Incentive Effect of Executive Stock Option:

Empirical Evidence from Listed Companies of Japan

Li Bin

Japan Studies Institute

Liaoning University

Shenyang, China

E-mail: lib841@yeah.net

Zhang Jun

Asia-Australia Business College

Liaoning University

Shenyang, China

E-mail: zj-lnu@126.com

Zheng Chenggong

Institute of Foreign Languages Studies

Liaoning University

Liaoyang, China

E-mail: zcg8199@yahoo.com.cn

Abstract-- With the occurrence of accounting scandals in Enron Corp, Incentive Effect of Executive Stock Option(ESO) is being questioned more and more. The task of the greatest urgency at present is to ascertain and find out whether ESO provides the administrators a stimulus to improve the corporate performance. This essay carries out a study with the samples from Japanese listed companies and the results show: the company's share price and performance with the introduction of ESO are significantly higher than those without; the incentive effect of the new and high-tech industries with the introduction of ESO is significantly better than those industries with traditional technology.

Key words--Japan; Executive Stock Options; incentive effect; corporate performance

I. Introduction

Executive Stock Option(ESO) , the typical model of sharing arrangement of residue Claims for human capital by the administrators, embodies the property right incentive of the human capital of the administrators. ESO, as a financial creative derivative and incentive mechanism, is being successfully practiced and popularized in most American listed companies from early 1920s, some scholars even believes that ESO is one of the secret weapons to make American economy outshine others and grow sustainably (Weinberg, 1999) .^[1] However, after Entering the 21st

century, with the shattering of the bubble of American stock market and the occurrence of accounting scandals in Enron Corp, ESO has brought more and more questions. Some scholars criticize America to have overused ESO and have overpaid the administrators and thus make ESO become the hotbed of American technology stock bubble and accounting scandals occurred in Enron Corp etc. Under this circumstance, some big companies, such as Microsoft and Citigroup declared to abolish ESO in July, 2003. Presently, when people are talking about the problems of Wall Street financial tsunami, American senior administrators and ESO that brings them high pay firstly face a thousand accusing fingers.

In the light of the disputes and questions caused by ESO, The urgent task at present is to ascertain and find out whether ESO provides the administrators a stimulus to improve the corporate performance. Japan began to lift a ban of ESO in May, 1997 and is among the latecomers that introduced ESO in recent years. This essay carries out a study with the sample data from Japanese listed companies, Empirically Studies on the incentive effect of introducing ESO.

II. Literature Review

Completely contradictory disputes exist in the effect of ESO on corporate performance. Some believe that the introduction of ESO has the incentive effect. The problem to be solved urgently in corporate governance is to deal with the agency problem caused by the inconsistency with the interest

relations between the administrators and the shareholders. The shareholders entrust the administrators with the business management of the industry. But because of the information asymmetry, the shareholders couldn't control the actions of the administrators. Although the shareholders expect the administrators to run the industry with shareholder maximum profit, it is likely that the administrators would run it maximizing the benefits of themselves. In order to solve this agency problem, it is very necessary to introduce ESO, which makes administrators' pay and the company's share price and performance closely connected, to make the interest relations between the administrators and the shareholders consistent. Many empirical studies show the result of a significant positive effect of share price of the corporate profit and performance after introducing ESO. For example, all the empirical study results of the American sample industries have shown: ESO has a significant positive effect on the rise of share price (Defusco et al, 1990; ^[2]Bryan et al, 2000^[3]). Besides, all the empirical study of the Singapore sample industries also back up this result (Ding & Sun, 2001) ^[4]. Of course, many scholars question the effectiveness of ESO. Through theoretical model deduction,^[5] Katsutoshi Shimizu and Akiyoshi Horiuchi(2003) point out that the very American problem lies in the excessive pay given to the administrators, the inconsistency of the effort level of the administrators and the share price and thus conclude the unlikely effectiveness of ESO.^[6] Brenner et al (2000) study shows that when the American share price falls, the shareholders always adopt the scheme that actually reduces the unexercising stock option exercise price, whereas the administrators always adopt the coping style of extending exercising time, which enables the administrators to get considerable profit in the future just because of variation of stock price, even they don't work hard in running the business.^[7]

III. Samples Chosen and Variable Set

A Sample Chosen and Processing

All the data in this essay comes from the value securities report of the industries in the Japanese EDINET. We have collected and processed the related fiscal year data of the listed companies in Tokyo Stock Exchange First Selection, Japan from 2002 to 2007. The sample data covers the

nonbalanced panel data of 863 listed companies in manufacturing industry in cross-section. The essay adopts the nonbalanced panel data model, conducts statistics and tests through softwares of Stata and SSPS. The study removes five outliers caused by the share price on the high side or the net assets on the low side. After removing the outliers, the rest 858 listed companies are kept as samples, which accounts for 99.3 % of the listed companies in manufacturing industry.

