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The Determinants of Exercising the Executive Stock Option and the Incentive Effect of the Executive Stock Option on the Firm's Financial Risk: Evidence from Chinese Listed Market

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Abstract:

This paper studies all the Chinese domestic listed companies that have issued executive stock options (ESO) from 2006-2012 and finds factors affecting their ESO exercising, like the ratio of exercising price relative to market price, financial performance (ROE), managerial ownership, and years to maturity (early exercising). This results explains why most of the Chinese ESOs have not been exercised in recent years of the economy recession. Furthermore, we examine the incentive effect of the ESO schemes on the listed companies' financial risk and obtain an empirical evidence of "risk-taking" in the group of Chinese listed companies whose ESO have been exercised. The results suggest that the ESO schemes provide effective incentive for executives to take more risk if their stock options have been exercises, while the incentive effect is not significant before the options are exercised. Therefore, the volatile Chinese bear stock market makes the ESO schemes more fragile and less effective; and on the other hand, induces listed companies to take more risk against the market recession. To have an appropriate design of the ESO for the Chinese listed companies becomes challenging at present.

Keywords:

executive stock option; exercising of executive stock option,financial risk; risk- taking.

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1. INTRODUCTION

The separation of ownership and management is an important feature of modern corporations, which improves the efficiency and effectiveness of corporate operation; but meanwhile leads to agency problem. Jensen and Murphy (1990) suggest that to issue executive equity-based compensation is an effective measure to solve this agency problem as it aligns management interest with shareholders'. This incentive compensation scheme has been widely used by American corporations and has been considered as a significant driver of economy booming in the U.S, particularly in the emerging industries, like IT and financial industry.

In response to a rapid economic growth in China, the China's Securities Regulatory Commission (CSRC) initially published the regulation on the Chinese listed Companies' equity-based compensation in 2006. This rule allows Chinese listed companies to employ stock-based compensation to motivate their top management and key talents to maximise the companies' business performance, including restricted stocks, stock options and stock appreciation right. As executive stock options (ESO) require little cash flow of company (low cost) and high incentive leverage for executive compensation (Brian, 2002), it becomes the most popular incentive tool. According to Towers Perrin's report, almost 80% of the US companies' incentive compensation plans are using stock option schemes today. Consistent with the western markets, stock option is also the major choice of Chinese listed companies for their incentive compensation package.

However, the recent serious financial crisis has brought great deal of criticism on the ESO. The public argued that this high leverage incentive has driven executives to focus on company's stock price and induced them to take excessive risk (Larcker et al, 2012). The higher of stock market price than the exercising price of the ESO is, the executive compensation is greater. The Chinese stock market has not become efficient capital market yet and there are many inside trading and noise trading. The stock price sometimes does not reflect actual firm performance and value and is volatile according to the factors that are not controllable by management. Therefore, due to the complexity in measuring pay-performance effect under the influence of various exogenous forces, previous literature in the studies of the Chinese ESO has been inconsistent (Tosi et al. 2000). The market price volatility significantly affected the success of the ESO incentive. During 2006-2012, we found that more than half (78%) announced ESO plans have been abrogated, withdrawn or expired without actually been exercised. This raised our interests on the exercising of the ESO that could be a proof of the incentive effects in Chinese market; and also the effect of the ESO on risk-taking when the stock market price is volatile in the Chinese stock market. Therefore, this paper aims to examine the determinants of the ESO exercising and the correlation between the ESO and firms' financial risk.

2. Literature review

Agency problem and the ESO

Jensen and Meckling (1976) defined agency relationship as an explicit or implicit contract relationship. In this contract, one party (the principal) appoints or employs another party (the agent) to serve on his behalf and accordingly pay the agent for the service provided judged by quality and quantity. Shareholders are principals as equity owners and managers are agents acting according to their employment contract. Clearly, managers must have the right authorised by the shareholders to engage in economic activities, allocate resources or make decisions for the company. Then a risk called moral hazard could arise in this relationship. Specifically, moral hazard refers to a tendency or probability that managers act on their own best interests rather than the principals' with the insider information (Kathleen, 1989). This divergence in interests cause agency cost because principals have to monitor managers and in turn managers have to show their justified behaviors. The cost of this agency problem varies with the degree of separation between ownership and management. Grossman and Hart (1983) discussed three important factors influencing agency problems:

Information asymmetry

The manager usually has more information regarding the situation and his own behaviors. This information, however, cannot be revealed by direct or indirect observing of managers' behaviors. The difficulty in monitoring the behavior induces managers to take actions to benefit their interests rather than the shareholders.

Uncertainty in environment

Principals use performance as a surrogate to monitor agents. However, performance is not only determined by the efforts of managers, but also some random and uncontrolled factors. Thus, it is also challenging for shareholders to use performance to measure the actual efforts and talents of the managers.

