



Why Firms Award Stock Options

-- Examining the Design of Employee Stock Options

Shu-hui Lin (Corresponding author)

Department of Business Education, National Changhua University of Education

No. 2, Shi-Da Road, Changhua, 50007 Taiwan

Tel: 886-4-723-2105 ext. 7135 E-mail: shlin@cc.ncue.edu.tw

Abstract

This study explores whether firms grant employee stock options to motivate and retain employees by examining the determinants of the use of option grants and how firms design vesting and maturity restriction terms. The results show that there is a relationship between the granting of stock options and the retaining of employees and motivating long-term profit-maximizing behavior. This study also finds that a firm sets more rigorous restrictions on exercising options when retaining employees is a high priority for a firm. The results suggest that firms not only grant stock options to provide performance and retention incentives for employees, but also amplify the effects of incentives by fine-tuning the rules governing the exercising of option grants.

Keywords: Employees, Stock options, Incentives, Retention, Restriction terms

1. Introduction

Employee stock options are a well-known incentive compensation tool. Nowadays, U.S. companies widely use employee stock options, which are becoming more prevalent in European and Asian companies too. Despite their popularity, employee stock options are increasingly controversial (Hall & Murphy, 2003). In the ongoing debate, some critics have pointed out the overuse of employee stock options, which partly stems from focusing only on the number or the value of the options granted and overlooks their design (Brandes, Dharwadkar, & Lemesis, 2003). Alan Greenspan, at the 2002 Financial Markets Conference of the Federal Reserve, pointed out that stock-option grants, when properly constructed, can be highly effective in aligning the interests of corporate officers with those of shareholders as well as maximizing the long-term market value of the firm. Neglecting the design of option grants may simplify their function but dilute their impact on a firm's value.

A firm structures an employee stock option in the form of a call option on the firm's stock with some extra restriction terms added. Besides a pre-specified exercise price and expiration date, the option contract includes terms that specify when the option may first be exercised (i.e., vesting schedule) and how to modify the vesting schedule and expiration date whenever employees leave a firm. These restriction terms can be devices for providing performance and retention incentives to employees, which can have an extra impact on an employee through a subtle choice of terms. For example, if a company incurs high costs for replacing existing employees it can set severe restrictions by shortening the options' expiration period for leaving employees, thereby providing a strong retention incentive.

Restrictions on vesting and maturity are basic and important aspects that companies can utilize to design effective stock options (Brandes et al., 2003). Investigating how companies design the restrictions in option plans is important for evaluating whether firms grant employee stock options efficiently. However, previous research pays relatively little attention to these contractual terms when addressing this subject. Brandes et al. (2003) mentions that firms can design the terms of stock options to implement their strategy; however, few empirical studies have addressed the issue of what determines these restrictions. Kole (1997) examines a variety of vesting schedules used in the option grants of U.S. firms, but provides no related discussion on the exercising restrictions of leaving employees.

This study investigates whether firms grant employee stock options to motivate and retain employees by examining what determines the use of option grants and how a firm designs the restriction terms. The study uses listed non-financial firms in Taiwan from 2001 through 2003 as its sample. Examining the option grants of Taiwanese firms is especially useful for this purpose because option grants are the only equity-based incentive compensation available in

Taiwan. This research can remove the effect of restricted stocks when investigating the relationship between a firm's considerations and the use of option grants.

The organization of the remainder of this article is as follows: the next section presents arguments on what determines the use of employee stock options and illustrates how firms design restrictions on vesting and maturity. The subsequent section provides sample and data descriptions followed by the empirical results and then a discussion and conclusion.

2. Hypotheses development

Employee stock options are contracts that give an employee the right to buy a share of a firm's stock at a pre-specified exercise price and for a pre-specified period. Stock options give employees an exercise price equal to the market price on the date of the grant and typically qualify for exercising for up to ten years. Usually, a grant of stock options cannot be exercised immediately but only over time. The exercising of the option depends on the vesting schedule; for example, 25 % might become exercisable in each of the four years following the grant. When a stock option can be exercised, then the option is said to be "vested". Employee stock options are not tradable and typically are not transferable except when an employee dies, in which case the spouse inherits them. An employee usually forfeits the option grant if the employee leaves the firm before the option is exercisable. Firms usually shorten a vested option's expiration period when an employee leaves but the related regulations differ among firms.

