

## Research Article

### Short-term Response and Long-term Financial Performance Before and After Announcement of Equity Incentive in China

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**Abstract:** Whether equity incentive has the ability to enhance the value of the company has been widely noted by the capital market. This study took 19 listed companies which were in the first batch of the implementation of equity incentive in 2006 as samples, used the event study methodology to study the short-term response in the market after the announcement of equity incentives, used the descriptive statistical analysis to test financial performance differences between before and after the equity incentive announcement and compared the short-term response and long-term financial performance. The study results show that, during the period in this study, the announcement of the equity incentive doesn't produce significant changes on stock market and there is synchronization between the performance of the company and management equity incentive level, the shareholding ratio of the top ten, company size, but there is no significant correlation between the equity incentive and performance of the company.

**Keywords:** Equity incentive, event study, financial performance

#### INTRODUCTION

As the corporate control right and ownership separates, the agency problems between managements and shareholders become an important issue in corporate governance and the success of business operation depends largely on the quality and capacity of managements. So incentive is a fundamental way to solve agency problems. How to motivate the company's senior managements' creativity and innovation ability has been concerned by the business community and the academic community all the time.

As an incentive mechanism, equity incentive has been widely used abroad. The United States began to incent the senior executive by equity since 1950s. The study of Chang-Jiang *et al.* (2011) have shown that, by the end of the 20<sup>th</sup> century, in the U.S. top 1000 companies, 90% of companies executives granted stock options, stock options' the proportion of the total income of the executives has risen from less than 20% in 1976 to 50% in 2000, even accounting for more than 95% in the executives of 10 companies such as General Motors, Coca-Cola, Johnson and Johnson, Disney.

In China, "The Management Measures of Listed Companies' Equity Incentive" introduced in December 31, 2005, the listed companies' equity incentive began to surge. During the year 2006, more than 100 companies have launched equity incentive plan, more than 40 put forward specific programs, some companies went into the implementation phase. In September

2006, the State-owned Assets Supervision and Administration Commission of the State Council (SASAC) and the Ministry of Finance jointly issued "The Trial Procedures for State Holding Listed Companies' (Domestic) Implementation of Equity Incentive", which marked the ice-breaking trip of the state holding listed companies' equity incentive came to an end.

There were a total of 43 listed companies in Shanghai and Shenzhen in 2006 announced equity incentive draft, including 19 companies officially began the implementation of equity incentive plan in 2006, less than 3% of the total number of listed companies. Then until the end of 2011, what was the situation of these 19 companies' equity incentive? How much influence did the announcement of the equity incentive have on stock? What was the effect of equity incentive on the companies' financial? In view of this, this study took 19 listed companies which were in the first batch of the implementation of equity incentive in 2006 for samples, selected the 10 days before and after the date of announcement for the event window, used the event study methodology to study the short-term response in the market after the announcement of equity incentives, calculated the value of information for shareholders, while contrasted to the long-term financial performance to study whether the companies which implemented the equity incentive had the authentic investment value. This study would provide a reference for improving our equity incentive system.

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## LITERATURE REVIEW

Defusco *et al.* (1990) studied the effects of the equity incentive plan on the shareholders and creditors of the enterprise, considered that the equity incentive plan has been approved by the board, the rate of return of the stock would be significantly increased and the value of the stock options would increase. Followed was the obvious rise in the value of the stock and the fall of bond price, which will lead to the transfer of a large number of bondholders to corporate shareholders. Chanvin and Shenoy (2001) found that before the announcement of equity incentive plan the stock price of the company would be a continuous process of decline, because the senior management tended to publish unfavorable bulletin before the announcement in order to get the lowest execution price. Morgan and Poulsen (2001) analyzed the equity incentive plan between 1992 and 1995 of the listed companies in Standard and Poor's 500 index and found in the event window of [-3, 3], the average cumulative abnormal returns was positive significantly, which proved that equity incentive plan can contribute to the increase of shareholder value, especially when these plans for senior managers. Martin and Thomas (2005) got a contrary conclusion. They analyzed the equity incentive plan of American companies between 1998 and 1999 and concluded in the window of [-3, 3], the equity incentive could lead to negative cumulative abnormal returns. In addition, Ikaheimo *et al.* (2007) took the Finnish listed companies' equity incentive plan between 1988 and 1998 as samples, through empirical studies found that the announcement of granting the administrators equity incentive plan would lead to a positive market reaction, but granting the employees would lead to a negative market reaction. Foreign scholars found equity incentive effect is widespread in the national capital market.