Incompleteness of the agency contract

Both parties cannot list all their rights and responsibilities in the contract, managers' behaviors might differ under such condition. In other words, managers may take a loophole in contract to benefit themselves.

In the modern economy, the degree of separation is deepening with a more dispersed ownership. Thus, the executive equity-based compensation becomes a widely used mechanism, which aligns the interests of agents and principals. The stock option is a dominant form of equity-based incentive compensation in the stock market as it provides less pressure on company's cash flow and high leverage in executive pay. But the limitation of the ESO is fragile when the market price is volatile and the incentive will disappear when the market price is lower than the predetermined exercising price.

Executive stock option in China

Executive stock option is a call option and entitles executives to purchase a certain amount of company shares at a predetermined price during a period (Devers et al., 2008). The predetermined price is called exercise price and if the option is exercised, the payoff for managers is the difference between exercise price and market price of stock at exercise date. The exercising period range is usually 4 to 10 years after the initial grant in China.

Compared to western countries, the introduction of ESO in China has started since 2006 when the initial CSRC regulation of the executive equity-based compensation published. The number of the Chinese listed companies who announced the ESO plan has significantly increased afterward, particularly since 2011. Most of the ESO plans used right issue of new shares to executives. Few companies purchased back existing sharing from the market and sold them to executives.

The agency theory explains that the ESO could mitigate the agency problem and motivate management to improve company performance in favour of shareholders. However, some evidence (Gong, 2009, cited in Li, 2000) has questioned if the ESO scheme in the Chinese listed companies exerts positive impact on the firm performance. One of the main reasons is the weak linkage between firm performance and firm stock price in China. Firstly, the Chinese stock market is a policy-driven market. Good policy events often form a bear market into a bear market whereas it also can lead to a continuous declining of share price by announcing bearish events (Hu & Long, 2010). The stock prices are easily influenced by company's non-controllable factors in China. Secondly, the most rigid IPO requirements have created a great opportunity for "rent-seeking" and accounting frauds. In 2013, there were nearly 700 pre-IPO companies in the line waiting for the CSRC examination and approval for their IPO application. Many underwriters, accounting firms are involved in accounting frauds and received the CSRC's administrative punishment after their scrutiny. Thirdly, the immature investors, weak legal system and poor accounting and auditing quality provide

opportunities for inside trading. The Chinese investors have rarely been awarded decent dividends from the companies they invested in. They obtain return of their investment only by trading their stock. Compared with the gain from the stock price validity by inside trading, the supervision costs from regulatory supervision and independent auditing are less; meanwhile the legal litigation costs for inside trading and accounting fraud is also fairly lower. Fourthly, the ESO design is complicated and requires good estimation on the stock prices and appropriate performance indicators as the conditions of vesting and exercising the ESO. Currently, the Chinese ESO scheme is still underdeveloped in both theory and practice, which is also not matched the local stock market (Xia, Jiang & Tian, 2010). It is of importance to well understand the link between the Chinese listed company's performance and stock price when designing the appropriate ESO.

The exercising of the ESO and the volatile stock market

When the ESO plan is announced, in some case the executives will be awarded the stock options immediately and in the other case there are vesting conditions to have the option. The ESO vesting conditions usually are single indicator and majority of indicators related to financial performance, such as ROE and net profit grow rate. The "calendar vesting" stock option means the executives are allowed to exercise the stock options before maturity independent of stock price performance. On contrary, if the exercise contingent on the performance targets, the stock options are defined as "performance vesting" (Brisley, 2006). Executives exercise their stock options when the share price higher than exercise price (in-the-money option). If the option is out-of-money, managers simply forgo the right and choose not to exercise it. The higher the market price is, the higher the payoff for managers (He, 2009). Furthermore, according to the research of Sun et al (2005), the high growth capability or good performance can motivate executives to exercise stock options as the option value is also increase under this situation. For risk- aversion managers, if the company has a low growth opportunity, the adoption of ESO scheme is perceived as risky and executives may undervalue it and then leave it lapse.

Numerous literatures have demonstrated that most executives tend to exercise early (Fu & Ligon, 2010, Brooks et al, 2012, Brisley, 2006, Monoyois, 2010). The main reason can be summarized by Fu and Ligon (2010) as following. Firstly, executives are risk-averse and tend to do early exercise. Secondly, they attempt to diversify away unsystematic risk by disposing the acquired shares. Less diversified executives with riskier stocks are more likely to exercise on the vesting date. Thirdly, it is driven by executives' liquidity needs which also supported by Fu and Ligon (2010, cited in Liu and Yermack, 2007). Finally, inside information also make an impact. Brooks et al (2012) suggested that executives use private information when exercising their stock options and they usually exercise when the option is the least in-the-money. He also claimed that the exercising may worsen the operating performance. Monoyois (2010) showed that executives who had inside information on the future stock price tend to exercise earlier before maturity than those non-informed executives.