The effects of stock option incentives on employee performance relate to the link between the option's payoff and to the stock price. Employees cannot sell the options, and the option grant must be held for a considerable amount of time before it can be exercised, which should provide a long-term effect. Employee stock options can have a retention effect by forcing the employees to forfeit or exercise them shortly after leaving a firm. In the following sections, the study will discuss how the objectives of motivating and retaining employees affect the use of employee stock options and the vesting and maturity restriction terms.

2.1 Determinants of stock options

According to incentive contract theory, firms with high growth opportunities and large research activities are more likely to grant stock options to their employees. The impact of R&D and investing in intangible assets on a firm's value is uncertain until some time in the future (perhaps years). Theory suggests that motivating managers to make such decisions appropriately requires long-term contracts with stock option grants included as incentives (Fudenberg, Holmstrom, & Milgrom, 1990). Theory also suggests that firms with high-growth opportunities and large research activities are more likely to grant employee stock options because stock-based measures provide a more accurate assessment of managerial effectiveness (Lambert & Larcker, 1987).

A firm is more likely to issue employee stock options when retaining employees is a high priority for a firm (i.e., when a firm is large, when a firm is rapidly expanding its workforce, when a firm has great growth opportunities, and when a firm is involved in intensive R&D activities). Because the investment in training employees increases with a firm's size, larger firms can receive especially greater benefits from retaining existing employees (Barron, Black, & Lowenstein, 1987; Haber, 1991; Lynch & Black, 1998). Ittner, Lambert, and Larcker (2003) suggests that retention is more important to firms with a rapidly growing workforce. Retaining employees avoids the large cost of training new recruits. Firms with substantial growth opportunities and extensive R&D activities have a great need for firm-specific human capital (Smith & Watts, 1992). The retaining of key employees who have technological firm-specific knowledge, or who are essential to a firm's competitiveness is extremely important to these kinds of firms.

Firms operating in an environment of high volatility are also more likely to grant stock options to retain employees. Oyer (2004) points out that the value of option-based pay packages is contingent on a firm's value, which relates to the state of the economy and the value of human capital in the labor market. When industry variance is high and competition for able employees among firms in the same industry is volatile, a firm will be more inclined to use option grants to avoid the cost of adjusting wages to reflect the state of the labor market.

Hypothesis 1: A firm is more likely to issue employee stock options when it has greater growth opportunities, when it has intensive R&D activities, when it is larger, when it is rapidly expanding its workforce, and when it is operating in an environment of high volatility.

2.2 Design of option contracts

A vesting schedule is a method of amplifying the impact of option grants on encouraging employees to make decisions with a long-term perspective. This study predicts that a firm will set longer vesting periods when trying to motivate employees working on long-term projects essential to its value (i.e., when a firm is involved in intensive R&D activities and has great growth opportunities).

Longer waits required before exercising stock options imply that there is more uncertainty about the value of the grants and the need to take more risks by those who hold the options. According to agency theory, which posits that there is a negative relationship between risk and incentive, this study expects that higher-volatility firms will set a relatively

shorter vesting period.

Vesting schedules and the exercising restrictions on departing employees are important tools for encouraging employees to remain with their firm (Core & Guay, 2001; Hale, 1998). Because firms typically forfeit the unvested options of leaving employees, longer vesting periods provide an incentive to stay on. In addition, firms usually shorten the maturity period of departing employees' vested options, which reduces the value of the option grants and raises the cost of leaving. A firm will set a longer vesting period and more rigorous restrictions on exercising options for leaving employees when retaining employees is more important to a firm (i.e., when a firm has greater growth opportunities, when it has intensive R&D activities, when it is larger, and when it is rapidly expanding its workforce). This study proposes the following hypotheses:

Hypothesis 2: When firms grant employee stock options, a longer vesting period will be associated with greater growth opportunities, intensive R&D activities, lower volatility, larger size, and a higher workforce growth rate.

Hypothesis 3: When firms grant employee stock options, rigorous restrictions on exercising options for leaving employees will be associated with greater growth opportunities, intensive R&D activities, larger size, and a higher workforce growth rate.