Because of the late introduction of equity incentive, domestic scholars began to study the equity incentive of listed companies since late 1990s, is still in its infancy for the time being. But the impact brought by equity incentive on the value of the company and the price of company's share has caused the attention of scholars. Wei (2000) used empirical evidence of China's listed companies to examine the relationship between companies' experience achievements and incentive for senior managements. The study results showed that the annual monetary income for the senior managements of listed companies was low, remuneration structure was irrational and in a single form and the holdings of senior management was also not achieved the desired incentive effect, it was merely a kind of welfare arrangement. Xu and Pu (2003), used Tobin's Q and ROE to measure the performance of the companies, found there was a significant positive correlation between the ownership of company chairman and general manager and business performance. Zhou and Sun (2003) used the empirical evidence of China's listed companies to examine the

triadic relationship between the characteristics of the corporate governance, managements' stock incentive and the improvement of companies' business performance. The results showed that the operators whose companies' internal governance mechanisms were weakening took advantage of stock equity incentives to plunder the interests of shareholder for their own profit. Gu and Zhou (2007) took the listed companies which implemented equity incentive for samples, excluded the industry influence to do empirical research on equity incentive effect. The results showed that, the implementation of managements' stock incentive in the Chinese listed companies did not have an obvious long-term effect at present. Li (2009), from the aspect of the reaction of the market on the stock price, those which announced the equity incentive plans in 2006 are the 49 listed companies in China's Shanghai and Shenzhen A-share market, which had a positive impact. There is significant equity incentive effect.

While reviewing the literature, many studies had done to domestic equity incentive program, the exploration of our existing problems and solutions on implementing share incentive plans and equity incentive's impacts on the performance of listed companies. However, there are few studies about the effect of the announcement of equity incentive in the capital market environment, the company's financial position changes before and after the equity incentive plan. With the studies on stock prices and the financial position changes of the first batch of 19 companies that began to implement equity incentive in 2006, the article intends to find out whether there is the informational value of equity incentive announcement to the shareholders to earn abnormal return. Besides it also tells whether the financial position improved since 1996. The conclusion could provide reference material for complete the equity incentive plan in China.

## MATERIALS AND METHODS

**Data sources:** The data used for the study were collected from CSMAR database with focus on equity incentive activities in Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE) in 2006. During the period, 43 listed companies took the first try in equity incentive in China's capital market. Out of these 43 companies, only 19 companies are taken for the analysis, because these are the ones who successfully and formally began to implement equity incentive. The financial information from 2005 to 2008 and the stock price around the announcement date are collected.

**Methodology:** In the study of short-term reaction, event study is used to ascertain whether there was any abnormal return associated with equity incentive announcements in SSE and SZSE. To calculate Estimation Period, daily data on stock prices and hushen 300 index values are collected for the period

Table 1: Setting variables

Variable	Code	Definition
Equity incentive	D	If the company implement equity incentive this year. D = 1,
Earnings per share	EPS	Net income belongs to common stock holder/outstanding shares
Returns on equity	ROE	Net income/net asset
Executive stock ownership ratio	EIP	Stocks to implement equity incentive/share capital when equity incentive announced
Company size	SIZE	LNSIZE
Asset-liability ratio	BSP	Liability/asset
Ownership concentration	OC	The shareholding ration of the top ten major shareholder
State-owned share proportion	SOSP	State-owned shares/total shares

starting 70 trading days prior to the announcement date and 70 trading days after the announcement date. Cumulative Abnormal Return over the event window is calculated by summing up the Abnormal Returns for each day in the event window.

Event date, event period and estimate on period are need to be first determined. The date of the announcement of equity incentive is defined as event date. Event period is (-10, 10). Estimation period is (-70, 70).