During the period from 2006 and 2012, the Chinese stock market has experienced significant fluctuations. Since 2006, Shanghai and Shenzhen stock exchange has started a leap development with the growth rate of 130% by the end of 2006. In 2007, the stock markets were booming, opened at 2728 points and closed at 6124 points. The Chinese stock markets created a myth of wealth accumulation and the growth of the stock market was beyond the GDP growth for the first time. However, due to the stamp tax raised by the government, stock price slumped on 30th May 2007. After this bull market, the stock market turned into bear market since 2008, with the lowest point of 1664. This is caused by many environmental factors like, the global financial crisis, non-tradable share conversions and the economy recession. In 2009, stock market experienced a dramatic increase to about 3400 points and then fluctuated at this point. This was caused by the aggressive fiscal policy, tax reform and quantified easy money policy. But in 2010, investors abandoned the market blue

chips and chased small and medium companies.The index has decrease about 14.3% by 2010. Since then the stock market prices have took a dive and the lowest index point in 2012 was only 1861.
Under such the volatile market, the exercising of the ESO has been significantly impacted because the stock prices are volatile and decreasing dramatically now. We find that a large proportion of the ESO plans were not exercised at expiration in China. That means managers do not gain any benefits from this incentive plan. This could lead to a different incentive effects on companies between whose managers exercised the stock option and those who did not. Currently, there is little literature studying the exercising of the ESO in China. This paper would like to identify all the ESO plans since 2006 in the Chinese stock market and examine factors influencing the exercising of the ESO. The management obtain the ownership and align with the shareholders by exercising the stock options. To study the option exercising is the first step to look into the ESO incentive effect.

2.4. Effect of stock option on risk-taking

Many recent literatures have showed that the ESO scheme increase firm risk-taking (e.g.Rajgopal and Shevlin, 2002; Deutsch, Keil and Laamanen, 2010, cited in Wright et al., 2007; Harris and Bromiley, 2007). In management perspective, the ESO develops a ownership between company and employees and it builds a sharing scheme for managers, including ownership, operating income, corporate value and its risk. In the view of incentive methods, it transfers the external incentives to intrinsic incentives (Gong, 2009) and the incentive effect will be strengthened (Iqbal et. al, 2010). Even those risk-averse managers may also take risk to create corporate value as the value of their options increase with the share price rising. Agency theorists argued that managers are risk averse and they may reject the project with high return and risk for fearing to lose the job or reputation caused by risk (Deutsch, Keil and Laamanen, 2010). The results showed by Ohad and Jerson (2008) by using utility function suggested that leverage effect of stock option will induce managerial decisions to accept risk-taking investment as they are also opportunistic.

Furthermore, some empirical studies have showed that the stock option increase both stock price and financial risk. Tong (2010) illustrated that firms with higher risk incentives have less cash holding. This may be caused by large capital requirement for big projects. In this case, the companies are encouraged to take aggressive financing activities, which may lead to financial risk. Additionally, Iqbal et al (2010) claimed that debt ratio and the size of new options are positively related. With the increase of option granted, this also brings financial risk to the firm.

However, it should be noted that when executives under the threats of employment risk or personal reputation when taking strategic risk, they may have low propensity to take the risking decision (Deutsch, Keil and Laamanen, 2010). Also Brisley (2006) illustrated that when the stock option issued at-the-money, it will give incentives to executives to take risks. Otherwise, when the options move deep in-the-money before vesting date, risk- averse executives may reject risky projects as they lose their convexity in payoffs. Therefore, driven by these theories, the financial risk of listed companies could be mitigated or increased by their ESO compensation schemes in the Chinese stock markets.
This paper would like to explore the ESO influence on the Chinese listed companies' financial decision and its financial risk with considering the stock option exercising activity. It aims to find out in China whether there are different incentive effect on firm financial risk among the groups that have exercised the ESO and the groups that have not.

