Influence of Stock Compensation Valuation on Firms' Performances: Par Value vs Fair Value

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Abstract

The FASB has converged SFAS 123R with IFRS No.2, which simultaneously defines that the value of stock compensation is an expense under fair value method that must be recognized in the current statement of operations. However, under the fair value method, volatility of the market value of stock is easily subjected to the business cycle, political condition, managerial behavior, and macroeconomic factors, which results in a poor explanatory index than par value method. This paper limits the research target to stock option and restricted stock as incentive vehicles only, and investigates separately influence of stock compensation on firm's financial performance under par value and fair value. According to the empirical results, growth, firm size, and fixed asset turnover are all significant and positively correlated with EPS; debt ratio is significant and negatively correlated with EPS. Stock compensation presented in par value is significant in t value and increases EPS by 0.68% while stock compensation presented in fair value is not. Stock compensation presented in par value of 60.5% R-square seems that there's no better explanation on the firm's financial performance than that in fair value of 60.2%. Therefore, using the fair value method does not deviate the influence of stock compensation on firm's financial performance.

Keywords：SFAS 123R, stock option, restricted stock, fair value method, par value, EPS, financial performance

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1. Introduction

Issues about the dilutive effects on stock-based compensation have been discussed for years. "Who says elephants can't dance?：inside IBM's historic turnaround", written by the Gerstner, CEO of IBM, 2003, mentioned that advanced employees tend to distribute themselves with amounts of stocks or stock options; thus that dilutes the shareholder equity.

The FASB has converged SFAS 123R with IFRS No.2, which simultaneously defines that the value of stock compensation is an expense that must be recognized in the current statement of operations. Some argued that excessive stock options generate dilutive effects on current shareholders, transfer claims on equity from current shareholders to the company employees, and result in a cost to the company. However, some argued that stock compensation system is the key for firms to become successful. Stock compensation plans tie employees closely to the firms, resulting in a great deal of incentive to generate future earnings.

Whether the dilutive and incentive effect can be offset is doubtful, and there are still substantial problems to be figured out, for example, valuation. The most common option-pricing theories is Black-Scholes model（1973）. However, the value of stock option is a function of price on the underlying stock, volatility, etc.. Those make it difficult and unreliable to measure.

Since stock-based compensation must be recognized as an expense in the current statement of operations, it is important to define explicitly the accounting principles. There are five commonly used employee compensation incentive vehicles: employee stock preemptive right, employee profit sharing, employee stock bonus, employee

stock option, and the recent rapid developed-restricted stock. However, this paper will only discuss two incentive vehicles as stock option and restricted stock since employee stock preemptive right doesn't belong to incentive awarding and employee profit sharing doesn't belong to stock awarding.

1.1 Accounting Background

1.1.1 Stock option

The principle for stock based compensation accounting is specified differently in Accounting Principles Board Opinion（APB, 1972）No.25, Financial Accounting Standard Board（FASB, 1993）SFAS 123, and（FASB, 2004）SFAS 123R, all regulated the measurement on how firms issue stock to employee as compensation.

Under APB 25, stock-based compensation cost should be calculated by the difference between the stock price and the exercise prices on the measurement date, and the cost should also be amortized by the employee's service life, the vesting period as Figure 1.1 shows. The measurement date is the date at which the exercise price and number of options are known. For example, if there are fixed options granted, the measurement date is the grant date; however, if options granted are performance based, the measurement date is the date which performance criteria are met.

APB 25 adopted the intrinsic value method where the current fair value exceeds the exercise price; that is to say, when firms grant fixed options to employee on the measurement date which is also the grant date and for most fixed option grants the stock price equals to the exercise price, compensation under APB25 is almost zero. Thus, it makes no influences on the current statement of operations. Figure 1.2 shows the accounting background of stock compensation.

Actually, options have value. Black and Scholes （1973） argued that options

have value beside the intrinsic value. Under this circumstance, it's not appropriate to recognize zero cost for stock-based compensation. Thus, FASB issued a draft of SFAS 123 in 1993, requiring firms to measure the options value by fair value. SFAS 123 requires companies to determine the value of the stock option grant and amortize this amount over the expected exercise period, the vesting period. The value of the stock option grant is determined by multiplying the number of options granted with the fair value of each option on the date of the grant. Option's fair values are determined by using well-known Black-Scholes model, based on assumptions as Figure 1.3 provided by the companies.

However, owed to the political interference and opposition, firms can still choose either APB25（intrinsic value method）or SFAS 123（fair value method）; even FASB officially proposed the SFAS 123 in 1995. Besides, SFAS 123 didn't require that companies recognize this cost in net income but it should be disclosured in pro forma income that included stock based compensation expense in a footnote.

By the end of 2004, in order to improve financial reporting condition, and to converge to International Financial Reporting Standards（IFRS）No.2 Share-Based Payment, FASB proposed adjusted SFAS123（SFAS 123R）. SFAS 123R superseded both APB 25, which permitted the use of the intrinsic-value method in accounting for stock-based compensation, and SFAS 123, which allowed companies applying APB 25 to just disclose the pro forma effect on net income by applying the fair value method. Under SFAS 123R, all forms of share-based payments to employees, including stock options and stock awarding plans, would be treated as compensation and recognized in the statement of operations on their fair value.

1.1.2 Accounting of Restricted Stocks

Restricted stock, also known as letter stock or restricted securities, refers to stock

of a company that is not fully transferable until certain conditions have been met. Upon satisfaction of those conditions, the stock becomes transferable. Restricted stock is another form of compensation granted by a company.

Typically, the conditions that allow the shares to be transferred are continued on employment during a period of time, upon which they vest. However, those restrictions can also be some sort of performance conditions, such as the company reaching earnings per share goals or financial targets. Restricted stock is becoming a more prominent form of employee compensation, particularly to executives.

It is much easier to derive market value for restricted stock on grant date; thus firms can use the market value on the grant date, or difference between market value and market value on grant date, to amortize the employee compensation expenses during vesting period by contract. Once the employees can't fulfill the service-based or performance-based conditions, firms can recognize the amortized expenses in previous years as other revenues in the current year.

1.1.3 Comparison to stock option

Flexibility

For employees, issuing restricted stock suffers less damage than adopting stock option, while the market price of stock drops. That is to say, employees take less risk and obtain more benefits, especially when the capital market holds a steady condition or down-turn. Besides, some employees can enjoy the claims of dividend and voting rights to firms even though they have not fulfilled certain conditions.

For firms, the amounts on issuing restricted stocks will be much fewer than those on stock options, resulting in a less dilutive effect on the shareholder equity; once firms decide to buy back the stocks, cash demand and damage to the debt holders can be decreased.

Settle the dispute of stock bonus system

Issuing restricted stock can make up for the disadvantages and flaws resulted from employee stock compensation system. As to profit and loss, issuing restricted stock is definitely an employee salary cost or expense, not the earnings distribution. Besides, it does create a less dilutive impact on shareholder equity. After obtaining the restricted stocks, employees have to serve in firms for a period, usually 3 to 5 years, and surely that can accomplish the purpose of keeping elites in firms. Figure 1.5 demonstrates the comparisons of stock option and restricted stock.

1.2 Research target

Basically, complicated factors and incentive plans need to be considered while firms try to attract employees, even with detailed financial analysis. Matching the proper incentive plans to the firms is never for sure. Generally, stock options, stock purchase, stocks bonus, and stock awarding plan are the most common ways to inspire employees. And, who deserves the awarding depends on the firm's policy, it may be an overall awarding basis, or constrained merely to some substantial and advanced managers.

Figure 1.6 and Figure 1.7 are surveys conducted by different incentive plans by Radford International in 2007. It clearly indicates that stock options remain the primary vehicle across industry segments though the use of restricted stock has increased significantly in the US. The same situation appears when stock option and restricted stock dominate in Asia. Therefore, this paper limits the research target to stock option and restricted stock as incentive vehicles only.

1.3 Motivation

Practically, prior to deciding which incentive plans to adopt, firms must

well-arranged evaluate its cash flow, the potential diluted earnings per share, the market price of the stock, agency cost, and expectations from employees, etc.. However, some uncertain and outside factors can't be avoided, especially when we predict and measure the employee compensation expense on the decision of restricted stock plan or stock option project.

Whether by restricted stock or stock option, market value of stock on grant date is necessary. Market value of the underlying asset is needed to calculate the fair value of the stock option and restricted stock. It seems that only market value of stock matters. However, the volatility of the market value of stock is easily subjected to the business cycle, political condition, managerial behavior, and macroeconomic factors.

