5-26-2012

Management Equity Incentive and Performance: Evidence from Listed Companies of Manufacturing Industry

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Abstract: As an important long-term incentive mode, the equity incentive promotes the managers to contribute to the interest uniformity of managers and shareholders. By using Paired-Samples T test methods and regression analysis method and choosing companies that issued the equity incentive plan in 2007 as the sample, this paper comparatively analyzes the differences in the performance of companies before and after the implementation of equity incentive, companies implementing equity incentive and ones not. Furthermore, factors which influence equity incentive effect are examined. The results show that equity incentives can promote the company's performance and the incentive effect should be better in the companies of state-control holding or low ownership concentration companies.

Keywords: equity incentive, financial performance, ownership concentration, managerial ownership proportion

1. INTRODUCTION

Due to the separation of the right of management from ownership, the moral hazard may appear in modern enterprises, which leads to the incentive and constrain problem at the senior management level. As an important long-term incentive mode, the equity incentive promotes the managers to contribute to the interest uniformity of the managers and the shareholders, thus to serve the interest of the shareholders better.

The equity incentive developed vigorously in America from 1950s to 1980s, and spread to other western countries gradually after 1990s. More than 90% companies have carried out the equity incentive plan among the top 500 industry companies in the world chosen by Fortune magazine. In China, there is a compatible view on the importance of the management equity incentive. As an industry with higher market competition degree, the manufacturing industry accounts for about 50% of the listed companies implementing the equity incentive. In general, the higher competitive degree of the industry is, the more management pressure assumed by the senior managers would be and dependence on managers' skills will be higher, thus the effect of the equity incentive will be more obvious.

Many studies have applied the managerial share-holding proportion as the variable of the equity incentive, while it may be achieved through the employee stock ownership plan or other non-equity incentive method. In this paper, we took the companies that issued the equity incentive plan in 2007 as the sample to reflect the effect of the equity incentive more directly. And we further analyzed the influence on the equity incentive effect by many factors such as the equity structure and the ownership concentration.

The remainder of this study is organized as follows. The next section presents our research hypothesis and a literature review. This is followed by the research design and descriptive analysis section. We describe the effect analysis in section 4 and the influence factors in section 5, finally, the conclusions.

2. LITERATURE REVIEW AND RESEARCH HYPOTHESIS

2.1 Literature review

There are two views for the effect of the equity incentive in the academic research which are the relativity theory and the non-relativity theory.

The main opinions of the relativity theory include the convergence of interest, managerial entrenchment and the interval effect theory. The convergence of interest was firstly put forward by Jensen and Meckling (1976) [1], who thought the cost of deviating from the value would decrease with the increase of the ownership of the managers. While Francis and Smith (1995)[2], Palia and Lichtenberg (1999)[3] thought long-term share-holding with high percentage of the managers can promote the value of the company. The managerial entrenchment believes that when the manager owns excessive stocks, his control capacity for the company will intensify, while the restrictive degree will decrease relatively, then he will pursue his own interests as much as possible to deviate from the maximized goals for the value. Shivdasani (1993)[4] found that the shareholding of the managers can generate the "managerial entrenchment" effect, which would reduce the value of the corporation. Morck, Shleifer and Vishny (1988)[5] summarized that the obvious non-monotonic relation existed between the stock right of the management level and the business performance. Bin Li and Yuejing Sun (2009) [6] thought that the private listed companies in China could incent the equity incentive of the proprietor, but the incentive strength was waiting to be intensified.

Correspondingly, some other scholars thought that the equity incentive had no relations with the performance. Foreign scholars Demsetz and Lehn (1985)[7] found that the stock right of managers had no obvious relations with the corporate performance. Himmelberg (1999)[8] introduced the observable corporate characteristics and the influenced variables of the fixed behaviors to explain the managerial ownership proportion on the basis of the former studies. Gang Wei (2000)[9] indicated that the "interval effect" did not exist between the amount of the shareholding for the senior managers in the listed companies and the corporate performance.

2.2 Research hypothesis

The equity incentive promotes the proprietor to hold the stocks of the company to be one of the owners, then the proprietor and the owners can share the "residual claim" together in order to reach the purpose of interests uniformity[10], to realize the "incentive compatibility" of both sides. The equity incentive is a long-term incentive system, and the effect will finally reflect on the performance. So put forward

Hypothesis 1: The equity incentive has significant positive relations with the performance.

