), significant at the 1% level. In Panel B, ROA_t ($AROA_t$) is used as firm performance and find that the coefficient on $DISP_{t-1} \times BONUS_{t-1}$ is 0.003 (0.003), significant at the 1% level. The results are the same when using performance at t+1.

Overall, my results indicate that the positive association between firm performance and profit sharing bonus increases as *ASYM* increases. Thus, results in Table 5 generally support a net incentive theory that asymmetric distribution signals a commitment to attract talented manpower in inventing inventions, and generate more capital gains for shareholders. Shareholders would like to combine employee ownership with employee bonus to reduce the agency problems between managers and shareholders.

Table 5
Firm Performance and the Dispersion of Stock/cash Proportion between Employee Bonus and Dividends

Panel A Tobin Q and employee bonus

$$TOBINQ_t = \alpha_0 + \alpha_1 TOBINQ_{t-1} + \alpha_2 BONUS_{t-1} + \alpha_3 ASYM_{t-1} + \alpha_4 ASYM_{t-1} \times BONUS_{t-1} + \alpha_5 SIZE_t + \alpha_6 LEV + \alpha_7 RD_{t-1t} + \varepsilon_t \quad (3)$$

	$TOBINQ_t$	$TOBINQ_{t+1}$	$ATOBINQ_t$	$ATOBINQ_{t+1}$
INTERCEPT	2.235	2.891	1.053	1.016
	(8.69)***	(9.32)***	(4.13)***	(3.40)***
$TOBINQ_{t-1}$	0.338	0.327	0.278	0.275
	(8.74)***	(8.62)***	(7.52)***	(7.46)***
$BONUS_{t-1}$	1.073	1.015	0.889	0.881
	(5.88)***	(5.70)***	(5.51)***	(5.41)***
$ASYM_{t-1}$	-0.039	-0.033	-0.016	-0.019
	(-4.14)***	(-3.51)***	(-1.75)	(-1.99)*
$ASYM_{t-1} \times BONUS_{t-1}$	0.104	0.100	0.096	0.098
	(4.46)***	(4.23)***	(3.90)***	(4.04)***
$SIZE_t$	-0.043	-0.080	-0.029	-0.026
	(-2.51)*	(-4.36)***	(-1.84)	(-1.48)
LEV_t	-1.577	-1.515	-1.588	-1.669
	(-9.40)***	(-9.20)***	(-10.51)***	(-10.98)***
RD_t	1.602	-0.047	0.352	0.640
	(2.37)*	(-0.07)	(0.54)	(0.92)
Control for Industry	Yes	Yes	Yes	Yes
N	1,799	1,799	1,799	1,799
adj. R^2	0.361	0.384	0.308	0.308

Panel B ROA and employee bonus

$$ROA_t = \alpha_0 + \alpha_1 ROA_{t-1} + \alpha_2 BONUS_{t-1} + \alpha_3 DISP_{t-1} + \alpha_4 DISP_{t-1} \times BONUS_{t-1} + \alpha_5 SIZE_t + \alpha_6 LEV + \alpha_7 RD_{t-1t} + \varepsilon_t \quad (4)$$

	ROA_t	ROA_{t+1}	$AROA_t$	$AROA_{t+1}$
INTERCEPT	0.130	0.165	0.099	0.113
	(6.36)***	(7.46)***	(4.72)***	(4.96)***
ROA_{t-1}	0.376	0.356	0.372	0.369
	(13.33)***	(12.67)***	(11.92)***	(11.76)***
$BONUS_{t-1}$	0.048	0.044	0.047	0.045
	(3.13)**	(3.04)**	(3.13)**	(3.07)**
$ASYM_{t-1}$	-0.002	-0.001	-0.001	-0.001
	(-3.29)**	(-3.13)**	(-2.01)*	(-2.17)**
$ASYM_{t-1} \times BONUS_{t-1}$	0.003	0.003	0.003	0.003
	(1.98)*	(1.89)*	(2.23)*	(2.03)*
$SIZE_t$	0.000	-0.003	-0.002	-0.002
	(0.11)	(-2.10)*	(-1.47)	(-1.73)
LEV_t	-0.138	-0.138	-0.135	-0.140
	(-10.48)***	(-10.27)***	(-10.09)***	(-10.07)***
RD_t	-0.064	-0.148	-0.141	-0.154
	(-1.19)	(-2.66)**	(-2.63)**	(-2.73)**
Control for Industry	Yes	Yes	Yes	Yes
N	1,799	1,799	1,799	1,799
adj. R^2	0.310	0.330	0.286	0.287

Note : [a] The overall sample size is 1,799. All firms are listed on the Taiwan Stock Exchange from 1997 to 2007 and all the data are collected from the Taiwan Economic Journal (TEJ) database.