3. Methods

3.1 Sample

In contrast to U.S. companies, who have been using option-grant plans for decades, Taiwanese companies only started to use stock options for employee compensation in 2001. Taiwanese companies could not offer stock-option grants to employees until the government amended Article 28 of the Securities and Exchange Law in 2000. Option grants are important to Taiwanese firms who want to provide incentive compensation to employees because there is no other equity-based compensation vehicle available in Taiwan. The awarding of stock bonuses is prevalent in Taiwanese firms, especially in the information technology (IT) industry. However, firms do not have the authority to prevent employees from selling stocks granted as bonuses. In addition, Taiwanese law forbids firms giving restricted stock awards (which U.S. companies employ) as part of an employee compensation plan.

For its sample, this study used non-financial Taiwanese companies listed on the stock exchange during the period 2001 to 2003. The number of firms who granted stock options in each sample year was 34, 115, and 114, respectively. After excluding firms whose option contracts were not available or had incomplete data, 189 remained for study. Stock option contracts of Taiwanese firms provided the details of the option grants used in this study. The annual financial data of these firms came from the Taiwan Economics Journal (TEJ) dataset.

Table 1 shows the distribution of the sample firms who granted stock options by industry classification code. It shows that the majority of firms offering option grants are so-called "new economy" firms (following the definition of Ittner et al., 2003). New economy firms are organizations competing in the computer, software, internet, telecommunications, and networking fields. Of the sample firms, 93.66% are new economy firms: 90.48% from the electronics industry, 0.53% from the communications industry, and 2.65% from the software industry. The remaining 6.34% come from the chemical, biotech, and healthcare industries and other traditional manufacturing industries.

Table 2 presents the terms of stock-option contracts in detail. The longest expiration period is ten years (the maximum allowed by law) and the shortest is three years. The minimum waiting time allowed before the granted option is exercisable is two years. The vesting of option awards generally takes place over a number of years following the granted date. This study follows Kole (1997) to calculate the average waiting time by assuming that an employee exercises an option as soon as the restrictions lapse. If an option award has a vesting schedule that includes a minimum wait of two years before exercising only a quarter of the option grant, the remainder of the award becomes available in equal installments over the next three years. The average wait for the award is thus 3.5 years ($0.25[2+3+4+5]$). The longest waiting time in the sample is 5.2 years. On average, the waiting time is 2.72 years (32.6 months), which is longer than Kole's (1997) findings for U.S. companies. Kole (1997) uses 371 firms from Fortune 500 firms of 1980 as a sample, and finds that the average waiting period before exercising to be 23.6 months.

One hundred and sixty nine firms in the sample set rules on exercising option grants for resigning employees. All these firms require the forfeiture of unvested options when an employee resigns. However, a variety of restrictions on vested options exists. On average, firms force employees to exercise their vested options within 0.12 years (1.4 months) after resigning. Some firms insist on the forfeiture of both vested and unvested option grants.

Of the sample contracts, 184 set rules for retiring employees. Firms usually have truncation rules, which shorten the life of options for retiring employees. On average, firms insist that an employee exercises all option awards within 0.81 years (9.7 months) after retirement. However, there is a great diversity of exercising periods for retiring employees. Some firms set no extra limits on exercising options, while other companies treat retiring employees far less generously and force them to forfeit all option grants at once. In contrast to the restrictions on resigning employees, the restrictions

on retirees are relatively lenient.

3.2 Dependent variables

This study focuses on what determines the issuing of employee stock options and how firms design restrictions on vesting and maturity using a logit model. The dependent variable in the logistic regression is whether a Taiwanese listed firm grants stock options to its employees (i.e., if a firm grants stock options ESO Plan=1; otherwise, ESO Plan=0).

This study used three dependent variables (i.e., Average wait to exercise, Time to exercise after resignation, and Time to exercise in retirement), respectively, to examine Hypotheses 2 and 3. Following Kole (1997), this study employed the average waiting period before exercising a stock option (i.e., Average wait to exercise) as a proxy for the option grants' vesting periods. This study employed the two variables, Time to exercise after resignation and Time to exercise in retirement, as proxies for how firms treat their departing employees. The longer the period for exercising an option after leaving, the more generously a firm treats its departing employees.