3. Methodology

Factors affecting the exercising of stock option

Based on literature reviews and theories, this work develops two stages of studies: firstly to examine the factors affecting the ESO exercising and secondly to examine the effect of the ESO scheme on firm's financial risk among the exercising group and non-exercising group. The logistic regression model will be used to test factors affecting the exercising of the ESO:

$$Y/N=a_1\ EP/SP +a_2\ II +a_3\ EH +a_4\ ROE + a_5\ NPGR + a_6\ G+ a_7\ YTM \quad \text{Model 1}$$

Table 3.1 independent variables

Variables	Abbreviation	Measurement	Predicted effect
Dependent variable:			
Exercising the ESO	Y/N	1=Exercising, 0=not exercising	
Independent variables:			
Exercise price/ Share price	EP/SP	Exercise price/Share price	-
Incentive intensity	II	Total number of incentive shares issued/Total capital	+
Executive holding	EH	Executive holding/Total shares	+
Return on equity	ROE	Net profit/Shareholders' equity	+
Net profit growth rate	NPGR	(Net profit in current year-beginning net profit)/Beginning net profit	+
Gearing ratio	G	Debt/Equity	+
Year to maturity	YTM	The years to vesting date	+

Dummy variable will be introduced as the dependent variable for the logit model. If the executives exercise the stock options, in the period of validity, it coded as 1, if NO, coded as 0. The factors affecting executives to make the exercise decision are defined as independent variables.

Exercise price/ Share price

Normally, the exercise price is the current stock price when the ESO is announced or the average price of the past 30 days when the ESO is vested. Executives usually exercise it when current share price is higher than exercise price (in-the-price). Therefore, exercise price to share price considered to be a strong proxy for the exercise choice.

Incentive intensity and executive holding

According to the studies of Iqbal et al (2010), with more option granted, the possibility of exercising the stock option is increasing. Many previous researches showed that executive holding ratio also positively influence the performance of corporate, which induce executives to exercise ESO (Sun et.al, 2005, cited in Zhang, 2002 & Li, 2000).

ROE and Growth rate of net profit

The variable of ROE and NPGR were chosen for two reasons, one is for performance indicators and another reason is that they are the most commonly used targets in vesting conditions. If the executives fail to meet these indicators requirement, they will lose right to exercise stock option and gain from this compensation.

Gearing ratio

The gearing ratio reflects the firm financial risk and indicates the uncertainty in the firm performance and value. It could argue that the high financial risk reflect high future return and motive the ESO exercising.

YTM

Furthermore, year to maturity (YTM) is also considered as an influential factor negatively related with the exercising choice as plenty of previous studies proved that executives tend to do early exercising.

The effect of the ESO scheme on financial risk

We assume that the implementation of ESO will have a positive relationship with the firm's financial risk, especially for those groups that the ESO have been exercised. The linear regression model will be used to test the above hypothesis as following:

Y=b 1 E +b 2 Per-SO +b 3 Log TA +b 4 B/M +b 5 TAGR +b 6 BC +b 7 ROE +b 8 CFGR +b 9 IP

——Model 2

Table 3.2 independent variable

Variables	Abbreviation	Measurement	Predicted effect
Dependent variable:			
Y		Financial Risk: Gearing ratio	
Independent variable:			
Exercise or not	E	Exercise coded as 1, otherwise coded as 0	-
Stock option	Per-SO	Amount of granted ranted stock options/ Total number of shares	+
Firm size	Log TA	Log of total assets	_-
B/M ratio	B/M	Ending total net assets/ Market value	+
Total asset growth rate	TAGR	(Endingtotal assets-Beginning total assets)/Beginning total assets	+
Business cycle	BC	Trade receivable days + Inventory days	+
Return on equity	ROE	Net profit/ Shareholders' equity	+
Cash flow growth rate	CFGR	(Net CF from current financing - beginning CF-from financing activities)/Beginning CF from financing activities	
Interest payable	IP	The interest accrued from long-term liabilities	+

In the study financial risk is defined as dependent variable by using long-term gearing ratio as it indicates how risky a business is perceived based on its level of financing. The gearing ratio reflect the financing activities and risk-taking by the management. It is expected that the executive stock option will positively related to the financial risk.

Exercise decision

This paper is going to examine the effects of stock options on risk taking by taking account of exercising like (Ren and Li, 2010, cited in Devers et al., 2008). This independent variable will be defined as 1 if the ESO was exercised during the vesting period, or defined as 0.

Ratio of granted stock option to total capital

We defined the ratio of granted stock options to total capital as another independent variable. It is the most

commonly used proxy of ESO scheme. Additionally, logarithm value of granted stock option is alternative proxy. It may be argued that this choice is consistent with the measurement of firm size in logarithm. However, we defined those comparable years which not granted ESO as 0, and no logarithm for 0, the choice of logarithm value of granted stock option is abandon. Furthermore, it is interesting to see if the incentive intensity will influence the risk-taking decisions of executives, which also can be measured by this ratio.