Firms that choose the fair value as an index can effectively decrease the information asymmetry problems and well disclose the transparency of the firms. Nevertheless, when it comes to talking about the influence of employee stock compensation on the firm's financial performance, using par value instead of fair value will be more explainable. That's because par value also represents value of the stock and eliminates many outside factors that influence value of the firm.

Besides, relevant studies about influences of stock compensation on financial performance are not consistent, especially when stock compensation is presented by fair value or par value. Figure 1.8 summarizes the different influences of compensation by par value and fair value on net income, EPS and ROE.

Since market value of stock is affected by many factors, chances are that stock price can't be fairly reflected the true value and performance of firms. Besides, since the stock price contains many potential market signals, why can it be used directly to evaluate financial performance? This paper mainly discussed the relation between the stock compensation and firm's financial performance by situations of par value and fair value. The original methodology is referred to Lin and Huang (2004), but

modifications are made to enhance and increase explanatory ability of the model by the results compared to Lin and Huang (2004). The three major research issues in this paper are:

(1) Compared the empirical results with Lin and Huang (2004).

(2) Influence of stock compensation on firm's financial performance.

(3) Explanatory power of stock compensation under fair value and par value.

Section 2 reviews the literature and develops hypotheses. Data selection and methodology are explained in Section 3. Section 4 analyzes the empirical results. Finally, conclusion is made in Section 5.

2. Literature Review and Hypotheses Development

2.1 Independent Variables

There are many substantial factors influencing the firm's financial performance, both internal and external. The size effect, growth effect, financing policy, the efficiency of operating asset and amount of stock compensation are mainly discussed in this paper while relating to the financial performance. Figure 2.1 is the research structure in this paper.

2.1.1 The Firm Growth Effect

The business growth is usually associated with the life cycle which is defined as start-up, rapid expansion, high growth, mature growth, and decline. The impact factor of the business growth is also discussed and related to studies about the financial performance.

Cui and Mak (2002), examined the relationship between managerial ownership and performance for high R&D firms that are listed on the NYSE, AMEX and

NASDAQ. They found that Tobin's Q initially declines with managerial ownership, then increases, declines ,and finally increases again：a W-shaped relationship. The controllable variables they used are firm size, debt ratio, fixed assets ratio, R&D intensity, and total sales growth rate.

Kim (1998), used the data of 198 U.S. firms to examine the relationship between profit sharing and profits. The controllable variables he used are firm size, capital intensity, R&D/sales, sales growth rate, and beta. He found that the average excess value for the profit-sharing firms is 0.15, but only 0.11 for firms without profit sharing, which suggests a high correlation between profit sharing and profitability. Besides, he also found that R&D expenditure and sales growth have positive effects on the profit measures.

Actually, in the studies of relation between growth and performance, R&D/sales is the most common variable. However, due to the incomplete reporting of R&D, this paper uses sales growth as growth opportunity to firm's performance. Because the data on sales growth is more accessible and the relationship between sales growth and performance is correlated in many studies, therefore the first hypothesis （H_1）is created as below：

H_1：Holding other variables constant, the corporate sales growth has positive relation with financial performance

Definition of the sales growth is from the *Compustat*, representing gross sale which is the amount of actual billings to customers for regular sales during the period. It also excluded cash discounts, trade discounts, and returned sales and allowances for which credit is given to customers.

2.1.2 The Size Effect

Empirical researches show that the corporate size has a positive relation with financial performance, mostly due to the economic effect. Gupta (1969), conducted the effects of industry, size, and growth on the financial structure of corporate enterprises, and indicated that the large-sized firms tend to have a higher sales profit margin than small-sized firms since the growth rate shows no regular pattern. Miller and Pras (1980), stood at the organization point that corporate size is a substantial factor and variables that the major investing firms operate are under conditions of imperfect competition. Most important of all, it also examined that the multinational diversification and firm size have a substantial connection with the profitability.

Because large-sized firms offer advantages in financial planning and investing opportunities, thus reaching the benefits on economic scale is easier than in small-sized firms, therefore the second hypothesis（H_2）is made below：

H_2：Holding other variables constant, the corporate size has positive relation with financial performance

Indices for the firm size vary, such as number of employees or values of sales. However, flaws may arise such as annual fluctuation on sales or labor density difference in different industries. This paper addresses the firm size that theories recommend, Miller and Pras (1980), Campello（2006）, while explaining the profit performance as value of assets. Compared to H_2, since large-sized firms offer advantages in financial planning and investing opportunities, value of assets seems to be a reasonable measure of economic scale on firm size. Besides, the nature logarithm of asset suggests that the value of asset wouldn't be distorted because it is a continuous function.

The size of the corporation = LN（book value of total assets）

2.1.3 The Financing Policy

Financing policy also influences the firm's financial performance; however, it's difficult to define that leverage degree has a negative or positive effect on the firm performance. Campello（2006）examined whether variation of debt affects a firm's product market performance, he used the data from 115 industries over 30 years to test the relation between leverage and sales performance. He indicated that moderate debt increases the gains of market share compared to the rivals, but excessive debt results in a poor market share performance. Myers and Majluf (1984), examined the corporate financing behavior to see if debt financing is preferred to equity financing. Firms with favorable growth prospects will exhaust their internal sources of funds before soliciting outside financing, which implied a negative correlation between debt and profitability.

Most of the discussions revealed the reverse correlation between debt and profitability. Whereas, there are still related researches showing that debt and profitability is positively correlated. Jensen (1986), indicated that most relevant researches only consider the cost of debt but ignore the benefits effect that debt motivates managers and corporate to be efficient by issuing large amount of debt to replace dividends or stock repurchase.

Many relevant researches about the leverage level and corporate profitability have been conducted. Therefore, controlling debt in the empirical model can't be overemphasized. Since most empirical results sustain that leverage degree has a negative effect on the firm performance, therefore the third hypothesis（H_3）is described as below：

H_3：Holding other variables constant, the corporate debt level has negative relation with financial performance

Traditionally, using debt ratio as an index is the most common way to discuss the financing policy; whereas dilemma arises, according to the theory of capital structure, debt ratio should be displayed in market value terms. Another situation is that only capital lease and interest-bearing debt need to be involved. However, due to the accessible problem on the market value of debt, book value of debt ratio is preferred.

DEBT =Book value of total debt/Book value of total asset

2.1.4 The efficiency of operating asset

The efficiency of the corporate operating asset is strongly associated with the firm's financial performance. In the definition of accounting, operating assets should serve the purpose of future economic benefits. Actually, most empirical results indicate that the higher efficiency of the asset turnover, the better the financial performance. Operating asset turnover measures the firm's ability to generate revenues and the level reflects the firm's asset utilization. Assets can be divided into two categories --current and non-current, resulting in kinds of assets turnover, such as account receivable turnover, inventory turnover, and fixed asset turnover.

Fairfield and Yohn（2001）, examined that decomposition of return on asset from traditional text book can be useful in predicting future profitability. They also found that the change in asset turnover is associated with the change in future profitability, while the change in profit margin is not. Feltham and Ohlson（1995）, indicated that operating activities bring up abnormal earnings. Ohlson (1995), indicated that the value of a firm can be expressed as a function of the firm's book value and future abnormal earnings. All of these relevant researches reveal that the firm value is dominated by the future profitability, while future return is dominated by the corporate operating assets.

Operating activities are the core activities that influence value of all firms. They are substantial, well-exercised to sustain the long run business cycle under the premise of keeping-going assumption. Therefore, those factors matter, as the operating assets support the operating activities. Definitions of operating assets differ from textbooks and studies. In the textbook of Financial Statement Analysis, written by K. R. Subramanyam and John J. Wild, 2009, operating assets has been defined as following：

Operating Asset = Cash + Accounts Receivable + Inventory + Prepaid Expense + Deferred Tax Asset + Property, Plant and Equipment（PPE）+ Long-term Investment（Equity method investments, goodwill, and acquired intangible assets）.

Due to the data availability and characteristics among industries, this paper only considers the turnover of property, plant and equipment, which is so-called fixed asset turnover. Since asset turnover is associated with the firm's performance, therefore the fourth hypothesis（H_4）is set as below：

H_4：Holding other variables constant, the corporate fixed asset turnover has positive relation with financial performance

Considering the industries types and characteristics in this paper, evaluating the financial performance by fixed asset turnover would be more objective and fair, rather than inventory or account receivable. Definition of fixed asset turnover is from *Compustat*, representing net sales divided by the average of the two most current years of total and net property, plant and equipment.