3.3 Independent variables

This study followed Gaver and Gaver (1993) to measure a firm's growth opportunity by using market-to-book ratio of assets. R&D spending scaled by sales was a proxy for a firm's R&D intensity (Baysigner & Hoskisson, 1989). The natural logarithm of the number of employees measured firm size (e.g., Ittner et al., 2003). The calculated percentage growth in employees acts as a proxy for the expansion rate of a firm's workforce (Ittner et al., 2003). Following Oyer and Schaefer (2005), two variables, firm volatility and industry volatility, acted as proxies for any variance in a firm's operating environment. Firm volatility was measured by the standard deviation of monthly stock returns; industry volatility was calculated by the standard deviation of monthly average stock returns of the industry to which a firm belongs. This study also controlled for any potential period effect by including a series of year dummies (2001-2002) in the regression model.

The regression model for determining the use of option grants controlled for other parts, including return on assets (ROA) and cash flow. Prior studies suggest that cash-strapped firms tend to use equity grants in place of cash compensation (Yermack, 1995). In addition, firms may grant stock options in place of cash pay to reduce the impact of compensation on earnings when profitability is poor. This is because cash compensation appears on the financial statements as an expense whereas the value of stock option grants appears only in its footnotes (Core & Guay, 2001). Return on assets (ROA) was calculated with earnings before interest, tax, and depreciation to total assets by percentage. Cash flow was measured by the net cash flow from operations minus capital expenditures, divided by total assets.

4. Results

To test Hypothesis 1, non-financial companies listed in Taiwan from 2001 to 2003 provided a sample. After excluding firms with incomplete data, 2,160 firm-years remained, composing 189 firm-years with options granted and 1,971 firm-years without options granted. Table 3 and Table 4 present descriptive information on the variables included in the study. Table 3 provides the means, standard deviations, and correlations. Table 4 shows the univariate comparisons of firms that offered option grants and those that did not. The tests show that significant differences in company characteristics between the two kinds of firms exist. Firms that granted stock options had higher market-to-book ratios, R&D expenditures, volatility, and employee growth. They were also larger and more profitable. The results are consistent with Hypothesis 1. To estimate the partial effects of these variables on the determinants of granting employee stock options, the study also used a logistic regression model.

Table 5 presents the results of the logistic regression. Standard errors are presented in parentheses. Asterisks ***, **, and * denote statistical significance at 1%, 5%, and 10% levels, respectively. The findings in Table 5 provide support for Hypothesis 1. The coefficients of the market-to-book ratio of assets and R&D spending are positive and highly significant, indicating that R&D intensity and growth opportunities influence the decision of whether to grant stock options to employees. As expected, the coefficient estimates for firm volatility and industry volatility are positive while only industry volatility has a highly significant effect on the probability of using stock options. This finding means that a firm operating in a highly volatile environment is more likely to award stock options to employees. The probability of offering stock options relates positively to the growth in the workforce and firm size, which shows that firms with greater expanding workforces and of a larger size are more likely to offer stock options to their employees; but only the coefficient of firm size is statistically significant.

The findings partially support Hypothesis 2. Column 1 of Table 6 shows that the coefficient of market-to-book ratio, as expected, is positive and significant. In addition, as predicted by Hypothesis 2, the coefficient estimates for volatility variables are negative; but only the estimate for firm volatility is strongly significant, indicating that firms with lower volatility set a longer vesting period. The average vesting period is not significantly associated with R&D spending or the growth rate of the workforce, which does not support Hypothesis 2. Surprisingly, the firm size coefficient is significantly negative, which is quite the opposite of that predicted by Hypothesis 2.

The findings also partially support Hypothesis 3, which proposes that a firm will set less generous restrictions on exercising options for leaving employees when retaining employees is a high priority. In column 2 of Table 6, the dependent variable is Time to exercise after resignation, which was employed as a proxy for how firms treat resigning employees. The coefficient of employee growth is significantly negative, which supports Hypothesis 3. The coefficients of market-to-book ratio and R&D spending, as predicted by Hypothesis 3, are negative but not statistically significant. In contrast to the prediction of Hypothesis 3, a longer period to exercise the option after resignation is significantly associated with larger firm size. In column 3 of Table 6, Time to exercise in retirement acted as a dependent variable to proxy for how firms treat retirees. The coefficient estimate for R&D spending is negative and highly significant, which supports Hypothesis 3. However, the time to exercise in retirement is not significantly associated with market-to-book ratio, employee growth, or firm size. Firm volatility and industry volatility were included in the regressions as control variables. The coefficients of volatility variables are negative and significant, indicating that more rigorous restrictions for leaving employees are associated with the high volatility of a firm's operation.