Control Variables

Several control variables which related to financial risk will also be included in the research, like firm size, ROE, cash flow growth, business circle, market value and etc. Yanartas and Kaya (2012) showed deterioration of cash flow will increase financial risk, which even may lead to bankruptcy. Therefore, it is expected a negative relationship between cash flow growth and financial risk. Xiao and Jin (2008, cited in Xu, 2007) argued that the effect of ESO scheme in medium and large companies is significant and the executives are more likely to make efforts to increase the share price. They also indicated that the corporate governance in these companies is better and this can be helpful in implementing this scheme with less risk. So we expect negative relationship between firm total assets and financial risk. The firm's growth potential is represented by the ratio, book value/market value (B/M) and the firm's expansion trend is coded by total asset growth rate (TAGW). Ren and Li (2010, cited in DeFond and Jiambalvo, 1991) argued that low growth companies may have problems in governance structure, which
have a negative effect on operating and push company face greater risk. However, some scholars found that some companies with high growth capacity may take aggressive expansion policies (Ren and Li, 2010, cited in Ahmed & Goodwin, 2007). Additionally, Cui et al (2006) revealed high growth companies have a high financial risk as the rapid expansion may lead to less awareness in financial risk control. Therefore, we expect the greater B/M indicates the greater growth potential and will positively relate with its financial risk and the TAGW is also positively impact financial risk. Moreover, the business circle (BC) is also controlled as it is supposed that the longer business circle is the higher financial risk is (Groth, 1992; Lu and Su, 2011). ROE will be selected as another control variable. Shao (2011) indicated that enterprise with high profitability has high financial risk as its aggressive financing decision and expand production for high returns. Furthermore, the large profitable projects usually require large capital, which need positive cash flow support and financing support (Tong, 2010). With increasing borrowing, companies also have interest payable burden. Interest payable is chosen as the control variables.

Sample and data description

Since 2006, with the establishment of some regulations and laws, the ESO scheme in China has achieved some development. Therefore, this paper targets all listed firms in China that have used stock option as incentive tool from 2006 to 2012. All data are from the CSMAR database. The firms which omit the required information were deleted. As result, we find that 55 listed companies that have issued the ESO schemes since 2006 and 44 companies have not exercised the ESO and only 12 companies have done so far.

In order to examine what factors affect the ESO exercising, we target each EPS plan individually announced by the Chinese listed companies. The same company may issue different EPS plans. For example, the company coded 00046 issue several EPS schemes at different dates and the exercising prices are different. We treat them as independent observations based on the different ESO schemes. As a result, we select 567 observations from 2006 to 2012. The observations include 403 that have not exercised their ESO from their announcement year to expired vesting year or until 2012 if it is still in the vesting period and 164 that have exercised their ESO from their announcement year to exercise year. The characteristics of the sample can be summarized with following tables:

Table 3.3.1: The listed exchanges and the equity owned

	Shanghai	Shenzhen	State-owned	Private
Full sample	39%	61%	14%	86%
Non-exercising	37.2%	41.4%	8.9%	69.9%
Exercising	1.8%	19.6%	5.1%	16.1%

Table 3.3.2: The distribution of first announcement of ESO (exercising companies)

First announcement time of ESO	2006	2007	2008	2009	2010	2011
Number in sample(exercising)	24(1)	10(1)	12(0)	3(3)	5(5)	2(2)

Table 3.3.3: The vesting period of the ESO

Years	3 years	4 years	5 years	6 years	8 years	10 years
Full sample	3.7%	37.3%	37.3%	12%	8.2%	1.5%
Non-exercising group	2.3%	40.9%	50%	6.8%	0	0
Exercising group	0	25%	41.7%	0	25%	8.3%

Table 3.3.4: The industry distribution of the ESO application

Industries	Manufacture	conglomerates	Real Estate	Commercial	Public utility
Full sample	62.5%	21.4%	5.4%	3.6%	7.1%
Non-exercising	53.6%	16.1%	3.6%	3.6%	1.8%
Exercising	8.9%	5.3%	1.8%	0	5.3%

In the second research model, we aim to study the effect of the ESO on the company's financial risk. Therefore, we target companies' financial risk for the period from the pre- ESO years to the date when they exercised the ESO for the first time. We extend the sample including observations before the companies issued the ESO compensation scheme. Therefore, it is able to find any significant change on the financial risk after the ESO announcement, and also compare this effect on the financial risk in two groups, exercising group and non-exercising group. Due to the fact that the second model is based on the individual companies not the individual ESO plans and there are also data missing, the second sample has 308 observations: 296 non-exercising observations and 44 exercising observations.

