

Equity Incentive and Firm Value: Evidence from the Chinese Stock Market based on Panel Regression Model

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Abstract. Nowadays, more and more firms use equity incentives to encourage executives to improve firm value. In order to have a better understanding of it, this article analyzes the relationship between the equity incentives and the firm value. Based on agency theory and management incentive plan, we explore the influence of corporate equity incentives on corporate value. We download data of A-share listed companies in China's two big Exchanges. In our process, panel regression model is set to prove our point. Our financial data come from CSMAR database and relevant data from the Wind financial terminal. After using Stata and calculating, we get 15,556 firm-year observation value, and our results show that in those companies, the implementation of corporate equity incentives will significantly promote corporate value improvement, and this relationship is still significantly established after experiencing A series of robustness. Further, there also provides us data to analyze four different types of companies. The result shows that the positive effect of equity incentives is greater in state-owned enterprises, enterprises audited by the Big Four auditors, enterprises with a high proportion of shares held by institutional investors, and companies with high growth. This paper provides support for the positive effect of the current equity incentive. At the same time, our analysis of different types of companies provides a basis for future research on a particular type.

Keywords: equity incentive; company value; agency problem; management incentive.

1. Introduction

Enterprise equity incentive is a long-term incentive mechanism implemented by enterprises to motivate and retain core talents and is one of the most commonly used methods to motivate employees. Equity incentives are mainly to give employees part of the shareholders' rights and interests through conditions to have a sense of ownership. Thereby it forms a community of interests with the company, promoting the common growth of the company and employees, and helping the company achieve the long-term goal of stable development. The management will be more active in research and development and focus on high-efficiency investment, promote the maximization of the company's interests and improve the company's performance.

The core idea of equity incentives is that the interests of managers are linked to the company's long-term interests. Through their efforts, managers can increase the company's operating performance and increase the stock price to obtain substantial benefits. This requires that the stock's market price must be able to truly reflect the company's operating conditions. The market price of the company's stock contains all the information related to the company's business activities and contains experts' predictions on the company's operating conditions.

Then based on the Chinese market listed companies, is equity incentive good or bad? What effect will it have on the future value of the company? Therefore, under the current background, can equity incentives promote the improvement of corporate value? Based on agency theory and management incentive plan, we explore the influence of corporate equity incentives on corporate value. The results show that in China's listed A-share companies, the implementation of corporate equity incentive will significantly promote the improvement of corporate value. This relationship is still significantly established after experiencing A series of robustness, including substitution index, firm, individual fixed effect, and the addition of omission variables. Further, we find that the positive effect of equity

incentives is greater in state-owned enterprises, enterprises audited by the Big Four auditors, enterprises with a high proportion of shares held by institutional investors, and companies with high growth [1].

The remainder of this study is organized as follows. We develop our hypothesis in Section 2. Section 3 describes the research design, including sample selection, model specification, and variable measurement. The empirical results are discussed in Section 4 which also includes robustness checks and further analyses; section 5 concludes the paper.

2. Hypothesis development

Enterprise equity incentive is a long-term incentive mechanism implemented by enterprises to motivate and retain core talents and is one of the most commonly used methods to motivate employees. Equity incentives are mainly to give employees part of the shareholders' rights and interests through conditions to have a sense of ownership. Thereby it forms a community of interests with the company, promoting the common growth of the company and employees, and helping the company achieve the long-term goal of stable development. The management will be more active in research and development and focus on high-efficiency investment, promote the maximization of the company's interests and improve the company's performance [2].

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Rapid growth, by creating more promotion opportunities, motivates employees to engage in extra-role behaviors that might result in promotion should an opportunity arise [3]. When does incentive compensation motivate managerial behaviors? An experimental investigation of the fit between incentive compensation, executive core self-evaluation, and firm performance [4]. We propose that a fit among compensation schemes, executives' characteristics, and situational factors is crucial to motivate desirable managerial behaviors [4]. For whether equity incentive would increase firm value, there are two different viewpoints. To encourage their senior executives, firms will have an equity incentive to let them make profits for the company. Building on the agency view of corporate governance, we propose that technology-intensive firms use both outcome and behavior-based performance criteria for rewarding CEOs [5]. According to the Convergence of Interests hypothesis, equity incentive helps to lower the management cost and increase the firm value. The inclusion of equity incentives elicits higher levels of own-unit and collaborative efforts over the profits-only contract [6]. So, some shareholders give their senior executives stocks as a kind of long-term incentive. There is also another hypothesis called the Trench utility hypothesis. It believes that giving too much to employees will lead to seeking personal gains.