Market model is used to calculate the normal return. The method is based on assuming that return on assets obeys multivariate normal distribution. The model is assumed as  $E(R(i, t)) = \alpha_i + \beta_i R(m, t) + \epsilon_i(i, t)$ .  $E(R(i, t))$  is the normal return on the stock price for firm  $i$  on event date  $t$  and  $R(m, t)$  is the return of the market on day  $t$  replaced by the return on the hushen 300 index and  $\epsilon_i$  is the random error.  $\alpha_i$  is a stable component of security returns and is constant over time and  $\beta_i$  is the market risk coefficient to a measurement of the systematic risk of security  $i$  and is assumed to be stable over time.  $\epsilon_i$  is the random error. Expectations period of the normal period is defined as the period prior to the event window instead of the overlapping period with the time window period.

Abnormal return is equal to the real rate of return less the normal return. The formula is  $AR(I, t) = R(i, t) - (\alpha_i + \beta_i R(m, t))$ . Where  $\alpha$  and  $\beta$  are to be estimated from the estimation periods at -70 to -11 trading days prior to the event window and day 11 to 70 trading days after the event window.

$$\text{Stock returns: } R(i, t) = (P(i, t) - P(i, t-1)) / (P(i, t-1)).$$

The formula of the Cumulative Abnormal Return is:

$$CAR = \sum_{t=1}^{t2} AR(i, t)$$

In order to judge whether the change of abnormal return is obvious, Z test model of all stocks is  $Z = (CAAR(t1, t2) - \mu) / S(CAR(t1, t2))$ . Where  $\mu$  is the Abnormal Return being tested for significance and takes the value of zero. The test statistics for standard error of prediction  $S(CAR(t1, t2))$  is calculated by dividing the Average Abnormal Return of all stock over a specified event period ( $t1, t2$ ) by the standard deviation of the estimation using Z statistics. The average cumulative abnormal return:

$$CAAR = \frac{1}{n} \sum_{t=1}^n CAR(t1, t2) \cdot S(CAR(t1, t2)) = \sqrt{\sigma^2/n}$$

where  $\sigma^2$  is the estimator of the variance,  $n$  is the number of sample stocks whose excess returns are available at day  $t$ . CAAR is calculated by averaging the CAR data for 19 companies for each day.

Standard Deviation for CAR is calculated for 19 Companies for each day. The statistics is assumed to follow a standard normal distribution. The study is to analyze whether equity incentive announcements made by listed firms have significant impact on the company's stock returns. If the impact is significant, the Z statistics is significantly different from zero. To test the significance:

- H1:** Null hypothesis: equity incentive announcements have no significant impact on stock returns
- H2:** Alternative hypothesis: equity incentive announcements have a significant impact on stock returns

In the study of the long-term performance, descriptive statistics and multiple regression analysis are used to analyze 19 companies' performance before and after equity incentive to assess the effect of equity incentive from a long-term perspective. The setting variables are defined as follows (Table 1).

Descriptive statistics was used to analyze 19 companies' earnings per share, return on equity, executive stock ownership ratio, company size, asset-liability ratio, ownership concentration and state-owned shares proportion with SPSS.19. The study described the maximum, minimum, mean and standard deviation. The results are as follows (Table 2).

Nineteen companies performance presented decreased after increasing trend in the four years, which was the best in 2007. Sample companies' performance was on the rise from 2005 to 2007. But in 2008, the level of performance was declined. From the horizontal, the gap between the management equity incentive levels was big. The EPS minimum even arrived at -2.3, while the maximum even arrived at 2.36. From the longitudinal, the maximum and mean were rising year by year except the effect of financial crisis resulting in the low ebb in 2008. The table proves that equity incentive, as an incentive system, has incentive function on top managers. The top 10 shareholders equity ratio fluctuated wildly every year in 19 companies. Then minimum was 21.39%, while the maximum was

Table 2: Descriptive statistics

	Year	Sample size	EPS	ROE	EIP	SIZE	BSP	OC	SOSP
Mean	2005	19	0.46	0.12	-	21.35	0.48	59.93	0.07
	2006	19	0.63	0.16	-	21.60	0.48	59.18	0.10
	2007	19	0.76	0.16	0.06	22.04	0.44	54.97	0.08
	2008	19	0.42	0.11	0.06	22.16	0.42	51.99	0.15
S.D	2005	19	0.21	0.04	-	1.120	0.18	13.25	0.18
	2006	19	0.20	0.05	-	1.220	0.15	14.47	0.15
	2007	19	0.53	0.10	-0.03	1.280	0.18	16.91	0.15
	2008	19	0.76	0.19	0.03	1.290	0.20	17.40	0.16
Minimum	2005	19	0.05	0.03	-	19.82	0.06	17.40	-
	2006	19	0.39	0.10	-	19.95	0.08	24.91	-
	2007	19	-0.22	-0.00	0.01	20.19	0.06	27.09	-
	2008	19	-2.30	-0.60	0.01	20.49	0.03	22.30	-
Maximum	2005	19	0.95	0.19	-	23.81	0.78	21.39	0.60
	2006	19	0.97	0.29	-	24.60	0.80	76.12	0.60
	2007	19	2.36	0.46	0.10	25.33	0.77	79.50	0.49
	2008	19	1.68	0.36	0.10	25.50	0.75	89.79	0.49