4. Preliminary results

Descriptive statistics of for the model of exercise decision

Table 4.1.1 (N=567) Summary of data distribution of exercising

	Mean	Standard deviation	Median	Min	Max	Range
E	0.287478	0.452986	0	0	1	1
EP/SP	0.7660842	0.7433825	0.577534	0.00311	5.138346	5.135236
ROE	0.0983905	0.0774997	0.07785	-0.00659	0.540515	0.547109
EH	0.0333855	0.0838903	0	0	0.502778	0.502778
YTM	3.111111	1.897553	3	0	10	10
II	5.594848	2.714994	4.92	0.9632	10	9.0368
NPGR	0.4396542	4.48507	0.031507	-25.0258	75.13045	100.1563
G	0.9399309	0.6578778	0.834047	0.033969	3.784364	3.750395

According to Table 4.1.1, the mean of dependent variable is 0.287478 and the median is 0, which means that the non-exercising ESO weighted a high proportion in the sample. This may be caused by lower share price than exercise price, named out-of-money. In this situation that EP/SP is above 1, executives cannot gain from the exercising. The mean value of EP/SP is 0.7660842 still less than 1, but the minium EP/SP is only 0.003 and the maximum is 5.1. The median is 0.577534 that shows that most of ESO scheme are significantly in-the-money. The executives can have great gain from the intrinsic value of option. But the reason why there is still low exercising rate is possible due to the failure to meet the performance target in the vesting conditions. The mean of ROE is 9.8%, but the median is 7.7% and then most of companies have low ROE, some even have losses. As majority of executives have no shareholding (median=0), the intrinsic incentive is low, which supports the fact that only a few exercising. Furthermore, executives tended to exercise the stock option about 3 years before the vesting expiry date. Considering the fact in the table 3.3.3 that 86.6% of the EPS plan have short vesting periods, 4-6 years, it indicates early exercising in China consistent with the findings in the western markets. The table 4.2.2 demonstrate the correlations among all variables in the first model. Among the independent variables, there is no significant correlation.

Table 4.1.2 Correlation and covariance of exercising data

	E	EP/SP	ROE	EH	YTM	II	NPGR	G
E	1							
EP/SP	-0.3114	1						
ROE	0.2133	-0.1175	1					
EH	0.0996	0.0463	0.0556	1				
YTM	0.4273	-0.1503	0.1360	-0.0899	1			
II	-0.1211	0.0182	-0.0579	0.0589	-0.1275	1		
NPGR	0.0334	-0.0195	0.0731	0.0457	-0.0603	0.0097	1	
G	-0.1969	0.3626	-0.1008	-0.2743	-0.1490	-0.0088	-0.0225	1

Descriptive statistics of the model for effect of ESO on firm risk

In the table 4.2.1, the average gearing level is higher than that of the post-ESO sample in the first model. Also, the minimum and maximum value of gearing ratio are far higher than those in first sample. The percentage of the ESO on the total shares in China is a bit low as the average is only 2.4% and the median is 1%.

Table 4.2.1 (N=296) Summary of the data distribution for non-exercisable group

	Mean	Standard deviation	Median	Min	Max	Range
G	1.243489	1.760087	1.049401	0.39419	28.7806	28.74118
E	0	0	0	0	0	0
Per-SO	0.0242946	0.2337855	0.010165	0	0.192513	0.192513
Log TA	9.462775	0.4864359	9.411325	8.534231	10.77488	2.240652
B/M	0.6715881	0.2461276	0.664675	0.111874	1.367858	1.255984
TAGR	0.1266623	0.2599892	0.06763	-0.20023	2.885596	3.085833
BC	377.9975	943.7567	203.7004	26.68963	11163.08	11136.39
ROE	0.0566153	0.4001731	0.065659	-6.70579	0.540515	7.246308
CFGR	4.370949	147.0747	-1.03292	-1408.78	2026.058	3434.841
IP	4179466	1.99e+07	0	0	2.04e+08	2.04e+08

It should be noted that the range of business cycle is very large, from 1136.39 to 26 and we cover varied industries. Lastly, the interest payable shows that its mean and median are both 0 indicating most of observations do not have interest payables.

Interestingly, in the table 4.2.2 the average gearing level in exercisable group is 0.8302729, which is lower than that in the first sample. Compared with non-exercising group, the exercising group has the lower average and maximum ratio of the ESO on the total shares. As to firm size, the exercising group seems smaller than non-exercising group. At the same time, the mean of B/M in exercising group is also lower than that in non-exercising group, which means the difference between the market value and book value is higher in exercising group. Moreover, the average ROE in exercising group is higher than that in non-exercising group. It is worthy of attention that the average cash flow growth rate is negative in the exercising group while the non-exercising group has positive CFGW, which implies the great cash outflow due to the risk-taking activities in the exercising group.