Fixed Asset turnover (FA) = (Net Sales/Average Fixed Assets)

2.1.5 Employee stock compensation

The nature of employee stock bonus project is to share firm's profitability with those who influence the firm's performance; thus it combines employees' benefits and firm's objectives together. There are already many studies and researches related to effect of employee stock bonus on firm performance so far, and most of the performance is measured by the employee productivity and profitability. However, whether stock compensation influenced positively on performance is doubtful, with differences on empirical results. This paper discusses influence of stock compensation on firm's financial performance, and also makes comparison of stock compensation presented in par value and fair value

Lin and Huang (2004), indicated that growth and fixed asset turnover are positively correlated to return on equity while debt is negatively correlated to return on equity. Besides, he found that valuing stock at par value generates the highest explanatory power, suggesting it is the best indicator for financial performance.

Aboody (1996), realized that the outstanding employee stock options and stock price are negative correlated. According to the further empirical results, evidence shows that options in their early vesting stages have a positive effect on firm value, but vested in-the-money options are considered as cost by the firm's shareholders. Besides, Aboody et al. (2004), further extends Aboody (1996) into four ways. First and the most important, studying the stock-based compensation disclosure under SFAS123 is rather than the researcher-recognized one which is identified with Skinner (1996). Second, evidence of stock-based compensation and effects of expected earnings are correlated. Third, expand instrumental variables approach. And finally, achieve the conclusion of negatively correlated changes in stock-based compensation and returns that Aboody (1996) failed to find.

However, Bell et al. (2002), conducted the economic effect between stock-based compensation and firm value with disclosure for 1996, 1997, and 1998 samples focused on 85 profitable software companies. He discovered that investors don't recognize the stock-based compensation as expense but intangible asset, while positively it impacts the firm value. This result is consistent with Keating et al. (2002) in knowledge-intensive industries.

Paugh, Oswald and Jahera (2000), conducted the empirical research of evaluating the performance and establishment of employee stock ownership programs. ESOP is run by 183 firms from the Wall Street Journal Index and NCEO's Non-Majority Employee Firms report. They found that ESOP only has small, positive, and short-term impact on ROE, ROA, and Net profit margin.

Botosan and Plumlee (2001), examined the effect of stock option expense on the diluted earnings per share and return on assets of 100 firms identified by *Fortune* magazine as "American Fastest-Growing Companies". They have the same characteristic that makes amounts of distribution of stock options incentive. By calculating the difference between diluted EPS and ROA in previous and later adjusted statement（fair value recognition）, it represents impact from stock option expense, and they also found that stock option expense has material effect on performance.

Robinson and Burton (2004), investigated the market reaction of the firms which adopted SFAS123 fair value method to measure the employee stock option. 97 samples from S&P Report in 2002 and industries are categorized into 30 groups.. In order to compare ESO usage and ESO expense on profitability, similar book value equity firms are also chosen in the same group without adopting the ESO program. The empirical results show that ESO and firm performance are negatively correlated and with the SAFS123, investors take the disclosure of ESO into consideration while

assessing the firm.

There are also early studies related to the stock-based compensation and firm performance. Park and Song (1995), examined the long-term performance of ESOP firms and found significant improvement in their year-end performance with M/V and ROA as indicator of performance. Conte (1992), found that most employee stock ownership plans and profit sharing plans wouldn't increase the relationship between the employee paycheck and company earnings.

Actually, from most of the empirical results, employee stock compensation is indeed a way commonly used as incentive. However, the comparative effect on firms' performance varied, but most of it stands at a negative viewpoint.

Nevertheless, this paper is going to examine the relation and explanatory power of employee stock compensation on firms' performance, including stock compensation in par value or fair value. Although fair value method is now a generally accepted accounting principle, its explanatory power on firms' performance will be doubtful since fair value sometimes is not that objective as par value. Therefore, the fifth hypothesis（H_5）and sixth hypothesis（H_6）are made as below：

H_5：Holding other variables constant, adoption of par value of stock compensation is more significant either positively or negatively than fair value on firm's financial performance

H_6：Holding other variables constant, adoption of par value of stock compensation is more explanatory than fair value on firm's financial performance

Measurement of stock compensation is not easy, especially in par value. This paper adopts the definition of stock compensation from *Compustat*, where the amount of stock compensation expensed on the income statement during the current period on an after-tax basis, including both stock option and restricted stock.

After-tax stock compensation presented in fair = COMPF

Actually, for SFAS 123R, stock compensation is presented in fair value for better information transparency by Enron and Worldcom. Stock compensation is difficult to be measured because par value is not consistent among companies and industries. In order to solve the problem, this paper considers the reverse of price to book ratio multiplied by stock compensation presented in fair as an index for par value.

After-tax stock compensation presented in par = COMPF* x *(1/Price to Book ratio)

2.2 Dependent Variables

2.2.1 Measurement of financial performance

As discussed in many studies, ROE, ROA, and EPS are the most suitable variables in measurement of financial performance, especially for ROE and EPS. Because stock compensation is tied closely to the current shareholders' equity, ROE or EPS will be much relevant and meaningful. EPS will be more relevant than ROE because EPS further limits the earnings distribution to common shareholders. Therefore, in this paper, both ROE and EPS will be discussed.

3. Data Selection and Methodology

3.1 Data Selection

This paper collects data for firms in the S&P 1,500 Super Composite indices, with sample period from 2006 to 2008 as Figure 3.1. Besides, 1,500 firms ought to fulfill the following conditions：

(1) The financial service company is excluded due to the nature character and difference between industries.

(2) The sample firms must have implemented employee stock compensation project either in stock option plan or restricted stock every year from 2006 to 2008.

(3) By data completeness, any sample with data missing or unavailable will be omitted. The following table summarizes the process of sample selection.

3.2 Model Design and Statistic Procedure

3.2.1 Model design

This paper studies influence of stock compensation plan, including stock option and restricted stock, on firm's financial performance, with other controllable variables as firm size, debt ratio, sales growth, and fixed assets turnover. Also, it examines the explanatory power of stock compensation plan on statement presentation of par value and fair value.

The first and second models are referred to Lin (2004) original idea but new adoption of sample firms in the US market; the third model rebuilt the first one with the amount of stock compensation added and the modification of variables, and it mainly studies the impact of substantial variables on firm financial performance. The fourth model is almost identical as the third one, but the amount of stock compensation is valued under par value rather than fair value. The third and fourth models are to test the explanatory power of stock compensation plan under statement presentation of par value and fair value. The following are four models：

【MODEL I】

$$ROE_{mv,it} = \alpha + \beta_1 GROWTH_{it} + \beta_2 LN_{it} + \beta_3 DEBT_{it} + \beta_4 FA_{it} + \varepsilon_{it}$$

【MODEL II】

$$ROE_{par,it} = \alpha + \beta_1 GROWTH_{it} + \beta_2 LN_{it} + \beta_3 DEBT_{it} + \beta_4 FA_{it} + \varepsilon_{it}$$

where i = 1, 2, …N, represents different cross-section individuals（Firm）,

t = 1, 2, …T, represents different time series individuals（Year）,

$ROE_{mv,it}$：Represents income before extraordinary items and discontinued operations less preferred dividend, divided by common equity as reported, which is defined as the common shareholders' interest in the company,

$ROE_{par,it}$：Represents income before extraordinary items and discontinued operations plus stock compensation presented in fair value, less stock compensation presented in par value, and less preferred dividend requirements, divided by common equity as reported,

$GROWTH_{it}: \frac{Net\ Sales_{it} - Net\ Sales_{it-1}}{Net\ Sales_{it-1}}$,

LN_{it}：This item is the logarithm of total assets, representing the size of the firm,

$DEBT_{it}$：Represents book value of total debt/book value of total asset,

$FA_{it}: \frac{Net\ Sales_{it}}{\left(Fixed\ Assets_{it} + Fixed\ Assets_{it-1}\right)/2}$.

【MODEL III】

$$EPS_{mv,it} = \alpha + \beta_1 GROWTH_{it} + \beta_2 MV_{it} + \beta_3 DEBT_{it} + \beta_4 FA_{it} + \beta_5 COMPF_{it} + \varepsilon_{it}$$

where i = 1, 2, …N, represents different cross-section individuals（Firm）,

t = 1, 2, …T, represents different time series individuals（Year）,

$EPS_{mv,it}$: $\frac{Net\ Income_{it} - Preferred\ stock\ dividend_{it}}{Weighted\ average\ outstanding\ shares_{it}}$ representing basic earnings per share adjusted to remove the effect of all special Items from the calculation,

MV_{it} : Common shares outstanding multiplied by the calendar year end price that corresponds to the period end date, representing the size of the firm,

$COMPF_{it}$: This is the amount of stock-based compensation expensed on the income statement during the current period on an after-tax basis, including stock compensation expense reported on an after-tax basis, amounts relating to all types of stock compensation including options, restricted stock.