The governance situation of the state holding company is different from the non-state holding company. On the one hand, the state is the major shareholder for the state listed company, the degree of supervision and restriction for the senior managers is low; on the other hand, due to the tenure restriction for the managers in the state-owned enterprises, the managers will neglect the long-term development of the enterprises, which will affect the function of the equity incentive. So put forward

Hypothesis 2: The influence on the business performance for the equity incentive of the state holding and non-state holding listed corporation exits differences.

The convergence of interest thinks that when the shareholding percentage of the management level is in a certain range, the managers will have the owner consciousness through holding the stocks, which will improve the performance. While the managerial entrenchment thinks that when the ownership owned by the managers increases continuously, they will pursue their own interests rather than maximizing the corporation value, which will have negative influence on the performance of the corporation[11]. So put forward

Hypothesis 3: The equity incentive can improve the corporation performance when the management ownership proportion is comparatively low. While the continuous increase, the function will be weakened.

From the point of the equity ownership structure, the connections between the interests of the strong shareholder and the corporation performance will be tight if the concentration of ownership structure is high. While for the corporations with dispersive stock right, the restriction for the senior management level is not

enough, the equity incentive will be more effective. So put forward

Hypothesis 4: The ownership concentration has negative relations with the utility of the equity incentive.

3. RESEARCH DESIGN AND DESCRIPTIVE ANALYSIS

3.1 Sample selection and data sources

This paper takes 124 listed companies in manufacturing industry implementing the equity incentive in 2007 as sample. And we take the following measures for the 124 corporations according to the purpose of analysis: reject the ST corporations with bad performance after implementing the equity incentive and those listed companies with the qualified opinion, refusing to speak and negative opinion by the CPA; reject the corporations listing after the end of 2007; reject those corporations which stop implementing the equity incentive halfway and held incomplete data; reject the corporations which are taken over or appear significant changes for the senior management level after implementing the equity incentive.The remaining 73 listed corporations in accordance with the requirements are regarded as the research samples. See Table 1 for the annual number of samples.

Table 1. Number of samples before and after implementing the equity incentive

	2006	2007	2008	2009	2010
Number	63	73	73	73	72

3.2 Definition of variables

Table 2. Definition of variables

Variables	Code	Definition
Rate of Net Profit growth	GR	(Current net profit/ Base net Profit)*100%-100%
Rate of Return on Common Stockholders' Equity	ROE	Net Profit / Shareholders' Equity Balance
Total Assets Turnover	TAT	Net Sales/Total Assets
Earnings Per Share	EPS	Income from Continuing Operations / Weighted Average Common Shares
Tobin's Q Ratio	Q	﹙Stock Market Value + Net Debt Market﹚/ Closing Total Assets
Equity Incentive	D	if implementing the Equity Incentive ，D=1 ；otherwise ，D=0
Percentage of The State-owned Shares	SO	State Owned Shares/Total Shares
Managerial Ownership Proportion	SR	Managerial Holding Shares/Total Shares
Ownership Concentration	OC	the shareholding percentage of the top ten shareholders
Asset-liability Ratio	BS	Total Liabilities / Total Assets
Scale of Enterprise	SIZE	natural logarithm of total assets
percentage of the independent director	ID	number of independent director/total number of directors

Select the five financial performance indexes, that is, rate of net profit growth, rate of return on common stockholders' equity, total assets turnover, earnings per share and Tobin's Q Ratio, to measure the achievements of the proprietor. Assume the equity incentive as the dummy variable, if the listed corporation implementing the equity incentive, the number is 1, otherwise, the number is 0. As for the structure of the stock right, select the percentage of the state-owned shares, ownership concentration and managerial ownership proportion as the agency variables. The scale of enterprise decides the influence capacity on the market and the risk resistance capacity of the corporation, and then affects the performance level of the corporation; proper allocation for the asset structure of the corporation also has effect on the performance of the corporation; the board of directors can supervise the management level and make great decisions, while the independent directors have the independence because they never achieve the payment from the corporation, the higher percentage will contribute to the better supervision for the corporation, and can affect the performance. In conclusion, select the

scale of enterprise, asset-liability ratio and the percentage of the independent director as the control variables.

3.3 Descriptive statistics

3.3.1 Characteristics of stock right for sampling corporations

See Table 3 for the whole characteristics of sampling corporations. Therein, the non-state holding corporations account for 75.34% which is a large percentage, the state holding corporations account for 24.66%; the sampling corporations account for 36.36% with the shareholding percentage of the senior management level below 0.1%, and the percentage of sampling corporations below 1% exceeds 50%; the top ten shareholders with more than 50% percentage account for 63.01%.