5. Discussion and conclusions

Restrictions on vesting and maturity are basic and important features in employee stock options, which are a device for providing performance and retention incentives to employees. This study investigates whether a firm grants employee stock options in order to motivate and retain employees by examining the determinants for the use of option grants and their restriction terms. The results of the logistic regression show that firms with greater growth opportunities, more intensive R&D activities, and of a larger size are more likely to grant employees stock options. This finding is consistent with previous arguments that the granting of stock options relates to retaining employees and motivating long-term profit-maximizing behavior (Kole, 1997). In addition, the significantly positive relationship between the probability of granting employee stock options and industry volatility supports the argument of Oyer (2004). Oyer (2004) suggests that the option grant is a cost-saving strategy for employee retention when industry variance is high and competition for able employees among firms in the same industry varies.

Previous studies suggest that firms use stock options to motivate and retain employees but little research has examined the relationship between the contractual terms of option grants and their two objectives. This study explores the relationship and finds that the vesting period of option grants significantly relates to growth opportunities, firm volatility, and firm size. Firms that have higher growth opportunities grant stock options with a longer vesting period to enhance the incentives for staying with a firm and maximizing long-term performance. This finding is consistent with the arguments of Kole (1997). A firm with a higher risk sets a shorter vesting period to reduce the uncertainty of pay. The result supports incentive contract theory, which indicates a negative relationship between risk and incentive. Larger firms set a shorter vesting period when issuing employee stock options, indicating that they grant stock options to provide retention incentives but do not use a vesting schedule to magnify the effect.

After examining the determinants of restriction terms, this study finds that firms keep employees by setting restrictions on exercising options for leaving employees. The time required to exercise options after resignation has a significant relationship to firm volatility, workforce growth rate, and firm size. The impact of firm volatility and workforce growth rate is negative, indicating that when granting stock options, firms with higher firm volatility and a faster workforce growth rate set stricter rules for employees who resign. Locating and training new recruits is costly. The findings show that to retain existing employees, firms with higher volatility (where a firm finds it difficult to keep good employees) and a higher growth in the workforce encourage employees to stay on by having stringent rules requiring the quick exercise of options when they resign (Zuber, 2001; Ongori, 2007). The time required to exercise options after resignation has a positive association with firm size, indicating that in larger firms employees have a longer time to exercise their vested stock options after resigning. This finding suggests that larger firms have generous rules for resigning employees when granting stock options. Larger firms have more devices, such as better opportunities for internal promotion (Griffeth & Hom, 1995; Wilson & Peel, 1991) and more sophisticated human resource practices (Terpstra & Rozell, 1993), to encourage employees to stay. These features may explain why larger firms set such generous rules governing the exercising of options for resigning employees.

This study also finds that firms discourage employees from retiring by setting rigorous rules governing the exercising of their stock options. Time to exercise in retirement has a significant and negative relationship with R&D intensity and firm risk, indicating that firms with more intensive R&D activities and operating in an unstable environment set a shorter period for retiring employees to exercise their stock options; this reduces the value of the options when employees retire and, consequently, deters retirements. The result is consistent with previous research on the relationship between age and performance. Avolio, Waldman, and McDaniel (1990) suggests that long-term experience would benefit performance in jobs that are stimulating or that enhance skill development over time. Firms with large investments in R&D provide continuous job-specific training and retraining for employees to maintain product innovations (Tan & Batra, 1997; Lillard & Tan, 1986). In addition, firms facing a higher fluctuation in product demand offer more training to core employees (in contrast to contract workers) on whom they rely (Frazis, Gittleman, & Joyce,

2000).