【MODEL IV】

$$EPS_{par,it} = \alpha + \beta_1 GROWTH_{it} + \beta_2 MV_{it} + \beta_3 DEBT_{it} + \beta_4 FA_{it} + \beta_5 COMPP_{it} + \varepsilon_{it}$$

where i = 1, 2, …N, represents different cross-section individuals（Firm）,

t = 1, 2, …T, represents different time series individuals（Year）,

$EPS_{par,it}$: $\frac{Net\ Income_{it} + COMPF_{it} - COMPP_{it} - Preferred\ stock\ dividend_{it}}{Weighted\ average\ outstanding\ shares_{it}}$

$COMPP_{it}$: the amount of $COMPF_{it}$ X $(1/Price\ to\ Book\ ratio)$ (Here the reverse of price to book ratio is used as an index to transform stock compensation expense calculated by fair value into par value),

Price to Book ratio：The close price for the calendar year multiplied by the company's common shares outstanding, and divided by common equity as reported, represents the common shareholders' interest in the company.

3.2.2 Statistic Methods

This paper applies *panel data* to analyze influence of controllable variables on firm's financial performance. The so-called panel data is to observe the change of a set of samples in a specific period; therefore, panel data includes cross-section analysis and time-series analysis while the OLS ignored.

Results from OLS are inefficient if there is heterogeneity among data; however, panel data possesses the dynamic character of time series and nature among samples. By different assumptions, regression model can be divided into Ordinary Least Square Model（OLS）, Fixed Effect Model, and Random Effect Model. The following illustrates panel data model used in this paper.

$$Y_{it} = \alpha_{it} + \sum_{k=1}^{k} \beta_k \mathrm{X}_{kit} + \varepsilon_{it} \quad \varepsilon_{it} \sim iid\left(0, \sigma_{\varepsilon}^2\right)$$

1. Ordinary least square model：Intercept of all samples is the same, where $\alpha_{it} = \alpha$
2. Fixed effect model：Each group has different intercept, where $\alpha_{it} = \alpha_{it}$
3. Random effect model：Intercept is affected by random item, where

   $\alpha_i = \overline{\alpha} + u_i \quad u_i \sim iid\left(0, \sigma_u^2\right)$

【Ordinary least square model】

$$Y_{it} = \alpha_{it} + \sum_{k=1}^{k} \beta_k \mathrm{X}_{kit} + \varepsilon_{it} \quad \varepsilon_{it} \sim iid\left(0, \sigma_{\varepsilon}^2\right)$$

where i = 1, 2, …N, represents different cross-section individuals（Firm）,

t = 1, 2, …T, represents different time series individuals（Year）,

k = 1, 2, …K, represents there are K independent variables,

Y_{it} ：Dependent variable of firm i at time t,

X_{kit} ：Independent variable of firm i at time t,

α ：Intercept of regression,

β_k ：Coefficient of the kth dependent variable,

$\varepsilon_{it} \sim iid\left(0, \sigma_\varepsilon^2\right)$ ：Random error term.

$\varepsilon_{it} \sim iid\left(0, \sigma_\varepsilon^2\right)$ implies that there is no difference between firms and time. However, the panel data is composed of various firms and different time; various firms may result in heterogeneity and different time may cause serially correlation. Therefore, estimation inefficiency may come into existence by OLS. Here, panel data model is suggested because it contains information of cross section and time series. Besides, by different assumptions of intercept, panel data model can be divided into fixed effect model and random effect model.

【Fixed effect model】

In fixed effect model, intercept is fixed in the same group but different among groups; that is, different groups have different but parallel regression lines. Advantages while using fixed effect model are that difference between groups can be presented to decrease bias of estimation.

Generally, fixed effect can also be separated into individual group effect and time specific effect, explained as follows：

(1) Individual group effect：Holding other variables constant, different groups have their own characters which make a long term impact on dependent variable, while this impact is not influenced by time.

(2) Time specific effect：Holding other variables constant, different time points have different characters which make a short term impact on dependent variable among groups, while this impact is not influenced by groups.

If both individual group effect and time specific effect are considered, fixed effect model can be also called two-way fixed model, explained as follows：

$$Y_{it} = \alpha_0 + \sum_{j=1}^{N} \alpha_i D_{jt} + \sum_{r=1}^{T-1} r_t E_r + \sum_{k=1}^{k} \beta_k X_{kit} + \varepsilon_{it} \quad \varepsilon_{it} \sim iid\left(0, \sigma_\varepsilon^2\right)$$

where α_0 is the normal fixed intercept.

$\sum_{j=1}^{N} \alpha_i D_{jt}$ represents intercept of different groups,

D_{jt} is dummy variable, if i=j, $D_{jt} = 1$; if i≠j, $D_{jt} = 0$,

$\sum_{r=1}^{T-1} r_t E_r$ represents intercept of different time,

E_r is dummy variable, if r=t, $E_r = 1$; if r≠t, $E_r = 0$

【Random effect model】

Random effect model is so-called the error component model, and it also considers both individual group effect and time specific effect. The main difference between fixed effect and random effect is the assumption of regression intercept. Fixed effect model emphasizes inference from data obtained, but random effect model assumes that data is collected from the different group population randomly. This paper does not apply random effect model for analysis because sample size equals to the population.

【F test】

By F test can we know that whether the intercept of regression is all the same. F test here is used to test either OLS or Panel data model.

$H_0 : \alpha_1 = \alpha_2 = ... = \alpha_n$ and $r_1 = r_2 = ... = r_n$ where intercept is all equal

$H_1 : \alpha_i$ ，i=1,2,3……..n where intercept is not all equal

r_t ，t=1,2,3……..T where intercept is not all equal

$$F\ value = \frac{\left(R^2_{Fixed} - R^2_{OLS}\right)/\left(n+T-2\right)}{\left(1-R^2_{OLS}\right)/\left(nT-n-T-K+1\right)} \sim F\left[\left(n+T-2\right),\left(nT-n-T-K+1\right)\right]$$

where R^2_{Fixed} ：Represents the R^2 while using the fixed effect model

R^2_{OLS} ：Represents the R^2 while using the OLS

n： the groups of cross section

T： the number of time series

k： the number of independent variables

Hence,

(1) $F\ value < F_{(n+T-2,nT-n-T-k+1)}$： Do not reject H_0, representing that intercept of all groups is equal, using OLS.

(2) $F\ value > F_{(n+T-2,nT-n-T-k+1)}$： Reject H_0, representing that intercept of all groups is not all equal, using panel data model.

3.2.3 Statistic Procedure

【Multi-collinearity test】

Correlation among independent variables can be detected by variance inflationary factor, VIF, as the following shows：

$$VIF = \frac{1}{1-R^2_j}$$

$$X_j = \alpha_0 + \beta_1 X_1 + ... + \beta_{j-1} X_{j-1} + \beta_{j+1} X_{j+1} + ... + \beta_k X_k + \varepsilon_{it} \quad \varepsilon_{it} \sim iid\left(0, \sigma^2_\varepsilon\right)$$

R_j^2 represents the multiple R-square. When there is no correlation among independent variables, R_j^2 equals to 1. Therefore, the smaller VIF is preferred, usually smaller than 10.

【Stepwise selection】

In the traditional implementation of stepwise selection method, the same entry and removal of F statistics for the forward selection and backward elimination methods are used to assess contributions of effects as they are added to or removed from a model.

At a step of the stepwise method, any effect in the model is not significant, and then the least significance of these effects is removed from the model and the algorithm proceeds to the next step. This ensures that no effect can be added to a model while some effects currently in the model are not deemed significant. Only after all necessary deletions have been accomplished can another effect be added to the model. In this case the effect whose addition yields the most significant F value is added to the model and the algorithm proceeds to the next step.

【F test】

This paper conducts 576 firms of cross section and covers 3 years of time series. Before examining the relation between stock compensation and financial performance, F test is needed to decide OLS model or Panel data properly. Figure 3.2 is statistic procedure for this paper.

4. Empirical Results

4.1 Descriptive Statistics

Descriptive statistics of all variables are summarized as Table 1. The independent variables, GROWTH, MV, FA, COMPF, and COMPP, have a higher standard deviation than mean, representing that these variables are more scattered while the DEBT is more concentrated than other independent variables.

Of the two dependent variables, EPS_{mv} and EPS_{par} both are positive and nearly equivalent mean, but EPS_{mv} is lower than EPS_{par}. This is consistent with different basis of calculation that if stock compensation is presented by fair value, influence on net income will be greater than by par value because most firms have a higher stock market price than par value of stock itself. Here, variables of model I and II are not under discussion because of the same character as Lin and Huang (2004) mentioned.