As others have researched: We use agency theory to examine the influence of ownership structure on the relationship between financial slack and R&D investments, highlighting how that relationship might differ depending on the identity of the owners, and their potentially different interests [7]. Or some said: After evaluating the lagged effects of direct employee equity incentives on organizational innovation. The results imply that direct employee equity schemes have lagged effects on that [8]. The trench utility hypothesis explains the senior executives and shareholders have different interests. If managers share more, they will control the company. Then they injure the shareholders' benefits. Using their power to let the firm invest in its best field increases the company's trust in them at the cost of shareholders' benefits. The senior executives may short the value in the short term, which makes the company's stock price increase quickly and ignore the research and development of innovative products, which is not conducive to the company's long-term development [9].

Sole majority shareholder, which will seek personal benefits at the expense of others, is common in China. Just like that, the senior executives would take advantage of the firm's capital to do things that bring interest to themselves. Therefore, equity incentive has no use to improve firm value. To make the question clear, we have two hypotheses to explain that, which are shown as follows:

Hypothesis 1: Equity incentives can promote the improvement of firm value, other things being equal.

Hypothesis 2: Equity incentives can hinder the improvement of firm value, other things being equal.

3. Research designing

3.1 Construction of sample

Our samples are selected from the samples of all A-share listed companies in China's Shanghai and Shenzhen Stock Exchanges from 2007 to 2018. We choose 2007 as the initial year because 2007 is the revision of China's new accounting standards. All our financial data come from the CSMAR database, and the relevant data of the company's equity incentive comes from the Wind financial terminal. To avoid the impact of missing values, we deleted the missing data from all our samples and financial companies and companies being staked. At the same time, to avoid the impact of outliers on our estimation results, we carried out a 1% end-off treatment for all continuous variables. Finally, we get the 15,556 firm-year observation value.

3.2 Models

To test the impact of equity incentives on corporate value, we construct the following panel regression model:

$$Roat = \beta_0 + \beta_1 Stock_t + \beta_n ControlVariable_t + \varepsilon_{i,t} \quad (1)$$

3.3 Variables

- Dependent variable: $Roat$. For reference research, we choose the $Roat$ of the company, i.e., The ratio of net profit to total assets is used to measure the value performance of the company. A higher $Roat$ indicates a higher value of the company; conversely, a lower $Roat$ indicates a lower value of the company

- Test variable: $Stock_t$, $Control Variable$.

- Control variables: We control for several factors that have been shown to affect future firm value. $Size_t$, which is defined as the natural logarithm of the book value of total assets in year t . Both Chen et al. and Hutton et al. report a positive relationship between size and crash risk. The variable $NCSKEW_t$ is the negative skewness of the company's specific weekly returns in year t . Chen et al. found that companies with high return skewness in year t may also have high return skewness in year $t+1$. $Oturnovert$ is the detrended average monthly stock trading volume in year t , calculated as the average monthly stock trading volume in year t minus the average monthly stock trading volume in year $t-1$. Chen et al. adopted this measure to measure the differences in opinions among investors. They found that this de-trended turnover variable is positively correlated with the risk of future crashes. Since volatile stocks are positively correlated with future stock price crashes, we added the variable $Sigmat$, which is the standard deviation of the weekly returns of a particular company during fiscal year t . The ability to predict past returns can be explained by accumulating bubbles indicated by high returns in the past. Then prices fall sharply when prices fall back to fundamentals. Therefore, we control the past return and calculate it as the arithmetic mean of the company's specific weekly return in a year [10].

4. Empirical analyses

4.1 Descriptive statistics

Table 1 reports our outcome about the descriptive statistics. From this, we know that the mean value of firm value Roa_t is 0.037, the minimal number is -0.181, the max number is 0.200. The SE is 0.053, from which we can see that the difference in firm value is too big among different firms.

Table 1. Descriptive Statistics

variable	N	mean	sd	min	p50	max
Roa_t	15,556	0.037	0.053	-0.181	0.033	0.200
$Stock_t$	15,556	0.177	0.308	0.000	0.002	0.952
$Size_t$	15,556	22.130	1.356	19.400	21.950	26.110
Age_t	15,556	2.740	0.366	1.609	2.773	3.401
Lev_t	15,556	0.497	0.201	0.065	0.504	0.955
Frs_t	15,556	0.362	0.154	0.088	0.345	0.758
$Growth_t$	15,556	0.221	0.603	-0.569	0.119	4.593
$CrossList_t$	15,556	0.083	0.276	0.000	0.000	1.000

4.2 Correlation analysis

Table 2 reports the results of univariate tests of the key variables used in this study. From these, we can know the correlation coefficient between our core explanatory variable and our explained variable firm value is 0.156(0.182). At the level of 1%, it is significantly positive. This preliminarily verifies our hypothesis 1. Furthermore, it can be found that the correlation of other variables is within the normal range, and there is no serious collinearity problem between the variables.