Table 3. Description of whole characteristics of sampling corporations

	Nature of control shareholder		Managerial ownership proportion				Top ten proportion of share-holding	
	state holding	non-state holding	<0.1%	0.1%-1%	1%-10%	>10%	<50%	>50%
N	18	55	16	8	9	9	27	46
Percent	24.66%	75.34%	38.10%	19.05%	21.43%	21.43%	36.99%	63.01%

3.3.2 Financial performance of sampling corporations

Table 4 indicates that various performance indexes in 2007 had been improved obviously, and then the differentiation appeared after 2007. The rate of net profit growth decreased gradually, while the deficit appeared in 2009; the rate of return on common stockholders' equity and the earnings per share kept stable except that Tobin's Q decreased dramatically in 2008, so all had been improved compared with that before implementing the equity incentive.

Table 4. Descriptive statistics of enterprise performance of sampling corporations

	Mean					Std. Deviation				
	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
GR	0.1773	0.9870	0.5340	-0.7767	-0.3101	3.4670	4.9598	4.3743	12.5737	4.8640
ROE	0.0937	0.1200	0.1071	0.1130	0.1130	0.1143	0.0832	0.1380	0.0863	0.1022
TAT	0.8398	0.8938	0.9436	0.8163	0.8973	0.4761	0.4982	0.5217	0.4901	0.5019
EPS	0.3755	0.5211	0.4678	0.4739	0.5072	0.3062	0.3810	0.8142	0.4496	0.5042
Q	1.4049	2.3572	1.4439	2.4885	2.7256	0.4918	1.2256	0.7669	1.4686	1.6419

4. EFFECT ANALYSIS OF EQUITY INCENTIVE

4.1 Paired-samples T test

4.1.1 Comparison of performance before and after implementing the equity incentive for the sampling corporations

We compared the data in those years before and after implementing the equity incentive for sampling corporations by using the paired-samples T test. Because the sampling corporations we selected were those listed corporations which issued the equity incentive in 2007. Therefore, we took the year of 2006 as the sample before implementing the equity incentive, and respectively took the year of 2008, 2009 and 2010 as the samples after implementing the equity incentive to carry out the examination for the matched samples for three times, that is, compare the data in 2008 with 2006, 2009 with 2006 and 2010 with 2006.

See Table 5 for the results of T test for matched samples. Therein, the difference of the total assets turnover in 2008 and 2006 is 0.079, and it is obvious at the level of 5%; the difference of the earnings per share in 2009 and 2006 is 0.127, and it is obvious at the level of 5%; the difference of Tobin's Q is 1.12 and it is obvious at the level of 1%; the difference of the earnings per share in 2010 and 2006 is 0.154 and it is obvious at the level of 5%, the difference of Tobin's Q is 1.218 and it is obvious at the level of 1%; all these indicate the business

performance of the sampling corporations between 2008 and 2010 is superior to the year of 2006, which also accord with the medium and long-term goals for the equity incentive, support the hypothesis 1.

Table 5. Comparison of the performance indexes before and after implementing equity incentive and the significance tests

		Paired Differences		t	df	Sig.(2-tailed)
		Mean	Std. Deviation			
2008-2006	GR	0.0118	0.1712	0.5461	62	0.5869
	ROE	0.0785	0.2444	2.5508	62	0.0131**
	TAT	0.3009	5.1010	0.4294	52	0.6687
	EPS	0.1094	0.8280	1.0483	62	0.2989
	Q	0.0279	0.5783	0.3834	62	0.7031
2009-2006	GR	0.01969	0.1281	1.2199	62	0.2274
	ROE	-0.0485	0.3459	-1.1139	62	0.2700
	TAT	0.6753	5.9658	0.8395	54	0.4052
	EPS	0.1272	0.4471	2.2581	62	0.0269**
	Q	1.1230	1.3316	6.6938	62	0.0000***
2010-2006	GR	0.0210	0.1384	1.2098	62	0.2314
	ROE	0.0283	0.2587	0.8680	62	0.3887
	TAT	-0.7575	6.3519	-0.8844	54	0.3796
	EPS	0.1536	0.5393	2.2612	62	0.0265**
	Q	1.2179	1.4000	6.9045	62	0.0000***

Note: ***, ** and * are obvious respectively in the level of 1%, 5% and 10%.