Correlations between controllable variables are summarized in Table2. As Table 2 shows, most variables have low correlation one another except COMPF and MV, COMPP and MV. Correlation coefficient between COMPF and MV is 0.786, which is highly correlated. One interpretation is that both COMPF and MV are calculated by the market stock price which doesn't mean COMPF or MV is not a substantial controllable variable in regression. Besides, Correlation coefficient between COMPP and MV is 0.519, and this is because COMPP is transformed from COMPF by multiplying reverse of price to book ratio.

By testing the controllable variables' contribution to regression and multi-collinearity problem, the following parts are tests of VIF and stepwise variables selection.

After examining Table 2, Table 3 and 4 shows the result from variance inflationary factor test and stepwise selection, and Table 3 and 4 represent the different regressive conditions for model III and IV. All controllable variables' VIF

are far smaller than 10, representing no multi-collinearity problem, and under stepwise selection, all controllable variables can be added into the regression model as substantial variables. Although COMPF and MV are highly positively correlated, neither these two variables can be removed from the regressions, so do COMPP and MV.

By comprehensive results from Table 1 to 4, the next step is to run the regression model after conducting F test which functions as whether OLS or Panel data is chosen.

By the results from Table 5, all regressions have rejected the null hypothesis, which means that all samples have no equal intercept in each regression. Therefore, panel data is suggested to replace OLS; besides, since sample size is also equal to the population, fixed effect model is chosen rather than random effect model.

4.2 Multivariate Analysis

4.2.1 Compared empirical results with Lin and Huang (2004)

Model I and II adopt identical variables with Lin and Huang (2004). As Table 6 shows, no matter how ROE calculated by fair value or par value, it is significantly influenced by controllable variables of GROWTH, LN, DEBT, and FA. However, this result slightly differs from Lin and Huang (2004), which all controllable variables except LN are significant.

By variable definition, LN is the nature logarithm of total assets. Based on the assumption that larger-sized firms offer advantages in financial planning and investing opportunities, firms of S&P 1,500 get a better understanding of size effect on financial performance than Taiwan companies. Besides, both DEBT are significant and negatively correlated with dependent variables in fair value or par value, while this

result is consistent with the assumption that leverage degree has a negative effect on the financial performance.

Another difference indicates that GROWTH is negatively correlated in S&P 1,500 but positively correlated in Taiwan market. A better interpretation is the constitution of sample firms. Most of the stock compensation projects are implemented by Hi-Tech industries, while S&P 1,500 is composed of various kinds of industries rather than merely Hi-Tech. Therefore, empirical results from S&P 1,500 should be more objective than those of Taiwan companies. Besides, since the sample period covers from 2006 to 2008, sales growth rate significantly decreased in 2008 for most companies than usual, so the other explanation is due to the financial crisis.

Both the R^2 are about 38.7% compared to Lin and Huang (2004), 20.8% while using ROE_{MV} as dependent variable and 23.1% for ROE_{par} . Since all the controllable variables are significant in sample firms from S&P 1,500, it explains why model I and II have a better explanatory power than Lin and Huang (2004). Model III and IV make some modifications for model I and II.

First, Lin and Huang (2004) used ROE as the dependent variable because stock compensation has a strong relation with the shareholder equity. This paper, however, uses EPS as the dependent variable because EPS emphasizes on the firm's distribution to common shareholder equity, and it represents a better relationship between the dilutive effect and incentive effect. Second, this paper considers another substitution as market value to size of the firm. Fama and French (1992), indicated that two variables market equity (ME) and the ratio of book equity to market equity (BE/ME) capture much of the cross-section of average stock returns. Here, firm size means stock price times shares outstanding. In this paper, market value is also an index of size related to the financial performance. Third, since this paper focuses on the

influence of stock compensation on performance, the amount of stock compensation should be considered as a substantial controllable variable.

This paper uses the real data of stock compensation from S&P 1,500, while Lin and Huang (2004) derived data by simulation, and deducted the stock compensation from the income statement during 1998 to 2001 in Taiwan stock market. Therefore, this paper produces more reliable results than Lin and Huang (2004).

4.2.2 Influence of stock compensation on firm's financial performance

From the result of model III, controllable variables as GROWTH, MV, DEBT, and FA are all significant in t-value with coefficient, 1.3896, 0.0000, -5.1252, and 4.7989, except stock compensation presented in fair value (COMPF). In model IV, all controllable variables as GROWTH, MV, DEBT, FA, and COMPP are all significant in t-value with coefficient, 1.3724, 0.0000, -5.1636, 4.8387, and 0.0068.

As to the GROWTH effect, the empirical results in model III and IV are more consistent with the assumption that firms of higher growth result in a better financial performance after considering stock compensation.

Only controllable variable DEBT is significant and negatively correlated with EPS, and DEBT also contributes the most in the relation with financial performance. The higher the debt, the more the interest expense which results in deduction of net income. By pecking order theory, cost of debt is lower than cost of equity, and proper leverage is beneficial to firm. However, if the degree of leverage exceeds the optimal capital structure, firms may turn out to face operational crisis. Therefore, higher DEBT is negatively correlated with financial performance since the cost of capital is higher. This result is also consistent with the assumption.

Although MV is not obviously correlated with financial performance, the result is consistent with model I and II that size effect is significant no matter in assets value

or in market value. FA can also prove that a better fixed asset turnover results in a better performance.

Finally, COMPF is not significant in model III, but COMPP is significant in model IV. Although there is no definitely agreement that employee compensation makes good, bad, or no contribution to the firm, COMPP seems to be a better index in the relation with financial performance than COMPF because stock compensation presented in par value is steadier than fair value, not to mention COMPP is significant in t-value of the model.

4.2.3 Explanatory power of stock compensation under fair value and par value

After modification from model I and II, R^2 obviously increases by 22% because model III and IV bring into substantial controllable variables as stock compensation. Although COMPP is significant in t-value in model IV, explanatory power makes no obviously difference between model III and IV. By the result can we say that stock compensation is positively correlated with the financial performance presented in par value, but due to the slight influence that results in no significant difference of explanatory power presented in fair value or par value.

5. Conclusion

Stock compensation presented in par value seems that there's no better explanation on the firm's financial performance than that in fair value, and it indicates that degree of deviation by fair value method is not that significant. However, by this research, stock compensation presented in par value truly influences the financial performance by 0.68% higher than 0.16% in fair value. This is consistent with intuition that stock compensation presented in fair value ought to make a greater

impact on income statement than in par value, even though COMPF is not significant in t value.

Actually, stock compensation affects the earnings and cash flow. Although stock compensation is an expense to the firm and it results in the deduction of the earning, expense itself can produce the effect of tax saving, which is beneficial to the firms with probability of increasing the stock price.

If managers try to make use of incentive plans to increase firm's financial performance, the proportion of stock compensation and impact of compensation on the existing financial condition are both needed to be well-considered. As long as firms keep in a stable sales growth ability, the after-tax compensation can surely be offset by excess profits, without worrying the impact of compensation on performance.

Finally, compensation plans indeed make the resources reallocation between employees and current shareholders, and control the movement of elites in the company. Except considering the profitability and financing policy, the most important thing is to build a proper compensation system in attracting and inspiring the employees.

This paper only considers the influence of stock compensation on financial performance in current period; however, stock compensation at current year may affect the performance for the following year. Therefore, theories of adaptive expectation may be applied to the relation between compensation and performance in the future.

Reference

Aboody, D. (1996). "Market valuation of employee stock options." Journal of

Accounting & Economics 22(1-3): 357-391.

Aboody, D., M. E. Barth, Kasznik, R. (2004). "SFAS No. 123 stock-based compensation expense and equity market values." Accounting Review 79(2): 251-275.

Bell, T. B., W. R. Landsman, Miller, B. L., Yeh, S. (2002). "The valuation implications of employee stock option accounting for profitable computer software firms." Accounting Review 77(4): 971-996.

Black, F., and M. Scholes. (1973). "The pricing of options and corporate liabilities." The Journal of Political Economy 81: 637-654.

Board, A. P. (1972). "Accounting for Stock Issued to Employees. ." APB Opinion 25.

Botosan, C. A. and M. A. Plumlee (2001). "Stock Option Expense: The Sword of Damocles Revealed." Accounting Horizons 15(4): 311-327.

Campello, M. (2006). "Debt financing: Does it boost or hurt firm performance in product markets?" Journal of Financial Economics 82(1): 135-172.

Chen, M. L. (2003). "Impact of employee stock bonus valuation on earnings per share" Accounting Research Monthly 207: 132-136.

Cheng Hsiao. (1996). "Analysis of Panel Data, 2nd edition." Cambridge University Press.

Conte, M. A. (1992). "Contingent Compensation: (How) Does It Affect Company Performance?" Journal of Economic Issues (Association for Evolutionary Economics) 26(2): 583.