B. Variable Set

The explained variables select SHP and corporate performance index(Tobin's Q and ROA), the explaining variable selects ESO dummy variable, the control variable selects factors that affects ESO, such as the size of the board, the average age of the board, the proportionate share of the operators, debt to assets ratio, company size and industry and yearly dummy variable. The definition of each variable is as follows(See Table I):

TABLE I The Definition and Metric of Each Related Variable Introducing ESO by Japan

Property	Variable	Index	Measure Standard
Explained Variable	share price	SHP	(the highest SHP in the year +the lowest SHP in the year)/2
	Tobin's Q	Q	(the average year SHP x total number of shares issued + liabilities)/total assets
	return on assets	ROA	current net profit/total assets
Explaining Variable	ESO dummy variable	DST	1 for introducing ESO, 0 for not
Control Variable	direct size of the board	DIR	take logarithm of the total number of the board
	the average age of the board	LDISn	take logarithm of the average age of the board
	the proportionate share of the operators	MSR	(total shares held by the board of directors + total shares held by the board of commissioners)/ total number of shares issued
	debt to assets ratio	DAR	debt amount to assets/total assets

	company size	SIZE	natural logarithm of total assets
	yearly dummy variable	YEAR	2002 as base, set 5 yearly dummy variables
	industry dummy variable	IND	electric industry as base, set 15 industry dummy variables

IV. Statistical Analysis and Empirical Study

A Descriptive Statistical Analysis

Three features of Japan's introducing ESO: (1) Nearly 1/3 Japanese manufacturing companies have introduced ESO. Among 4672 observed samples between 2002 and 2007, 1321 of them have introduced ESO. The mean value of DST in 2007 is 0.318(see table II); (2) The Japanese manufacturing companies hold an active and cautious attitude toward introducing ESO. The mean value of DST each year between 2002 and 2007 is increasing, but the growth rate is not significant(see table II); (3) Distinctive industry otherness in introducing ESO exist in Japan. In manufacturing industry, the mean value of new and high technology industries is 0.345, while the mean value of traditional technology industries is 0.268(see table III) ¹, this shows that new and high technology industries are more active in introducing ESO compared with traditional technology industries.

TABLE II The Mean Value Statistical Result of Japan's Introducing ESO

YEAR	2002	2003	2004	2005	2006	2007	2002~2007
DST	0.268	0.259	0.271	0.292	0.301	0.318	0.287
Observed Value	484	816	831	838	847	856	4672

TABLE III The Mean Value Statistical Result of DST after Introducing ESO in Japan's Different Industries

Technical Level	Observed value	Mean value	Median	Standard deviation	Minimum value	Maximum value
new and high	1125	0.345	0	0.014	0	1
traditional	3541	0.268	0	0.007	0	1

B. Parametric Tests of Incentive Effect on Introducing ESO

¹ In manufacturing industries in Japan, , the R&D rate(R&D expenditure/tangible fixed assets) of medicine that contains biotechnology and IT technology and electric industry is 0.326, and the R&D rate in other industries is 0.0826. Thus, in this essay, medicine industry and electric industry are counted as new and high technology industries, and other industries are counted as traditional technology industries.

In order to test the incentive effect on introducing ESO, the samples are divided into group 1 and group 2 on the basis of whether introducing ESO or not, parameter test and non-parameter test are taken on share price and corporate performance in group 1 and group 2. Table IV shows that share price and performance in group 2 are significantly higher than those in group 1, the difference is 1% level of significance. The comparison between groups shows that introducing ESO has positive incentive effect.

TABLE IV Comparison Results of SHP and Corporate Performance between Groups of Whether Introducing ESO In Japan

Variable	Group1: ESO (no)		Group2: ESO(yes)		Group1 VS Group2	
	Mean	N	Mean	N	T-test	Mann-Whitney U-test
SHP	1071.1	3309	1829.1	1312	-10.94***	-18.09***
Q	1.141	3309	1.312	1311	-10.60***	-9.901***
ROA	2.322	3331	3.170	1321	-5.635***	-9.369***

Note: *** means the test is significant at 1% statistical level. Parameter test is tested by the mean value

T of each separate sample, Non-parameter test is tested by Mann-Whitney U of each separate sample.