Table 4.2.2 (N=49) Summary of data distribution for exercisable group

	Mean	Standard deviation	Median	Min	Max	Range
G	0.8302729	0.7650381	0.595408	0.056103	3.417139	3.361036
E	1	0	1	1	1	0
Per-SO	0.0142178	0.0254817	0	0	0.129379	0.129379
Log TA	9.355568	0.5035712	9.276823	8.504846	10.54643	2.041587
B/M	0.5281564	0.2458988	0.500191	0.146327	0.975386	0.829059
TAGR	0.1186325	0.2875777	0.048986	-0.123277	1.698655	1.821932
BC	374.6627	419.5366	196.9642	0	1671.604	1671.604
ROE	0.0865187	0.0604414	0.74922	-0.006594	0.274882	0.281476
CFGR	-8384.607	58667.68	-1.024212	-410677.3	29.43888	410706.7
IP	1414042	6109870	0	0	4.00e+07	4.00e+07

The correlations among all independent variables in the second the model are demonstrated in the table 4.2.3 and 4.2.4. There are no multi-linearity problems either.

Table 4.2.3 Correlation and covariance non-exercisable group

	G	*Per-SO*	*Log TA*	*ROE*	*B/M*	*TAGR*	*CFGR*	*BC*	*I P*
G	1								
Per-SO	-0.1154	1							
Log TA	0.1250	-0.0275	1						
ROE	-0.8964	0.0691	0.0878	1					
B/M	0.1801	-0.3180	0.1676	0.0653	1				
TAGR	-0.0533	-0.0254	0.1092	0.0646	-0.0037	1			
CFGR	-0.0501	0.1100	-0.0914	-0.0040	-0.0057	-0.0248	1		
BC	-0.0533	0.0053	0.1338	-0.0918	0.2241	-0.0422	0.0268	1	
IP	-0.0501	-0.0105	0.3400	0.0259	0.0905	0.0283	-0.0057.	0.2424	1

Table 4.2.4 Correlation and covariance for exercisable group

	G	Per-SO	Log TA	ROE	B/M	TAGR	CFGR	BC	IP
G	1								
Per-SO	0.0537	1							
Log TA	0.7016	-0.1609	1						
	0.2600	0.0791	0.3661	1					
	0.5472	-0.2233	0.1969	-0.1521	1				
	0.0376	-0.0146	-0.1075	0.1843	-0.0355	1			

0.1040	0.0813	0.2288	-0.1779	-0.0017	-0.0157	1	
0.7063	-0.1249	0.4909	0.1149	0.3546	0.0568	0.0548	1
0.2266	0.0584	0.2294	0.0333	0.1260	0.0669	0.0338	-0.0770 1

5. Regression results and analysis

Factors affecting the ESO exercising in China

Table 5.1 shows the result of the first logistic model to examine the factors affecting the ESO exercising in China. The adjusted R square stands for 30.95% of the explanation power of the logistic model. There are four independent variables significantly related to the exercising activity. Firstly, EP/SP is negatively related to the exercising consistent with our hypothesis. This suggests that with a lower exercise price to higher share price, the executives are more likely to exercise the stock option to obtain the great gain. Table 3.3.2 shows, in 2008, no stock options were exercised, and it may be caused by the financial crisis, which drove share price decrease dramatically.

Secondly, the result shows that with a higher ROE ratio, the executives are more likely to exercise ESO. When company have better performance and then it is more possible for them to meet the vesting and exercising conditions, it increases the chance for executives to exercise their stock options. The result actually supports our hypothesis.

The results show EH is another significant factor influencing the ESO exercising. The more managerial shares executives hold, the executives' interests are more closely related to that of shareholders and a ownership relationship is built instead of employment relationship. Executives tend to exercise their stock option when they have more shareholdings as the gain from the difference between exercising price and market price become significant capital return in perspective of shareholders.

Table 5.1 Results for exercising

	Predicted sign	*Co-efficiency*	*P>|Z|*
Dependent: Exercising or not			
Independent variables:			
EP/SP	-	-2.35667	0.000***
ROE	+	3.60301	0.024**
EH	+	5.753772	0.001***
YTM	+	0.6165562	0.000***
NPGR	+	0.0273298	1.02
II	+	-0.0236923	0.580
G	+	0.2828523	0.185
Total sample N=567			
Adjusted R^2: *30.95%*			

. Note: *** Significance at the 0.01 level.

** Significance at the 0.05 level.

*Significance at the 0.10 level

The positive relationship between YTM and exercising activity is also consistent with our hypothesis, which suggests "early exercising" exists in China. Many literature suggest the "early exercising" be linked to inside trading and price volatility. As insiders executives are well informed about company operations and are able to predict company performance for a short period; however, as there are still many other non-controllable factors influencing stock price in the market, particularly long-term price. It is rational for executives to exercise their ESO early by using their inside information.

The effect of the ESO on the listed companies' financial risk

In the second stage, the financial risk regression model has been run for three times and attempts to investigate whether the ESO scheme has different implication on financial risk between the exercising and non-exercising group. Table 5.2 summarises the regression results.