Cui, H. and Y. T. Mak (2002). "The relationship between managerial ownership and firm performance in high R&D firms." Journal of Corporate Finance 8(4): 313-336.

Fairfield, P. M. and T. Yohn (2001). "Using Asset Turnover and Profit Margin to Forecast Changes in Profitability." Review of Accounting Studies 6(4):

371-385.

Fama, E. F. and K. R. French (1995). "Size and Book-to-Market Factors in Earnings and Returns." Journal of Finance 50(1): 131-155.

Feltham, G. A. and J. A. Ohlson (1995). "Valuation and Clean Surplus Accounting for Operating and Financial Activities." Contemporary Accounting Research 11(2): 689-731.

Frank H. Wagner, Mark J. Kazmierowski. (2006). "High-Technology Equity Programs:Powerful Forces for Change" WorldatWork Journal.

Gerstner, L. V. (2003). "Who says elephants can't dance?:inside IBM's historic turnaround." Harperaudio.

Gupta, M. C. (1969). "The Effect of Size, Growth, and Industry on the Financial Structure of Manufacturing Companies." The Journal of Finance 24(3): 517-529.

Jensen, M. C. (1986). "Agency Costs of Free Cash Flow, Corporate-Finance, and Takeovers." American Economic Review 76(2): 323-329.

Keating, E. K., T. Z. Lys, Magee, Robert P. (2003). "Internet downturn: finding valuation factors in Spring 2000." Journal of Accounting and Economics 34(1-3): 189-236.

Kim, S. (1998). "Does profit sharing increase firms' profits?" Journal of Labor Research 19(2): 351-370.

Lin, Y. C. and H. F. Huang (2004). "Expensing Employee Bonus and Financial Performance Measurement", Journal of Performance and Strategy Research 1(1): 47-64.

Marie Brinkman, VP. (2007). "Curtailing Turnover in Asia Leveraging Incentive Plans for Retention" Radford International Survey.

Miller, J. C. and B. Pras (1980). "The Effects of Multinational and Export

Diversification on the Profit Stability of U.S. Corporations." Southern Economic Journal 46(3): 792.

Myers, S. C. and N. S. Majluf (1984). "Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have." Journal of Financial Economics 13(2): 187-221.

Ohlson, J. A. (1995). "Earnings, Book Values, and Dividends in Equity Valuation." Contemporary Accounting Research 11(2): 661-687.

Park, S. and M. H. Song (1995). "Employee stock ownership plans, firm performance, and monitoring by outside blockholders." Financial Management 24(4): 52-65.

Pugh, W. N., S. L. Oswald, Jahera Jr, John S. (2000). "The Effect of ESOP Adoptions on Corporate Performance: Are there Really Performance Changes?" Managerial & Decision Economics 21(5): 167-180.

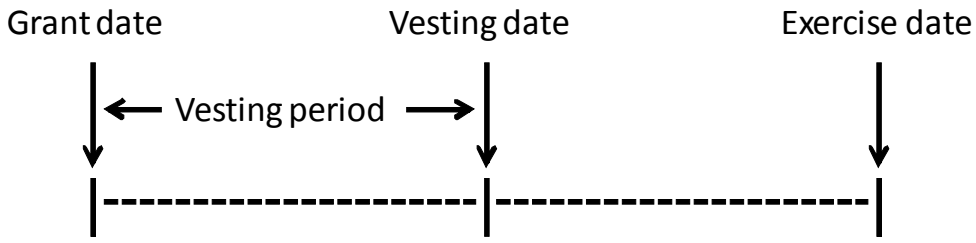
Robinson, D. and D. Burton (2004). "Discretion in Financial Reporting: The Voluntary Adoption of Fair Value Accounting for Employee Stock Options." Accounting Horizons 18(2): 97-108.

Skinner, D. J. (1996). "Are disclosures about bank derivatives and employee stock options' value-relevant?" Journal of Accounting & Economics 22(1-3): 393-405.

Subramanyam, K. R. and J. J. Wild (2009). "Financial Statement Analysis, 10th edition." McGraw-Hill, NY.

Figures

Figure 1.1 Illustration of an option granted to an employee



From：Subramanyam, K. R. and J. J. Wild (2009). "Financial Statement Analysis, 10th edition."

Figure 1.2 Accounting background of stock compensation

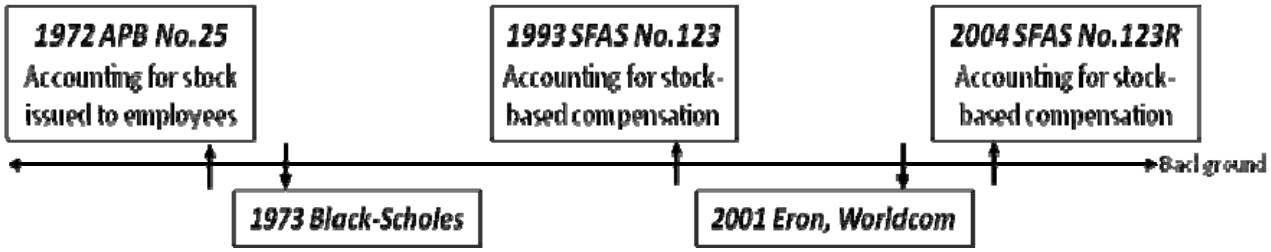


Figure 1.3 Factors affecting the fair value of an option

Factor	Effect on fair value
Exercise price	−
Stock price on date of grant	+
Expected life of option	+
Risk-free rate of interest	+
Expected volatility of stock	+
Expected dividends of stock	−

From：Subramanyam, K. R. and J. J. Wild (2009). "Financial Statement Analysis, 10th edition."

Figure 1.4 Financial accounting treatments of employee stock options

Accounting Method	Grant Date	End of Year	Exercise Date
Continue APB No.25/ SFAS No. 123 disclosure	No entry	No entry	Dr. Cash Cr. Common stock
Adoption of SFAS No. 123 compensation expense recognition	No entry	Dr. Compensation cost Cr. Paid-in capital-Employee stock option	Dr. Cash Dr. Paid-in capital- Employee stock option Cr. Common stock
Exposure Draft on stock-based compensation	Dr. Prepaid compensation Cr. Options outstanding	Dr. Compensation cost Cr. Prepaid compensation	Dr. Cash Dr. Options outstanding Cr. Common stock

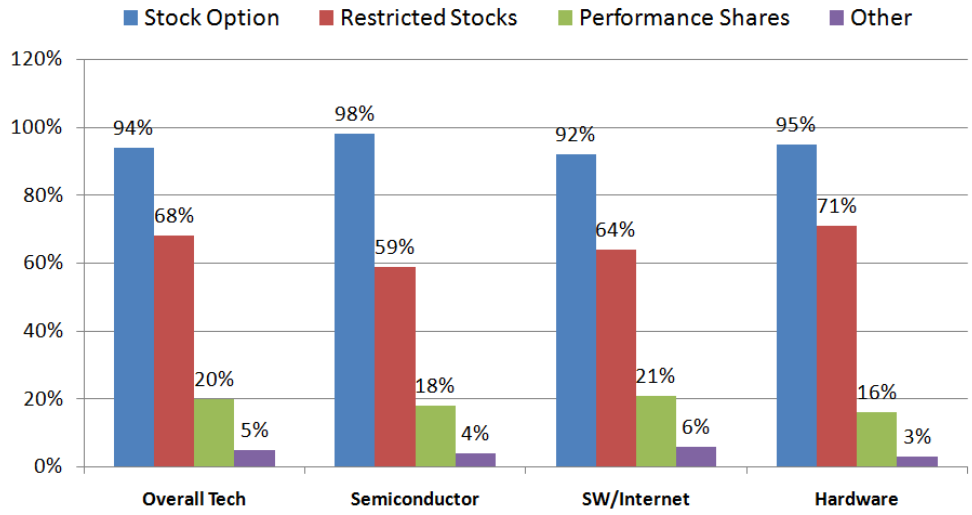
From：Bell, Landsman, Miller, and Yeh (2002)

Figure 1.5 Comparisons of stock option and restricted stock

Comparisons	Stock Options	Restricted Stock
Description	➢ A right granted by the employer entitling employees to purchase stock at an established price during a specified period of time. ➢ The purchase price is generally set at the stock's fair market value on the grant date. ➢ Options typically last for 10 years though some companies grant options with shorter terms. ➢ The timing of exercise is at the employee's discretion.	➢ Restricted stock refers to shares of stock subject to restrictions on transferability, with a substantial risk of forfeiture. It's granted without cost to the recipient. ➢ Typically, shares have voting and dividend rights though dividends can be subject to restrictions. ➢ Common design is three to four year time-based vesting, with some use of performance-based vesting (Which is increasing in popularity).
Accounting considerations under APB 25	➢ There is footnote disclosure of pro forma earnings and earnings per share. ➢ There is no accounting charge if the option is granted at fair market value.	➢ If restrictions lapse based on the passage of time, expense is the value of stock on grant date, amortized over the restriction period (i.e., fixed on the date of the grant). ➢ For performance vesting shares, expense is the stock's value at the time of vesting.
Accounting considerations under SFAS 123R	A modified grant date "fair value" method (For example, Black-Scholes or binomial model) is used to determine compensation expense.	➢ Expense for restricted stock (whether time-based or performance-based) is the value of the stock on grant date, amortized over the restriction period. ➢ Expense is reversible if any performance measures used to vest shares are not market conditions (For example, revenue, earnings, return on capital). ➢ Expense for restricted stock with a market condition is irreversible. Also, the market condition must be considered in determining the "fair value" of the award.