91.19%. Ownership concentration and the mean of shareholding ratio were declining year by year. The natural logarithm of total assets changed little but presented growth trend, which explained that the companies' size had the ability to enlarge in the future. Overall, from 2005 to 2008, company performance and the management equity incentive level, the top10 shareholders equity ratio and company size had obvious sync trends. In 2007, the means of EPS and ROE almost arrived at the maximum of these years, while in 2008 the performance was decline. On the whole, equity incentive had some effect on company performance. However, it was helpless when financial crises happened.

The explained variable of this study is company performance. Earnings per share and returns on equity are measurement indexes. Earnings per share is one of the most important financial ratios for investors and other information users to evaluate the corporate profitability, forecast corporate growth potential and then make the important decisions. ROE is the core of the financial system in DuPont indicators, which reflects the ability of its own capital gaining net income.

The study mainly wanted to analyze whether the performance of the company changed before and after the equity incentive. As a result, the study selected a logical variable, equity incentives, as an explanatory variable. If the company began to implement equity incentive in this year, D = 1, otherwise, D = 0.

The selection of the control variables has a great impact on the empirical results. The improper selection may lead to deviation of empirical results. With reference to the past literature, the control variables were determined: executive stock ownership ratio, company size, asset-liability ratio, ownership concentration and state-owned shares proportion.

Therefore, the model of measuring the correlativity of equity incentives with company performance is as follows:

$$EPS = a_0 + a_1D + a_2EIP + a_3SIZE + a_4BSP + a_5OC + a_6SOSP + \epsilon$$

$$ROE = b_0 + b_1D + b_2EIP + b_3SIZE + b_4BSP + b_5OC + b_6SOSP + \epsilon$$

Table 3: The implementation of these 19 companies' equity incentive

Securities code	Abbreviation	Present	Years
000006	SZYA	Termination	5
002021	ZJGF	Termination	6
002038	SLYY	Complete	3
000002	WKA	Termination	5
002032	SBE	Complete	5
002045	GGDQ	Complete	8
000651	GLDQ	Complete	
600887	YLGf	In progress	6
000069	HQCA	In progress	3
600143	JFKJ	Complete	8
600739	LNCD	In progress	5
600572	KEB	Termination	10
000568	LZLJ	In progress	5
002014	QPL	Complete	6
002003	YXGF	Termination	5
000690	WXGF	Complete	4
600880	BXCB	In progress	8
000926	FXGF	Complete	4

## RESULTS AND DISCUSSION

Table 3 showed the implementation of these 19 companies' equity incentive before 22th December in 2012.

That is to say, 8 of 19 companies have completed equity incentive plans. 6 of them stop in the middle. The others are still in progress. 19 companies' Z statistics' results are as follows (Table 4):

Table 4 shows the Cumulative Abnormal Returns for all the days of the event window for 10 days before and 10 days after and day-10 to day 10 for 21 days, as well as each two short windows during the whole 21 days event period are calculated.

The CAAR is significant only on day (-4,-3) (CAAR = -0.0205), day (-1, 0) (CAAR = 0.0401), whereas on other days of event window the CAAR is not significant. Abnormal Returns may be obtained over day -4 to -3 or one day just before the announcement by buying the firm's stock i.e., 4 days before the announcement day and sell it immediately on day -3 or one day before the announcement day and sell it on that day to capture the capital gains.