[b] $TOBINQ_t$ is profitability at year t, defined as the sum of market value of common stock, the liquidation value of preferred stock and total debts divided by total assets; $ATOBINQ_t$ is industry-adjusted TOBINQ, calculated as the difference between TOBINQ and the median value for industry TOBINQ. ROA_t is return on shareholders' assets at year t; $AROA_t$ is industry-adjusted ROA, the difference between ROA and the median value for ROA. $BONUS_{t-1}$ is the bonus ratio, defined as market value of total employee bonus divided by total distributable net income at year t-1; $ASYM_{t-1}$ is asymmetric distribution of stock/cash distribution as measured by the ratio of stock/cash proportion in employee bonus relative to stock/cash proportion in dividends; $SIZE_t$ is the natural logarithm of total assets at year t; LEV_t is total liabilities to total assets; RD_t is R&D intensity at year t, defined as R&D expenditures divided by net sales.

[c] *t* statistics in parentheses $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

6. Additional Tests

6.1 Self-Selection bias and Endogeneity

Since asymmetry between stock bonus and stock dividends could be the result of self-selection and the factors that determine the asymmetry can also influence firm value, a Heckman (1979) two-stage model is used to control for the endogeneity of the asymmetry. The first stage is a Probit model that includes the type of subsample as a dependent variable (1 for the "high-asymmetry" subsample, and 0 for the "low-asymmetry" subsample). I transform *ASYM* into a binary variable based on whether *ASYM* is above or below the industry median, coding it as 1 for high *ASYM* and 0 for low *ASYM*.

The determinants include firm size as measured by the log of total assets, leverage as measured by total debts divided by total assets, R&D intensity, as measured by R&D expenditures divided by net sales, growth, as measured by the market to book ratio of shareholders' equity, an indicator for family firms, board size, the shareholding by board of directors, outside blockholder shareholdings, the percentage of independent board member, the percentage of stocks by domestic financial institutions, the percentage of stocks by foreign financial institutions, an indicator for whether the CEO serves as chair of the board, and the shareholdings held by managers. Governance and firm characteristics are

Table 6
Heckman Model

Panel A: the Determinants of Dispersion Stock/cash Proportion between Employee Bonus and Dividends and Corporate Governance

$$Prob(ASYM_{t-1}) = \alpha_0 + \alpha_{10}FMDM_{t-1} + \alpha_5 BDSZ_{t-1} + \alpha_1 BDSH_{t-1} + \alpha_2 BLKSH_{t-1} + \alpha_3 INDST_{t-1} + \alpha_7 INST_{t-1} + \alpha_8 FIN$$
$$+\alpha_9 DUAL_{t-1} + \alpha_{10} MGR\_SHARE_{t-1} + \alpha_{11} LEV_{t-1} + \alpha_{12} SIZE_{t-1} + \alpha_{13} Growth_{t-1} + \alpha_{13} RD_{t-1}$$

	Coefficient	*t*-values
INTERCEPT	-0.336	(-0.34)
FMDM	0.104	(0.70)
SZ	-0.059	(-1.44)
BDSH	-1.502	(-2.95)**
BLKSH	-0.198	(-0.28)
INDST	0.538	(2.19)*
INST	4.441	(1.97)*
FINST	10.082	(2.53)*
DUAL	-0.124	(-0.99)
MGR_SHARE	-0.698	(-0.40)
LEV_t	-0.628	(-3.30)*
$SIZE_t$	0.131	(2.89)**
$GROWTH_t$	0.091	(1.97)*
RD_t	14.863	(4.46)***
Control for Industry	Yes	Yes
N	1,799	1,799
Wald Chi2	720.27	