C. Industry Otherness Test on Incentive Effect of ESO

Model (1) is still used to test industry otherness of incentive effect of ESO, and PER_{it} indicate corporate performance (Q), the selection of other indexes is still the same. Tobin Q is used to measure corporate performance, new and high technology industries introducing ESO have a positive correlation with corporate performance(Q) at 5% level of significance. Traditional technology industries introducing ESO have an insignificant negative correlation with corporate performance(Q)(see table V). This means that new and high technology industries introducing ESO have a much better positive effect on corporate performance(Q) than traditional technology industries.

TABLE V Regression Results of Effect on Corporate Performance of Japan's Different Industries Introducing ESO

Variable	Q	
	New and high technology industries	Traditional technology industries
DST	0.090**(2.04)	-0.001(-0.04)
LDIR	0.047(0.42)	0.153*** (2.83)
LDISn	-1.45**(-2.54)	1.066*** (3.43)
MSR	0.004*(1.84)	0.001(0.55)
DAR	-0.393***(-3.50)	0.805*** (16.75)
SIZE	0.063(1.22)	-0.203***(-2.75)
C	3.641*** (3.58)	-0.436(-0.67)
IND	Yes	Yes
YEAR	Yes	Yes
Adj. R ²	0.160	0.286
F-statistic(chi ²)	197.03	101.42
Hausman-test	10.77(0.463)	75.84(0.000)
Model Selection	RE	EF
N	1112	3449

Note: *, ** and *** indicates significance at the 1%, 5% and 10% levels respectively, test values are in the brackets, F value in RE Model shows chi² results, Hausman survey report shows chi² results. P value is in the brackets.

V. Principal Conclusions and Enlightenments

This essay analyzes and studies the incentive effect of introducing ESO through the correlated data of Japan's listed companies, proves the incentive effect of ESO hypothesis, supports the standpoint that the incentive effect of ESO has its otherness, the detailed results are: (1)The incentive effect of introducing ESO find expression in share price and corporate performance in the industries introducing ESO are significantly higher and better than those not; (2) The introduction of ESO should vary from industry to industry. New and high technology industries introducing ESO have a significant positive effect on corporate performance(Q).

The study results above have the following enlightenment significance in China's introducing ESO: (1) China should make no scruple about pushing ahead with the trying and practicing measures of introducing ESO;(2) China should make it clear that not all the industries are suitable for introducing ESO, new and high technology industries should

be first taken into consideration, whereas traditional industries should make assurance doubly sure; (3) China should learn to improve the system that goes with ESO and work out an scheme of introducing ESO that suits the specific conditions of our country, and thus strengthen the techniques of operating ESO.

ACKNOWLEDGMENT

This essay is part of academic research achievements of The Scientific Research Award Fund for National Social Science Fund Program:“*Study of the Current Situation, Problems and Development Trend of Japanese Economy under the Condition of Economic Globalization*”(05BJL060) and Excellent Middle-aged of 2009 Liaoning University: “*Researches of Reformation of Corporate Governance in Japan: Based on Parametric Test and Panel Data Model*”(2009LDQN14) and “*Researches of Reformation of Contractual Relation in Corporate Governance in Japan*” (2009LDQN09).

REFERENCES

- [1] Weinberg,Carl R., “CEO Compensation:Greed or Glory?”*The Chief Executive,September*:<http://www.chiefexecutive.net/mag/147/article2.htm>. 1999
- [2] DeFusco,R.A., Johnson, R.R., & Zorn,T.S. “The effect of executive stock option plans on shareholders and bondholders”.*Journal of Finance*, 1990, (45),pp.617-627.
- [3] Bryan,S.,L.Hwang,and S.lilien, “CEO Stock-Based Compensation: An Empirical Analysis of Incentive-Intensity,RelativeMix and EconomicDeterminants”.*Journal of Business*, 2000,73(4),pp. 661-693.185-191.
- [4] Ding,D.K.& Sun.Q., “Causes and effects of employee stock option plans: evidence from Singapore”.*Pacific-Basin Finance Journal*, 2001, (9),pp.563-599.
- [5] Yermack,D., “Do Corporations Award CEO Stock Options Effectively?”.*Journal of Financial Economics*, 1995,39(2-3),pp.237-269.
- [6] Katsutoshi Shimizu,Akiyoshi Hiriuchi,” *Incentive Economics*”,Tokyo Yuhikaku Publisher2003
- [7] Brenner, Menachem, Sundaram, Rangarajan K., and Yermack, David, “Altering the Terms of Executive Stock Options”,*Journal of Financial Economics*, 2000, (57),pp.103-128.