The results show that the 21 day CAAR (denoted as CAAR over day -10 to day 10) is -1.52617% which

Table 4: Z statistics' results

Days	CAAR	Std	N	N^0.5	S. Err	Z-value	Mod Z	Test	Hypothesis
(-10,9)	0.018	0.043	19	4.359	0.010	1.789	1.789	1	Accept null Hypothesis
(-9,8)	0.007	0.060	19	4.359	0.014	0.502	0.502	1	Accept null Hypothesis
(-8,7)	0.005	0.051	19	4.359	0.012	0.453	0.453	1	Accept null Hypothesis
(-7,6)	0.005	0.050	19	4.359	0.012	0.462	0.462	1	Accept null Hypothesis
(-6,5)	-0.001	0.030	19	4.359	0.007	-0.201	0.201	1	Accept null Hypothesis
(-5,4)	-0.010	0.035	19	4.359	0.008	-1.237	1.237	1	Accept null Hypothesis
(-4,3)	-0.020	0.044	19	4.359	0.010	-2.034	2.034	1	Accept null Hypothesis
(-3,2)	-0.011	0.042	19	4.359	0.010	-1.121	1.121	1	Accept null Hypothesis
(-2,1)	0.018	0.058	19	4.359	0.013	1.367	1.367	1	Accept null Hypothesis
(-1,0)	0.040	0.075	19	4.359	0.017	2.342	2.342	1	Accept null Hypothesis
(0,1)	0.036	0.081	19	4.359	0.019	1.938	1.938	1	Accept null Hypothesis
(1,2)	0.015	0.053	19	4.359	0.012	1.251	1.251	1	Accept null Hypothesis
(2,3)	0.000	0.048	19	4.359	0.011	0.029	0.029	1	Accept null Hypothesis
(3,4)	0.003	0.042	19	4.359	0.010	0.305	0.305	1	Accept null Hypothesis
(4,5)	-0.005	0.054	19	4.359	0.012	-0.385	0.385	1	Accept null Hypothesis
(4,5)	-0.008	0.049	19	4.359	0.011	-0.708	0.708	1	Accept null Hypothesis
(5,6)	0.000	0.043	19	4.359	0.010	0.027	0.027	1	Accept null Hypothesis
(6,7)	0.003	0.043	19	4.359	0.010	0.283	0.283	1	Accept null Hypothesis
(7,8)	0.015	0.056	19	4.359	0.013	1.179	1.179	1	Accept null Hypothesis
(9,10)	-0.017	0.077	19	4.359	0.018	-0.951	-0.951	1	Accept null Hypothesis
(-10,10)	0.040	0.139	19	4.359	0.032	1.248	1.248	1	Accept null Hypothesis
(-10,-1)	0.020	0.059	19	4.359	0.014	1.451	1.451	1	Accept null Hypothesis
(0,10)	0.047	0.131	19	4.359	0.030	1.564	1.564	1	Accept null Hypothesis

The sample size is 19, Day 0: The date of equity incentive announcement

Table 5: The results of multi-variable linear return analysis

Coefficientsa		Un standardized coefficients		Standardized coefficients		
		B	Std. error	β	t	Sig.
EPS	(constant)	-3.232	1.442		-2.241	0.028
	D	0.021	0.132	0.023	0.160	0.873
	EIP	-0.702	1.629	-0.055	-0.431	0.668
	SIZE	0.174	0.067	0.473	2.588	0.011
	BSP	-0.759	0.414	-0.313	-1.919	0.058
	OC	0.007	0.004	0.241	1.788	0.077
	SOSP	-0.407	0.322	-0.144	-1.264	0.210
	D	-0.674	0.236		-2.071	0.041
ROE	D	-0.012	0.030	-0.057	-0.399	0.691
	SIZE	-0.065	0.368	-0.022	-0.178	0.859
	BSP	0.036	0.015	0.438	2.406	0.018
	OC	-0.171	0.093	-0.297	-1.826	0.071
	SOSP	0.002	0.001	0.268	1.991	0.050
	D	0.003	0.073	0.005	0.045	0.964

EPS: R<sup>2</sup> = 0.098 adjusted R<sup>2</sup> = 0.036 F = 1.584 sig F = 0.161  
 ROE: R<sup>2</sup> = 0.102 adjusted R<sup>2</sup> = 0.040 F = 1.653 sig F = 0.142