Panel B firm performance and asymmetric distribution

	$ATOBINQ_t$	$ATOBINQ_{t+1}$	$AROA_t$	$AROA_{t+1}$
INTERCEPT	1.050	0.782	0.227	0.233
	(1.53)	(1.11)	(3.74)***	(3.79)***
$TOBINQ_{t-1}$	0.265	0.259	0.331	0.327
	(9.78)***	(9.54)***	(12.14)***	(11.91)***
$BONUS_{t-1}$	1.110	1.093	0.041	0.040
	(9.26)***	(9.09)***	(4.19)***	(4.11)***
$ASYM_{t-1}$	0.008	0.007	-0.002	-0.002
	(0.68)	(0.59)	(-1.62)	(-1.85)
$ASYM_{t-1} \times BONUS_{t-1}$	0.067	0.069	0.004	0.004
	(2.81)**	(2.93)**	(2.08)*	(1.98)*
$SIZE_t$	-0.040	-0.030	-0.009	-0.009
	(-1.20)	(-0.88)	(-3.22)**	(-2.96)**
LEV_t	-1.467	-1.591	-0.098	-0.107
	(-5.17)***	(-5.54)***	(-3.91)***	(-4.25)***
RD_t	0.896	1.343	-0.182	-0.159
	(1.22)	(1.66)	(-2.84)**	(-2.28)*
Mills ratio	-0.098	-0.027	-0.040	-0.037
	(-0.28)	(-0.08)	(-1.30)	(-1.21)
Control for Industry	Yes	Yes	Yes	Yes
N	1,799	1,799	1,799	1,799

Note : a The overall sample size is 1,799. All firms are listed on the Taiwan Stock Exchange from 1997 to 2007 and all the data are collected from the Taiwan Economic Journal (TEJ) database. Heteroscedasticity consistent t statistics are reported in parentheses.

b $ASYM_t$ is the asymmetric distribution of stock/cash distribution as measured by the ratio of stock/cash proportion in employee bonus relative to stock/cash proportion in dividends; $FMDM_t$ equals to one if the firm is a family-controlled firm, and zero otherwise; $BDSZ_t$ is board size in seat number; $BDSH_t$ is the shareholding by board of directors; $BLKSH_t$ is outside blockholder shareholding; $INDST_t$ is the percentage of independent board member;

$INST_t$ indicates the percentage of stocks by domestic financial institutions; $FINST_t$ is the percentage of stocks by foreign financial institutions; $DUAL_t$ equals to one when the CEO serves as chair of the board and zero otherwise; MGR_SHARE is the shareholdings by managers. LEV_t is total liabilities to total assets; $SIZE_t$ is the natural logarithm of total assets at year t; $Growth_t$ is the market to book ratio of shareholders' equity; RD_t is R&D intensity at year t, defined as R&D expenditures divided by net sales.

[c] *t* statistics in parentheses $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

commonly employed in prior research (e.g., Young and Wu, 2009; Coles *et al.*, 2005; Anderson *et al.*, 2004; Beasley, 1996; Chung *et al.*, 2002). The inverse Mills ratio (IMR) generated from the first stage is then added to Model (3) and (4) as the second-stage regression. Table 6 shows the results. The results for the second stage regression remain unchanged, indicating that the results in the main tests are not driven by the self-selection bias of asymmetry.

7. Conclusion

This paper documents the relationships between profit sharing bonus and firm performance for publicly traded corporations in the high-tech industry of Taiwan. As employee stock bonus in Taiwan is part of the profit sharing scheme, the decision for the amount and the method of profit sharing bonus is usually made along with the decision for shareholder dividends. The main contribution of this paper is disentangling the incentive and entrenchment effects of the profit sharing stock bonus practice that rarely exists in US data. Firm valuation generally increases with the profit sharing bonus. This result is consistent with a large literature on the positive incentive effects associated with increased employee stock bonus (Conte and Svejnar, 1990; Kruse, 1992, 1993; Lin and Chen, 2009; Jeng *et al.*, 2009). The results also find that the positive relationship between employee bonus and future performance can increase with asymmetric distribution. The results are supportive of the prior literature that stock compensation can help align the interests between shareholders and the firm and can mitigate the agency problems between shareholders and managers.

This study is subject to a few limitations. First, I use Taiwan firms as our sample. Future studies could extend the research to other countries to improve the

generalizability of the results. Second, the results are subject to the robustness of the measure for asymmetric distribution—the stock/cash proportion of employee bonus relative to the stock/cash proportion of dividends, and two performance measures—TOBINQ and ROA. In addition, the effect of asymmetric distribution might be reflected in other outcomes. Future research can employ other research designs to validate whether benefits still outweigh the costs of asymmetric distribution.

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