Table 2. Correlation Coefficients

	Roa_t	$Stock_t$	$Size_t$	Age_t	Lev_t	Frs_t	$Growth_t$	$CrossList_t$
Roa_t	1	0.182***	-0.079***	-0.141***	-0.421***	0.098***	0.290***	-0.017**
$Stock_t$	0.156***	1	-0.057***	-0.125***	-0.192***	-0.223***	0.102***	-0.108***
$Size_t$	-0.038***	-0.172***	1	0.250***	0.426***	0.193***	0.018**	0.224***
Age_t	-0.119***	-0.276***	0.217***	1	0.191***	-0.173***	-0.089***	0.127***
Lev_t	-0.388***	-0.265***	0.406***	0.209***	1	0.037***	0.031***	0.083***
Frs_t	0.097***	-0.163***	0.227***	-0.164***	0.034***	1	0.020**	0.044***
$Growth_t$	0.163***	0.035***	-0.005	-0.004	0.060***	0.046***	1	-0.032***
$CrossList_t$	-0.016**	-0.148***	0.280***	0.112***	0.085***	0.043***	-0.024***	1

4.3 Univariate analysis

Table 3 reports the results of our univariate analysis. According to the degree of equity incentive, the company is divided into a high equity incentive group and a low incentive group according to the annual median of the industry. It is 0.045 in the high equity incentive group and 0.029 in the low equity incentive group. We can see the company value of the high equity incentive group is significantly improved, which verifies our hypothesis1.

Table 3. Univariate Analysis

Two-sample	t	test	with	equal	variances	
Variables	G1(0)	Mean1	G2(1)	Mean2	MeanDiff	t-Value
Roa_t	7840	0.0290	7716	0.0450	0.0160	19.391***

4.4 Multivariate results

Our basis regression results are reported in Table 4. Column (1) shows the results without adding control variables, controlling for Industry fixed effect and Year fixed effect. The core variable, the coefficient of equity incentive, is 0.030, which is significantly positive at the level of 1%. The second column is the result after we introduce the control variable. When we add it, the coefficient of it is still significantly positive, which indicates that the implementation of equity incentive will promote the improvement of firm value. We know that bigger firms, firms that have longer time, their firm value is high. High Lev_t will decrease the firm value.

Table 4. Baseline Regression Results

	(1)	(2)
	<i>Roat</i>	<i>Roat</i>
<i>Stock_t</i>	0.030***	0.020***
	(11.65)	(7.87)
<i>Size_t</i>		0.008***
		(11.73)
<i>Age_t</i>		0.006***
		(2.61)
<i>Lev_t</i>		-0.124***
		(-26.57)
<i>Frs_t</i>		0.028***
		(5.87)
<i>Growth_t</i>		0.015***
		(17.93)
<i>CrossList_t</i>		-0.004
		(-1.52)
_cons	0.030***	-0.111***
	(5.74)	(-7.00)
<i>N</i>	15556	15556
Industry_fixed_effect	YES	YES
Year_fixed_effect	YES	YES
r2_a	0.054	0.242

4.5 Robustness checks

To ensure the robustness of our estimation results, we conducted the following series of robustness tests. In the first column, we use the ratio of the number of shares held by the management to the total number of shares of the company to measure the equity incentive of the company. We find that the result is still positive when using this indicator. The second column is that we implemented a dummy variable. When the company implemented an equity incentive. The results are still positive. The third column is that we control the individual effect of the company. Under this result, the main variable is still significantly positive. The fourth column is to avoid the impact of a series of missing variables. We add several missing variables. After that, we found that these results were still significantly positive.

Table 5. Robustness Checks

	(1)	(2)	(3)	(4)
	Roa_t	Roa_t	Roa_t	Roa_t
$Stock_t$	0.022***	0.014***	0.032***	0.016***
	(4.83)	(9.35)	(9.86)	(5.56)
$Size_t$	0.008***	0.008***	0.001	0.008***
	(11.52)	(10.88)	(0.65)	(11.69)
Age_t	0.003	0.000	-0.003	0.006***
	(1.14)	(0.03)	(-0.50)	(2.73)
Lev_t	-0.126***	-0.127***	-0.135***	-0.122***
	(-26.85)	(-27.46)	(-39.72)	(-26.52)
Frs_t	0.023***	0.022***	0.059***	0.029***
	(4.87)	(4.61)	(10.70)	(6.12)
$Growth_t$	0.015***	0.015***	0.014***	0.015***
	(18.19)	(18.15)	(25.85)	(17.87)
$CrossList_t$	-0.005*	-0.005*	-0.007	-0.005*
	(-1.79)	(-1.77)	(-0.89)	(-1.74)
SOE_t				-0.006***
				(-3.72)
$Big4_t$				0.004
				(1.33)
$Gender_t$				-0.001
				(-0.59)
ln_age_t				0.005*
				(1.88)
$Isduality_t$				-0.005
				(-1.62)
_cons	-0.098***	-0.080***	0.063***	-0.128***
	(-6.10)	(-5.15)	(2.82)	(-7.04)
N	15556	15556	15556	15556
Industry_fixed_effect	YES	YES	NO	YES
Firm_fixed_effect	NO	NO	YES	NO
Year_fixed_effect	YES	YES	YES	YES
$r2_a$	0.236	0.237	0.194	0.245