From：WorldatWork Journal (2006)

Figure 1.6 Types of Plans - US



Data Source: Radford International Survey-August 2007

Figure 1.7 Types of Plans - Asia

Type of Stock/Long term incentive - % of Companies Offering							
Asia Developed	**Stock Options**	**Restricted stocks**	**Other**	**Asia Emerging**	**Stock Options**	**Restricted stocks**	**Other**
Hong Kong	83%	51%	6%	China	81%	46%	5%
Japan	83%	50%	5%	India	82%	57%	1%
Singapore	85%	50%	5%	Indonesia	73%	55%	9%
South Korea	84%	53%	6%	Malaysia	76%	49%	9%
Taiwan	86%	49%	7%	Philippines	85%	44%	3%
Average	84%	51%	6%	***Average***	80%	50%	5%

Data Source: Radford International Survey-August 2007

Figure 1.8 Valuation and influence of stock compensation

Accounting method	**Entry**	**Impact on Net income**	**Dilutive effect on EPS**	**Impact on ROE/ROA**
Compensation（Par value）	Dr. Compensation Cr. Common stock	Decrease	Minor	Decrease
Compensation（Fair value）	Dr. Compensation Cr. Common stock Cr. Paid-in capital	Decrease significantly	Major	Decrease significantly

From：Chen (2003)

Figure 2.1 Research structure

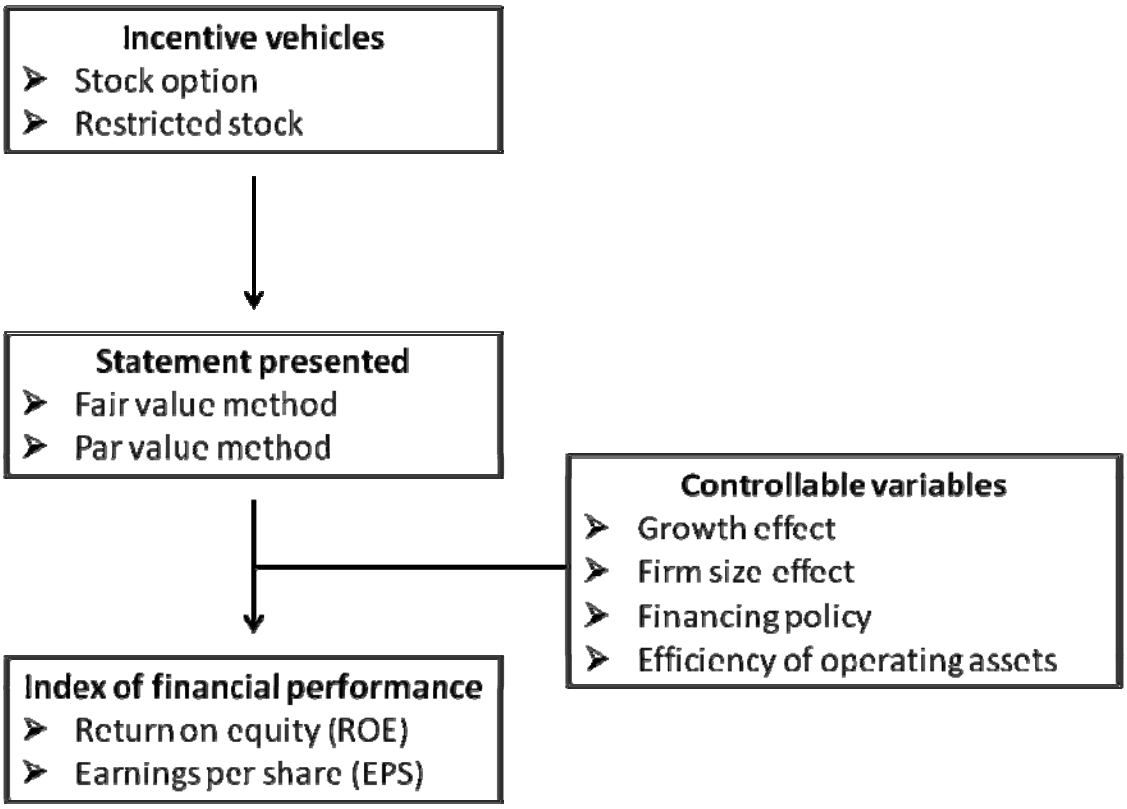
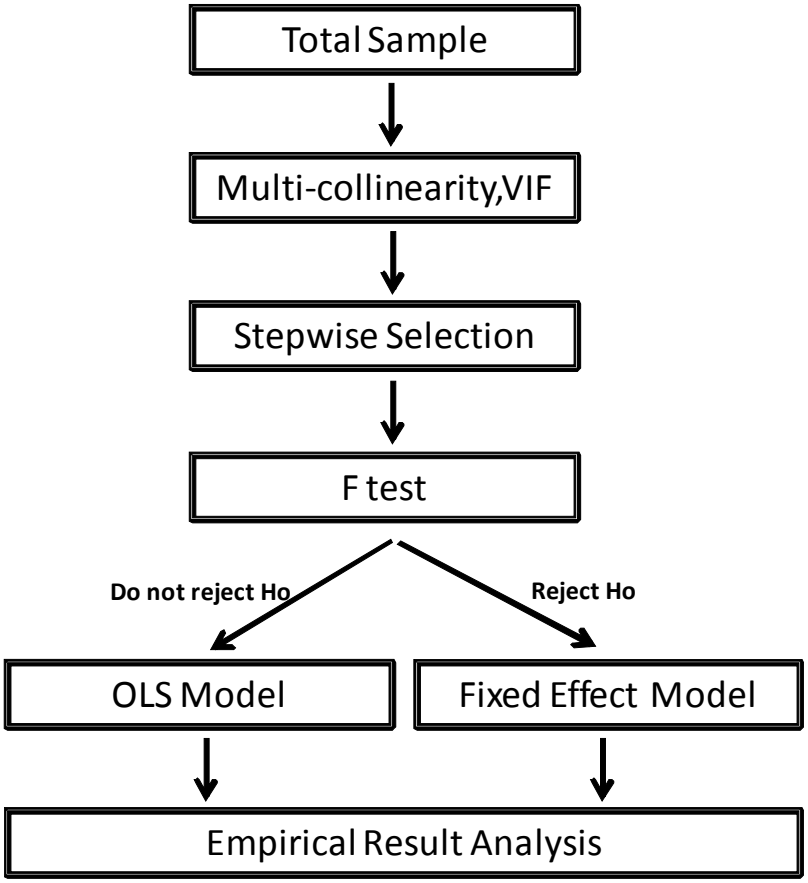


Figure 3.1 Sample firms selection

Preliminary sample firms	1,500
Minus：Financial service firms	269
No stock compensation project-2006 to 2008	637
Firms with data missing or unavailable	18
Final sample firms	576
Number of observations used	1,728

Figure 3.2 Statistic Procedure



Tables

Table1 Descriptive statistics of all variables[a]

	Variables[b]	Mean	Medium	Std. Dev.	Minimum	Maximum
Independent						
	GROWTH	0.1216	0.0923	0.2046	-0.8748	2.3301
	MV	12,229.93	2,665.12	33,296.48	64.83	504,239.58
	DEBT	0.2123	0.2071	0.1731	0.0010	1.3947
	FA	0.1036	0.0579	0.2110	0.0024	3.4989
	COMPF	34.81	9.77	85.98	11.72	1,115.00
	COMPP	13.51	3.86	33.72	11.22	658.51
Dependent						
Model III	EPS_{mv}	1.8237	1.7200	2.6781	-29.7200	18.0400
Model IV	EPS_{par}	1.9267	1.8119	2.7787	-29.5721	18.0108

[a] There are 1,728 observations.