The results contribute to employee stock options literature in several ways. First, they confirm the contention of earlier literature that the contractual terms of the option grant is a method of retaining employees. Recent studies have started to pay attention to the retention benefit of employee stock options, suggesting that employee retention is an important objective (e.g., Ittner et al., 2003; Oyer & Schaefer, 2005). However, none of the empirical studies explores the determinants of restriction terms used for exercising options in an option-grant contract. After examining the rules governing the exercising of options for resignations and retirements, this study finds that firms amplify the extent of retention incentives for employees intending to resign or retire by fine-tuning the exercise period. This study also finds that firms do not treat resignation and retirement the same, which explains why firms, in practice, usually have separate rules for resignations and retirements rather than one set of rule for all leaving employees.

Second, the results suggest that to understand the comprehensive effects of option grants, multi-dimensional treatments should be employed to capture the features of each option contract. Previous studies use a one-dimensional treatment, such as the number or the value of the option grants, to characterize option grants and treat all stock options as equal. However, firms can exert different influences on employees by the way they design stock option grants. In other words, if employees of two comparable firms receive the same payout from stock options, it does not mean that the firms provide the same level of incentive in their employee option awards. An option grant, for instance, that stipulates a shorter time for its exercise after resignation will provide a greater incentive for employees to stay on.

This study focuses on how the performance and retention considerations of firms affect the design of the restriction terms, and not on the efficacy of these restriction terms. The results would be more powerful if both points were taken into consideration. Future research might investigate the impacts of option-grant-restriction terms on a firm's employee turnover, long-term investment decisions, and performance.

References

- Avolio, B.J., Waldman, D.A., & McDaniel, M.A. (1990). Age and work performance in nonmanagerial jobs: The effects of experience and occupational type. *Academy of Management Journal* 1990, 33(2), 407-422.
- Barron, J.M., DA Black, D.A., & MA Lowenstein, M.A. (1987). Employer size: the The implications for search, training, capital investment, starting wages, and wage growth. *Journal of Labor Economics* 1987, 5(1), 76-89.
- Baysinger, B., & Hoskisson, R.E. (1989). Diversification strategy and R&D intensity in multiproduct firms. *Academy of Management Journal* 1989, 32(2), 310-332.
- Brandes, P., Dharwadkar, R., & Lemesis, G.V. (2003). Effective employee stock option design: reconciling Reconciling stakeholder, strategic, and motivational factors. *Academy of Management Executive* 2003, 17(1), 77-93.
- Core, J., Guay, W. (2001). Stock option plans for non-executive employees. *Journal of Financial Economics* 2001, 61, 253-287.
- Frazer, H., Gittleman, M., & Joyce, M. (2000). Correlates of training: an An analysis using both employer and employee characteristics. *Industrial and Labor Relations Review* 2000, 53(3), 443-462.
- Fudenberg, D., Holmstrom, B., & Milgrom, P. (1990). Short-term contracts and long-term agency relationships. *Journal of Economic Theory* 1990, 51, 1-31.
- Gaver, J., & Gaver, K.. (1993). Additional evidence on the association between the investment opportunity set and corporate financing, dividend and compensation policies. *Journal of Accounting and Economics* 1993, 16, 125-160.
- Griffeth, R.W., Hom, P., Griffeth RW. (1995). The Eemployee tTurnover process. *Cincinnati, OH: South-western.Research in Personnel and Human Resources Management*, 13, 245-293.
- Hale, J. (1998). Strategic rewards: keeping Keeping your best talent form walking out the door. *Compensation & Benefits Management* 1998, 14, 39-50.
- Hall, B.J., & Murphy, K.J. (2003). The trouble with stock options. *Journal of Economic Perspectives* 2003, 17, 49-70.
- Harber, S.E. (1991). Participation in industrial training programs. *Small Business Economics*, 3, 39-48. Survey of incomes and program participation working paper No. 8813; 1988. Washington, D.C.: Census Bureau.
- Ittner, C.D., Lambert, R.A., & Larcker, D.F. (2003). The structure and performance consequences of equity grants to employees of new economy firms. *Journal of Accounting and Economics* 2003, 34, 89-127.
- Kole, S. (1997). The complexity of compensation contract. *Journal of Financial Economics* 1997, 43, 79-104.
- Lambert, R., Larcker, D. (1987). An analysis of the use of accounting and market measures of performance in executive compensation contracts. *Journal of Accounting Research* 1987, 25, 85-123.
- Lillard, L.A., & Tan, H. (1986). *Private sector Sector trainingTraining: who Who gets Gets it It and what What are its*