4.1.2 Comparison of performance of sampling companies with ones not implementing equity incentive

Carry out the paired-samples T test to compare the sampling companies in 2008, 2009 and 2010 after implementing the equity incentive with the financial performance of ones not implementing the equity incentive. Compare the performance of the sampling corporations with the matched corporations through the T test to check the effect of the equity incentive. The character of the first majority shareholder, asset-liability ratio and the scale of enterprise are the main elements to affect the performance of the listed corporations, so the selection principles for the matched samples are as follows: first, the corporation does not inform to implement the equity incentive; second, the character of the first majority shareholder is similar to the sampling corporations; third, similar to the scale of the sampling corporation, that is, the total assets in the annual report of the equity incentive is similar to the sampling corporations; fourth, similar to the asset-liability ratio of the sampling corporation. According to the selected matched sampling corporations, check the effect of the equity incentive through comparing the performance indexes in three years after implementing the equity incentive for the sampling corporations with the matched corporations, see Table 6. The rate of return on common stockholders' equity, rate of net profit growth, earnings per share of the sampling corporations in 2008 have differences with the matched samples. From the point of the difference and the mean value, in the first year after implementing the equity incentive, the three indexes are obviously higher than the matched corporations without implementing the equity incentive, and have passed the significance test at the level of 1%. At the same time, in the second and the third year that is in 2009 and 2010 after implementing the equity incentive, the difference of the earnings per share also has passed the significance test at the level of 1%.

Table 6. Comparison of performance of sampling companies with the matched ones

		Paired Differences		t	df	Sig.(2-tailed)
		Mean	Std. deviation			
2008	GR	0.0916	0.2515	3.1120	72	0.0030***
	ROE	0.0845	0.7078	1.0200	72	0.3112
	TAT	3.7464	8.5953	3.2030	53	0.0021***
	EPS	0.3348	0.8934	3.2010	72	0.0019***
	Q	0.1432	0.9288	1.3170	72	0.1919
2009	GR	0.4490	3.3555	1.1350	71	0.2600
	ROE	0.0881	0.6332	1.1880	72	0.2390
	TAT	-0.2934	14.6498	-0.1500	57	0.8790
	EPS	0.2657	0.5703	3.9540	71	0.0000***
	Q	0.1244	1.9259	0.5480	71	0.5848
2010	GR	0.0211	0.1388	1.2839	70	0.2031
	ROE	-0.0282	0.7316	-0.3275	71	0.7437
	TAT	1.4965	19.2150	0.5828	55	0.5621
	EPS	0.2394	0.7151	2.7805	68	0.0071***
	Q	0.1694	2.0315	0.7077	71	0.4814

Note: ***, ** and * are obvious respectively in the level of 1%, 5% and 10%.

4.2 Multiple regression analysis

The earnings per share refer to the net profit produced by per share among all the stock assets of the corporation, it reflects the profit level per capital, and can reflect the goals of the equity incentive better. Therefore, we select the earnings per share as the explained variable to measure the performance of the corporation. In addition, select the equity incentive as the independent variable, and the percentage of the state-owned shares, ownership concentration, managerial ownership proportion, scale of enterprise, asset-liability ratio and the percentage of the independent director as the control variable. Therefore, model 1 measuring the relations between the equity incentive and the performance of the corporation is as follows:

$$EPS=a_0+a_1D+a_2SO+a_3\ OC\ +a_4\ SR\ +a_5BS+a_6SIZE+a_7ID+\varepsilon \quad (1)$$

Table 7 regression results indicate that the equity incentive has the positive relations with the performance. The ownership concentration, asset-liability ratio, scale of enterprise and the percentage of the independent directors have passed the significance test at the level of 1%. The percentage of the state-owned shares has passed the significance test at the level of 10%.

Table 7. Regression results of model 1

	⌒Constant⌣	D	SO	OC	SR	BS	SIZE	ID
B	-2.4899	0.1869	-0.1559	0.6858	0.3104	-0.7771	0.1390	-0.7326
Std. error	0.3770	0.0592	0.0916	0.1259	0.3940	0.1107	0.0181	0.2428
t	-6.6040	3.1562	-1.7017	5.4472	0.7878	-7.0181	7.6815	-3.0180
Sig	0.0000***	0.0021***	0.0886*	0.0000***	0.4312	0.0000***	0.0000***	0.0031***

Note: ***, ** and * are obvious respectively in the level of 1%, 5% and 10%.