4.6 Further analyses

Table VI is the result of our further analysis. We divide firms into SOE, Big4, High Ins, and High Growth. We find that in these four categories of companies, the results are still significantly positive at 1%, which shows that equity incentive plays an important role in enhancing the firm value for these firms.

Table 6. Further Analyses I

	(1)	(2)	(3)	(4)
	SOE	Big4	High Ins	High Growth
<i>Stock_t</i>	0.054*** (4.53)	0.029* (1.96)	0.032*** (6.66)	0.019*** (6.10)
<i>Size_t</i>	0.008*** (9.78)	0.006** (2.51)	0.007*** (8.17)	0.006*** (6.53)
<i>Age_t</i>	0.009** (2.55)	0.015** (2.05)	0.010*** (3.32)	0.005* (1.70)
<i>Lev_t</i>	-0.131*** (-21.72)	-0.169*** (-10.02)	-0.135*** (-21.91)	-0.113*** (-18.76)
<i>Frs_t</i>	0.023*** (3.71)	0.033* (1.85)	-0.000 (-0.05)	0.028*** (5.05)
<i>Growth_t</i>	0.013*** (12.26)	0.014*** (3.64)	0.011*** (12.14)	0.005*** (5.51)
<i>CrossList_t</i>	-0.003 (-1.13)	-0.003 (-0.48)	-0.007** (-2.30)	-0.002 (-0.62)
<i>_cons</i>	-0.116*** (-5.85)	-0.063 (-1.09)	-0.079*** (-3.83)	-0.051** (-2.51)
<i>N</i>	8334	1111	8218	5332
<i>Industry_fixed_effect</i>	YES	YES	YES	YES
<i>Year_fixed_effect</i>	YES	YES	YES	YES
<i>r2_a</i>	0.268	0.324	0.270	0.235

Table 7. Further Analyses Ii

	(5)	(6)	(7)	(8)
	NON SOE	NON Big4	Low Ins	Low Growth
<i>Stock_t</i>	0.013*** (4.09)	0.020*** (7.82)	0.028*** (9.02)	0.014*** (5.06)
<i>Size_t</i>	0.010*** (8.28)	0.008*** (11.12)	0.008*** (7.63)	0.007*** (10.42)
<i>Age_t</i>	0.005 (1.63)	0.004* (1.86)	0.005* (1.72)	0.011*** (4.33)
<i>Lev_t</i>	-0.113*** (-16.00)	-0.122*** (-25.72)	-0.106*** (-17.07)	-0.125*** (-24.85)
<i>Frs_t</i>	0.044*** (6.14)	0.027*** (5.45)	0.018** (2.29)	0.029*** (5.70)
<i>Growth_t</i>	0.016*** (13.01)	0.015*** (17.72)	0.020*** (12.08)	0.073*** (15.52)
<i>CrossList_t</i>	-0.002 (-0.30)	-0.004 (-1.20)	0.002 (0.52)	-0.003 (-1.25)
<i>_cons</i>	-0.146*** (-5.62)	-0.110*** (-6.58)	-0.113*** (-5.05)	-0.115*** (-6.92)
<i>N</i>	7222	14445	7338	10224
<i>Industry_fixed_effect</i>	YES	YES	YES	YES
<i>Year_fixed_effect</i>	YES	YES	YES	YES
<i>r2_a</i>	0.219	0.240	0.233	0.280

5. Conclusions

Under the existing background, whether equity incentives can promote the promotion of corporate value, based on the agency theory and management incentive plan, we explore the impact of equity incentives on corporate value. We selected all A-share listed companies in China market from 2007 to 2018 as the research objects. In this process, we put forward the missing data, financial companies, and ST companies. Through the construction of the panel regression model, we find that the implementation of equity incentives can significantly promote the company's value. And when the ratio of the number of shares held by the management to the number of shares held by the company is used as a substitute index for the implementation of equity incentive, the positive relationship is still significant. At the same time, when we control the individual effect of the company and increase the missing variables related to the management behavior characteristics, the positive relationship still holds significantly. Furthermore, we find that the positive effect of equity incentives is more significant in the Four Auditors, enterprises with a higher proportion of investors, and high growth companies. This paper provides support for the positive effect of equity incentives.

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