- Its effects* Effects?. RAND, Santa Monica, California. In: Ehrenberg RG, editor. Research in Labor Economics, vol. 13. Greenwich, Conn.: JAI Press, 1992.
- Lynch, L.M., & Black, S.E. (1998). Beyond the incidence of employer-provided training. *Industrial and Labor Relations Review* 1998, 52(1), 64-81.
- Ongori, H. (2007). A review of the literature on employee turnover. *African Journal of Business Management* 2007, 49-54.
- Oyer, P. (2004). Why do firms use incentives that have no incentive effect?. *Journal of Finance* 2004, 59, 1619-1640.
- Oyer, P., Schaefer, S. (2005). Why do some firms give stock options to all employees? an An empirical examination of alternative theories. *Journal of Financial Economics* 2005, 76: 99-133.
- Smith, C.W., & Watts, R. (1992). The investment opportunity set and corporate financing, dividend, and financing policies. *Journal of Financial Economics* 1992, 32, 262-292.
- Tan, H., Batra, G. (1997). Technology and firm size-wage differentials in Colombia, Mexico, and Taiwan. *The World Bank Economic Review* 1997, 11(1), 59-83.
- Terpstra, D.E., & Rozell, E.J. (1993). The relationship of staffing practices to organizational level measures of performance. *Personnel Psychology* 1993, 46, 27-48.
- Wilson, N., & Peel, M.J. (1991). The impact on absenteeism and quits of profit-sharing and other forms of employee participation. *Industrial and Labor Relations Review* 1991, 44, 454-468.
- Yermack, D. (1995). Do corporations award CEO stock options effectively?. *Journal of Financial Economics* 1995, 39, 237-269.
- Zuber, A. (2001). A career in food service cons: high High turnover. *Nations Restaurant News* 2001, 35(21), 147-148.

Table 1. Descriptive statistics for the sample

	Number of observations	% of sample
Food	1	0.53
Plastics	2	1.06
Electric & Machinery	3	1.58
Chemicals, Biotech & Healthcare	4	2.11
Electronics	171	90.48
Communications	1	0.53
Software	5	2.65
Others	2	1.06
Total	189	100.00

This table presents the distribution of the sample firms who granted stock options by industry classification code. For its sample, this study used non-financial Taiwanese companies listed on the stock exchange during the period 2001 to 2003. The number of firms who granted stock options in each sample year was 34, 115, and 114, respectively. After excluding firms whose option contracts were not available or had incomplete data, 189 remained for study.

Table 2. Details of stock option contracts

	Sample (numbers)	Mean	Std. Dev.	Median	Max.	Min.
Expiration date (years)	189	6.25	1.69	6	10	3
Average wait to exercise (years)	180	2.72	0.37	2.75	5.20	2
Time to exercise after resignation (years)	169	0.12	0.09	0.08	0.5	0
Time to exercise in retirement (years)	184	0.81	0.52	1	3.5	0

This table presents the terms of stock-option contracts in detail. This study follows Kole (1997) to calculate the average waiting time by assuming that an employee exercises an option as soon as the restrictions lapse.

Table 3. Descriptive statistics and correlations

Variable	Mean	S.D.	1.	2	3	4	5	6	7	8
1. ESO Plan (ESO Plan=1)	0.087	0.28	1.00							
2. Market-to-book ratio	1.19	0.72	0.22***	1.00						
3. R&D (%)	2.24	4.43	0.27***	0.28***	1.00					
4. Firm volatility (%)	19.25	10.31	0.06***	0.08***	0.07***	1.00				
5. Industry volatility (%)	13.59	4.49	0.11***	0.24***	0.14***	0.41***	1.00			
6. Firm size (in logarithm form)	5.89	1.89	0.07**	0.05**	0.005	-0.15***	-0.009	1.00		
7. Employee growth	0.012	0.29	0.09***	0.24***	0.08***	-0.03	-0.08***	0.05**	1.00	
8. Cash flow (%)	3.40	10.64	0.02	0.16***	-0.03*	-0.04**	0.08***	0.13***	-0.008	1.00
9. ROA (%)	6.17	9.33	0.06***	0.59***	0.01	-0.17***	-0.01	0.19***	0.31***	0.24***

Asterisks (***, **, and *) denote the statistical significance at 1%, 5%, and 10% levels, respectively.