5. FACTORS AFFECTING THE EQUITY INCENTIVE

5.1 Model design

We increased the interactive variable of the virtual variable for the equity incentive and the character of the controlling shareholders, managerial ownership proportion and the ownership concentration to check the influence on the equity incentive and the performance of the corporation by the character of the stock right. Therein, the virtual variables of the character of the controlling shareholders: the state-owned controlling corporation is 1 and the non-state controlling corporation is 0. The virtual variables of the ownership concentration: the percentage of the top ten shareholders with more than 50% percentage is 1 and less than 50% percentage is 0. The virtual variables of managerial ownership proportion: the shareholding percentage of the senior management level more than 10% is 1 and less than 10% is 0, the shareholding percentage of the senior management level below 1% exceeds 10% is 1 and less than 1% is 0. We rejected the indistinctive SR variables in the regression analysis of model 1, and other controlling variables remain unchanged. Therefore, in the following model 2 – measuring the influence on the equity incentive and the performance by the character of the stock right, SQ represents the virtual variable of the character of the controlling shareholders, ownership concentration and managerial ownership proportion in different regression analysis.

$$EPS=a_0+a_1D+a_2D*SQ + a_3SO+ a_4OC+a_5BS+a_6SIZE+a_7ID+\varepsilon \quad (2)$$

5.2 Results analysis

See Table 8 for the regression model results. The interactive coefficients of model 2(a) and 2(c) are obvious at the level of 5%, and it is obvious at the level of 1% for model 2(d). The interactive coefficient of model 2(a) is -0.3, indicating that the influence will decrease 0.3 for the equity incentive of the state-owned corporation on the performance. It's likely that the lack of supervision of the state-owned holding corporations led the managers to implement the earnings management easily, so it supports hypothesis 2. The interactive coefficient of model 2(b) is not obvious, and the interactive coefficient of model 2(c) is 0.1506, indicating when the managerial ownership proportion is between 1% and 10%, the incentive effect is better, so it supports hypothesis 3. The interactive coefficient of model 2(d) is -0.2533 and it is obvious at the level of 5%, this indicating that the incentive effect will decrease when the ownership concentration exceeds 50%, this may because the high concentration can effectively control the agency risk and the hazard risk, therefore, the incentive for the corporations with lower ownership concentration is much more effective, so it supports the hypothesis 4.

Table 8. Regression results of model 2

	(Constant)	D	D*SQ	SO	OC	BS	SIZE	ID
Model 2(a)	-2.5075***	0.2673***	-0.2999**	-0.1292	0.6711***	-0.7816***	0.1402***	-0.7352***
	(0.3746)	(0.0681)	(0.1293)	(0.0917)	(0.1245)	(0.1103)	(0.0180)	(0.2419)
Mode 2(b)	-2.4605***	0.1896***	-0.0097	0.1674*	0.7018***	-0.7746***	0.1374***	-0.7277***
	⌒0.3763⌒	(0.0634)	(0.1533)	(0.0906)	(0.1243)	(0.1108)	(0.0180)	(0.2428)
Model 2(c)	-2.5099***	0.1257*	0.1506**	-0.1561*	0.6985***	-0.7712***	0.1393***	-0.7138***
	(0.3752)	(0.0665)	(0.0741)	(0.0904)	(0.1239)	(0.1104)	(0.0180)	(0.2422)
Model 2(d)	-2.4542***	0.3466***	-0.2533***	-0.1684*	0.7819***	-0.7719***	0.1350***	-0.7317***
	(0.3743)	(0.0945)	(0.1180)	(0.0903)	(0.1294)	(0.1294)	(0.0180)	(0.2420)

Note: (1) SQ is the virtual variable of the controlling shareholder in model 2 (a), and is the virtual variable of the shareholding percentage of the senior management in model 2 (b), and is the virtual variable of the managerial ownership proportion as in the model 2 (c), and is the ownership concentration in model 2 (d). (2) ***, ** and * are obvious respectively in the level of 1%, 5% and 10%, the value in the bracket is the standard deviation of the coefficient.

6. CONCLUSION

While the market competition of the manufacturing industry is fierce, the development of the enterprises

has close relations with the behavior of the managers, so it is necessary to motivate the managers to improve the performance. The research found that the performance level of sampling companies is higher when after implementing the equity incentive compared with the ones before this action, and the performance of all those sampling companies which have implemented the equity incentive is superior to those matched ones without this action. Therefore, the equity incentive can effectively improve the performance of companies. The character of the stock right and the percentage of the shareholding of the senior management level will affect the effect of the equity incentive; the effect for non-state owned holding listed companies is superior to the state-owned listed ones; when the share-holding percentage of the senior management level is lower, the increase of the shareholding percentage for the senior management level can intensify the effect of equity incentive, while the shareholding percentage of the senior management level is too large, the effect of equity incentive will be weakened; the incentive effect for companies with low concentration of stock right is much more obvious.

ACKNOWLEDGEMENT

This research was supported by the Hunan Province University Innovation Platform under Grant 10K013, National Education Science "11th Five-Year Plan" Education Ministry Key Project under DIA060149, Hunan Province Risk Oriented Risk Research Base.

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