[b] Variable definition as follows：

$EPS_{mv,it}$ = Net income adjusted for common stock / Weighted average common stocks

$EPS_{par,it}$ = Net income adjusted for common stock + Stock compensation (fair value) – Stock compensation (par value) /Weighted average common stocks

$GROWTH_{it}$: $Net\ Sales_{it} - Net\ Sales_{it-1} \big/ Net\ Sales_{it-1}$

MV_{it} = Common shares outstanding x Calendar year end price

$DEBT_{it}$ = Book value of total debt/Book value of total asset

FA_{it} = $Net\ Sales_{it}$ /Average fixed assets

$COMPF_{it}$ = Amount of after tax stock compensation calculated by fair value

$COMPP_{it}$ = Amount of after tax stock compensation calculated by par value

Table 2 Pearson Correlation Coefficients Matrix[abc]

Variables[d]	*GROWTH*	*MV*	*DEBT*	*FA*	*COMPF*	*COMPP*
GROWTH	1.000	0.016	-0.105***	0.016	0.017	-0.026
		(0.516)	(<.0001)	(0.513)	(0.473)	(0.274)
MV	0.016	1.000	-0.062***	-0.073***	0.786***	0.519***
	(0.516)		(0.009)	(0.002)	(<.0001)	(<.0001)
DEBT	-0.105***	-0.062***	1.000	-0.126***	-0.078***	-0.052**
	(<.0001)	(0.009)		(<.0001)	(0.001)	(0.031)
FA	0.016	-0.073***	-0.126***	1.000	-0.053**	-0.039
	(0.513)	(0.002)	(<.0001)		(0.028)	(0.106)
COMPF	0.017	0.786***	-0.078***	-0.053**	1.000	0.708***
	(0.473)	(<.0001)	(0.001)	(0.028)		(<.0001)
COMPP	-0.026	0.519***	-0.052**	-0.039	0.708***	1.000
	(0.274)	(<.0001)	(0.031)	(0.106)	(<.0001)	

[a] There are 1,728 observations

[b] Significant level at 1%***；5%**；10%*

[c] Number in parentheses represents p-value

[d] Variable definition as follows：

$GROWTH_{it}$: $Net\ Sales_{it} - Net\ Sales_{it-1} / Net\ Sales_{it-1}$

MV_{it} = Common shares outstanding * Calendar year end price

$DEBT_{it}$ = Book value of total debt/Book value of total asset

FA_{it} = $Net\ Sales_{it}$ /Average fixed assets

$COMPF_{it}$ = Amount of after tax stock compensation calculated by fair value

$COMPP_{it}$ = Amount of after tax stock compensation calculated by par value

Table 3 Summary of Stepwise Selection and VIF for Model III[a]

$$EPS_{mv,it} = \alpha + \beta_1 GROWTH_{it} + \beta_2 MV_{it} + \beta_3 DEBT_{it} + \beta_4 FA_{it} + \beta_5 COMPF_{it} + \varepsilon_{it}$$

Step	Variables[b]	Partial R^2	F value	P value	VIF[c]
1	***MV***	0.0450	81.42	<.0001	2.6228
2	***GROWTH***	0.0124	22.78	<.0001	1.0113
3	***FA***	0.0056	10.32	0.0013	1.0230
4	***DEBT***	0.0035	6.54	0.0106	1.0346
5	***COMPF***	0.0026	4.85	0.0278	2.6214

Table 4 Summary of Stepwise Selection and VIF for Model IVa

$$EPS_{par,it} = \alpha + \beta_1 GROWTH_{it} + \beta_2 MV_{it} + \beta_3 DEBT_{it} + \beta_4 FA_{it} + \beta_5 COMPP_{it} + \varepsilon_{it}$$

Step	Variables[b]	Partial R^2	F value	P value	VIF[c]
1	***MV***	0.0456	82.5	<.0001	1.3785
2	***GROWTH***	0.0120	21.97	<.0001	1.0131
3	***FA***	0.0058	10.64	0.0011	1.0230
4	***COMPP***	0.0051	9.50	0.0021	1.3713
5	***DEBT***	0.0047	8.67	0.0033	1.0332

[a] There are 1,728 observations

[b] Variable definition as follows：

$GROWTH_{it}$: $Net\ Sales_{it} - Net\ Sales_{it-1} / Net\ Sales_{it-1}$

MV_{it} = Common shares outstanding * Calendar year end price

$DEBT_{it}$ = Book value of total debt/Book value of total asset

FA_{it} = $Net\ Sales_{it}$ /Average fixed assets

$COMPF_{it}$ = Amount of after tax stock compensation calculated by fair value

$COMPP_{it}$ = Amount of after tax stock compensation calculated by par value

[c] All controllable variables' VIF are far smaller than 10, representing no multi-collinearity problem

Table 5 F Test for Model III and IV

Model I, II, III, IV	F value	P value	OLS or Panel
$ROE_{mv,it} = \alpha + \beta_1 GROWTH_{it} + \beta_2 LN_{it} + \beta_3 DEBT_{it} + \beta_4 FA_{it} + \varepsilon_{it}$	1.15	0.0260	Panel
$ROE_{par,it} = \alpha + \beta_1 GROWTH_{it} + \beta_2 LN_{it} + \beta_3 DEBT_{it} + \beta_4 FA_{it} + \varepsilon_{it}$	1.15	0.0266	Panel
$EPS_{mv,it} = \alpha + \beta_1 GROWTH_{it} + \beta_2 MV_{it} + \beta_3 DEBT_{it} + \beta_4 FA_{it} + \beta_5 COMPF_{it} + \varepsilon_{it}$	2.66	<.0001	Panel
$EPS_{par,it} = \alpha + \beta_1 GROWTH_{it} + \beta_2 MV_{it} + \beta_3 DEBT_{it} + \beta_4 FA_{it} + \beta_5 COMPP_{it} + \varepsilon_{it}$	2.68	<.0001	Panel

Note:

$F\ value < F_{(n+T-2,nT-n-T-k+1)}$：Do not reject H_0, representing that intercept of all groups is equal, using OLS. $F\ value > F_{(n+T-2,nT-n-T-k+1)}$：Reject H_0, representing that intercept of all groups is not all equal, using panel data model.

Table 6 Stock Compensation and Financial Performance

Model I, II, III, IV

$$ROE_{mv,it} = \alpha + \beta_1 GROWTH_{it} + \beta_2 LN_{it} + \beta_3 DEBT_{it} + \beta_4 FA_{it} + \varepsilon_{it}$$

$$ROE_{par,it} = \alpha + \beta_1 GROWTH_{it} + \beta_2 LN_{it} + \beta_3 DEBT_{it} + \beta_4 FA_{it} + \varepsilon_{it}$$

$$EPS_{mv,it} = \alpha + \beta_1 GROWTH_{it} + \beta_2 MV_{it} + \beta_3 DEBT_{it} + \beta_4 FA_{it} + \beta_5 COMPF_{it} + \varepsilon_{it}$$

$$EPS_{par,it} = \alpha + \beta_1 GROWTH_{it} + \beta_2 MV_{it} + \beta_3 DEBT_{it} + \beta_4 FA_{it} + \beta_5 COMPP_{it} + \varepsilon_{it}$$

Variables[a]	$ROE_{mv,it}$	$ROE_{par,it}$	$EPS_{mv,it}$	$EPS_{par,it}$
Intercept	-10.0749	-9.8359	2.7167	2.6442
t-value	(-2.57)**	(-2.51)**	(2.24)**	(2.12)**
$GROWTH_{it}$	-1.0584	-1.0443	1.3896	1.3724
t-value	(-6.36)***	(-6.28)***	(3.95)***	(3.78)***
LN_{it}	0.4498	0.4394		
t-value	(2.63)***	(2.57)**		
MV_{it}			0.0000	0.0000
t-value			(3.19)***	(3.62)***
$DEBT_{it}$	-1.3507	-1.3264	-5.1252	-5.1636
t-value	(-2.88)***	(-2.82)***	(-5.97)***	(-5.82)***
FA_{it}	1.2695	1.2652	4.7989	4.8387
t-value	(1.97)**	(1.97)**	(3.45)***	(3.37)***
$COMPF_{it}$			0.0016	
t-value			(0.7)	
$COMPP_{it}$				0.0068
t-value				(2.16)**
R^2	**38.7%**	**38.7%**	**60.2%**	**60.5%**

[a] Variables definition：

$ROE_{mv,it}$ = Net income/Average common equity

$ROE_{par,it}$ = Net income + Stock compensation (fair value) - Stock compensation (par value)/ Average common equity

$EPS_{mv,it}$ = Net income adjusted for common stock / Weighted average common stocks

$EPS_{par,it}$ = Net income adjusted for common stock + Stock compensation (fair value) – Stock compensation (par value) /Weighted average common stocks

[b] Significant level at 1%*** 5%** 10%*