Table 4. Comparison of firms that offered option grants and those did not

	Option grants (ESO Plan=1)			No option grants (ESO Plan=0)		
	Median	Mean	Std. Dev.	Median	Mean	Std. Dev.
Market-to-book ratio	1.44	1.70	0.92	0.94***	1.14***	0.67
R&D (%)	3.76	6.16	7.33	0.65***	1.86***	3.84
Firm volatility (%)	18.24	21.48	10.44	16.84**	19.03***	10.27
Industry volatility (%)	10.71	15.19	5.65	12.08	13.44***	4.33
Firm size (in logarithm form)	5.90	6.17	1.23	5.82***	5.86***	1.18
Employee growth	0.034	0.105	0.47	-0.013***	0.003***	0.27
Cash flow (%)	2.37	4.11	14.05	3.01	3.33	10.25
ROA (%)	8.16	8.04	11.05	5.77**	5.99**	9.13

Asterisks (***, **, and *) denote the statistical significance at 1%, 5%, and 10% levels, respectively.

Table 5. Logistic regression of determining the use of option grants

	ESO Plan (=1, having option grants)
Intercept	-6.168***
	(0.564)
Market-to-book ratio	0.562***
	(0.124)
R&D (%)	0.092***
	(0.014)
Firm volatility (%)	0.012
	(0.008)
Industry volatility (%)	0.089***
	(0.024)
Employee growth	0.279
	(0.221)
Firm size (in logarithm form)	0.334***
	(0.072)
Cash flow (%)	-0.006
	(0.008)
ROA (%)	-0.010
	(0.011)
Likelihood ratio χ^2	205.617***
Observations	2160

This table shows the results of logistic regressions with fixed year effects. The dependent variable in the logistic regression is whether a Taiwanese listed firm grants stock options to its employees (i.e., if a firm grants stock options ESO Plan=1; otherwise, ESO Plan=0). The market-to-book ratio is derived from the sum of the market value of equity and the book value of debt, divided by the book value of total assets. R&D (%) is measured as the ratio of R&D spending to sales. Firm volatility is measured by standard deviation of monthly stock returns. Industry volatility is calculated by standard deviation of monthly average stock returns of the industry to which a firm belongs. The natural logarithm of the number of employees measured firm size. The employee growth is calculated by the growth rate in the number of employees. Return on assets (ROA) is the percentage of earnings to total assets before interest, tax, and depreciation. Cash flow is the net cash flow from operations minus capital expenditures, divided by the total assets. All regressions include a series of year dummies (2001-2002). Standard errors are in parentheses. Asterisks (***, **, and *) denote statistical significance at 1%, 5%, and 10% levels, respectively.

Table 6. Regressions for the determinants of restriction terms

	Dependent Variable		
	Average wait to exercise	Time to exercise after resignation	Time to exercise in retirement
Intercept	2.989***	0.086***	1.942***
	(0.094)	(0.030)	(0.211)
Market-to-book ratio	0.038***	-0.004	0.018
	(0.009)	(0.013)	(0.52)
R&D (%)	-0.003	-0.0007	-0.019***
	(0.003)	(0.0005)	(0.0005)
Firm volatility (%)	-0.007***	-0.001***	-0.006*
	(0.0005)	(0.0003)	(0.0038)
Industry volatility (%)	-0.011	0.0015	-0.078***
	(0.007)	(0.0025)	(0.005)
Employee growth	0.019	-0.009**	-0.048
	(0.045)	(0.004)	(0.069)
Firm size (in logarithm form)	-0.017**	0.006***	-0.013
	(0.008)	(0.0007)	(0.008)
Adjusted R ²	0.004	0.005	0.192
Observations	180	169	184

This table presents the results of regressions for the contractual terms of option grants. Dependent variables are: Average wait to exercise, Time to exercise after resignation, and Time to exercise in retirement, respectively. Average wait to exercise is the average waiting period to start exercising option grants. Time to exercise after resignation is the period for exercising vested options after employees resign. Time to exercise in retirement is the period for exercising option grants after employees retire. All regressions include a series of year dummies (2001-2002). Standard errors are in parentheses. Asterisks (***, **, and *) denote statistical significance at 1%, 5%, and 10% levels, respectively.