Table 5.2 the results for relationship between stock option and firm's financial risk

	Full sample	*Non-exercisable Group*	*Exercisable Group*
Dependent Variable:			
Gearing			
Independent Variables:			
E	-0.1231726	-	-
	(0.256)		
Per-SO	-0.2269695	-0.871464	7.548625
	(-0.846)	(0.486)	(0.001)***
Log TA	0.7624694	0.6807906	0.6820946
	(0.000)***	(0.000)***	(0.000)***
ROE	-0.3974512	-3.98604	0.9026658
	(0.000)***	(0.000)***	(0.365)
B/M	0.6984555	0.6154632	1.193068
	(0.000)***	(0.001)***	(0.000)***
BC	-4.8106	-0.0000228	0.0006885
	(0.912)	(0.610)	(0.000)***
TAGR	-0.0303799	-0.11140562	0.1662184
	(0.826)	(0.458)	(0.360)
CFGR	-8.7107	-0.0004101	-3.7007
	(0.599)	(0.133)	(0.686)
IP	-3.16e-10	4.81e-10	1.05e-08
	(0.811)	(0.824)	(0.230)
N	345	296	49
Adjusted R^2	83.71%	85.09%	81.04%

Note: *** Significance at the 0.01 level.

** Significance at the 0.05 level.

* Significance at the 0.10 level.

The second model has strong explain power for financial risk, gearing ratio because all adjusted R^2 are over 80%. The interest independent variable, the percentage of the ESO on the total share (Per-SO) has no significant relationship with gearing ratio in the full sample and non-exercising group. However, in the exercising subsample, Per-SO is significantly positively related with the gearing ratio. This result proves our hypothesis that issues of the ESO scheme may induce the Chinese listed companies to take more financial risk. To gain from the convex payoffs of ESO, executives are willing to accept the risky projects and take aggressive financing activities. The stronger the incentive was given, the less risk averse with executives. But this risk-taking effect only exists in the group of the listed companies whose ESO have been exercised. In the non-exercising group the ESO incentive effect is not significant, or effective. It reflects the ESO's feature, fragility. In our sample, 78.6% companies have not exercised their ESO. Based on the first model, high exercising price relative to market price and low financial performance are the main reason for non-exercising. Therefore, the market price volatility and financial performance target used for vesting or exercising condition decide the incentive effect of the ESO schemes. Only if these stock options are exercisable, the executives are motivated to take more financial risk.

The company size and B/M are two significant control factors influencing financial risk in all groups consistent with our hypothesis. The company size is positively related with gearing ratio. So larger companies have high financial risk as their capability against risk is increasing with their size. B/M represents book value relative to market value, the growth potential, and its averages are 0.67 and 0.52 respectively in non-exercising and exercising group. Most of observations' B/M is less than 1 and therefore, the higher B/M means the market price is closer to the book value and indicates lower growth potential recognised by the market. Therefore, the lower growth potential results in high financial risk.

ROE is significantly negatively related with gearing ratio in the full sample and non- exercising group. It suggests the better profitability is, the less financial risk then. However, in the exercising-group the ROE is not significantly related with gearing and interestingly, the sign is positive. This result implies the rule of high return with high risk and explains the motivation of the executive's risk-taking is to expect high return in exercising group. Business circle only has a significant positive relationship with gearing ratio in exercising group. The longer the BC, the higher the financial risk. As BC is equal to the sum of trade receivable days and inventory turnover days, the increase in trade receivable days and inventory turnover days will demand more amount of working capital.

6. Conclusion and future study

In summary, this paper has identified some factors influencing the ESO exercising in the Chinese listed companies and examined the ESO incentive effect on the companies' financial risk by controlling the exercising factor. We find that the ratio of exercising price relative to market price, and ROE are two significant determinants for the ESO exercising in Chinese listed companies. This result explains why most of the Chinese

ESO has not been exercised in recent years. The volatile Chinese bear stock market makes the ESO schemes more fragile and less effective. To have an appropriate design of the ESO becomes challenging at present. As the same as the western companies, the Chinese companies also would like to exercise the ESO in early years because of uncertainties in long-term market prices. The more managerial shares the executive have already will increase the odd ratio to exercise their ESO because as shareholders they can have alternative capital return.

This paper also finds that the ESO's exercising strengthens their incentive effectiveness. By examining the ESO effect on the companies' financial risk in non-exercising group and exercising group separately, the statistical results confirm that only the listed companies exercising their ESO are motivated to take more financial risk when the ESO is increasing in China. Although the high risk may bring high return in the future, if the financial risk-taking is not well managed and controlled, it could harm the wealth of shareholders eventually. More people now are paying attention to the negative implication of the executive stock option. In our study, the risk-taking behaviour has not been found in the non-exercising group. This paper has used gearing ratio as the proxy of financial risk and there are alternative indicators. The future study also can consider other type of risk, like market risk. Furthermore, industry type, and ccorporate governance can be explored in the next study.

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