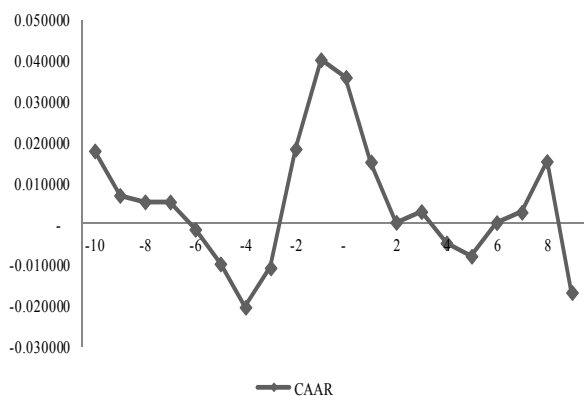


Fig. 1: Showing CAAR over event window

is significantly different from zero and the 10 day CAAR before the announcement (CAAR over day -10

to day -1) is 0.655543% which is significantly different from zero. Besides, the 10 day CAAR after the announcement (CAAR over day 1 to day 10) is -1.89983% which is also significantly different from zero.

Figure 1 shows the CAAR data over the event window is very close to zero. As a result, the changes in stock prices of 19 companies are not obvious.

The results of linear-regression analysis of equity incentive proportion and EPS are as follows (Table 5):

Table 5 tells that R Square of EPS and ROE is 0.036 and 0.040 respectively. In other words, goodness of fit is 3.6 and 4.0%, at a very low level. F value of two variables is 1.584 and 1.653. Corresponding probability is 16.1% and 14.2%. Both variables don't pass the test of significance. The two models were not significant in the overall. Besides sig. F was 0.873 and 0.691. There was no significant correlation of equity and EPS, ROE, while company size, asset-liability ratio

and ownership concentration show significant correlation. The final formulas are as follows:

$$\text{EPS} = -3.232 + 0.0218D - 0.702EIP + 0.174\text{SIZE} - 0.795\text{BSP} + 0.007\text{OC} - 0.407\text{SOSP}$$

$$\text{ROE} = -0.674 - 0.012D - 0.065EIP + 0.036\text{SIZE} - 0.171\text{BSP} + 0.002\text{OC} + 0.003\text{SOSP}$$

### CONCLUSION

This study took 19 listed companies which were in the first batch of the implementation of equity incentive in 2006 as samples, selected the 10 days before and after the date of announcement for the event window, used the event study methodology to study the short-term response in the market after the announcement of equity incentives, while contrasted to the long-term financial performance to study whether the companies which implemented the equity incentive had the authentic investment value. The research results showed that, the CAAR data over the event window is very close to zero. As a result, the changes in stock prices of 19 companies are not obvious. The CAAR is significant only on day (-4,-3) and day (-1, 0), whereas on other days of event window the CAAR is not significant. Abnormal Returns may be obtained over day -4 to -3 or one day just before the announcement by buying the firm's stock i.e., 4 days before the announcement day and sell it immediately on day -3 or one day before the announcement day and sell it on that day to capture the capital gains. That the Abnormal Returns may be obtained over day -4 to -3 or 1 demonstrates that there are some loopholes on regulatory. Some investors were able to acquire some inside information about equity incentive and bought the stocks of this company in advance. In this way, they gained considerable abnormal returns. However, for those ordinary investors, they had to bear high risk and had little chance to have some benefits. As a result, regulations should strengthen the supervision of information disclosure of those listed companies.

With the use of multiple regression analysis of sample companies, the study finds that there is no significant correlation with equity incentive and company, which means that from the long-term perspective, equity incentive does not help the company to achieve the original expectations, to improve the performance of the company. Of course, there may be the influence of the external environment, such as the financial crisis occurred in 2008. Equity incentive can't overcome this non-anti-factor.

The implementation of equity incentive is necessary and has some effect, because through descriptive statistical analysis the study found that from 2005 to 2008, there was apparent synchronization

between the performance of the company, the management equity incentive level, the largest shareholder stake and the company size. In 2007, after the announcement of equity incentive in 2006, the average of earnings per share and return on equity has reached the highest values of the past few years.

To sum up, equity incentive did not get investors bullish on the stock market. Although the performance of the company has increased, it was not significantly related with equity incentive. As a result, for the first batch of the companies who implemented equity incentive, it wasn't the same as that investors thought that there would be positive impact on the performance of the company. And shareholders and managers need further practice and effort on how to improve the performance of the company through equity incentive.

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