THE EFFECTS OF STOCK OPTION COMPENSATION ON MANAGERIAL RISK TAKING BEHAVIOR AND FIRM FINANCIAL PERFORMANCE THE GLOBAL FINANCIAL CRISIS FROM A DIFFERENT PERSPECTIVE

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Abstract
The aim of this study is to figure out whether managerial risk taking behaviour and firm financial performance is effected by stock option compensation. In literature stock option compensation is mentioned as a means to solve agency problems. It is analysed how stock option compensation aligns the shareholders'and managers' interests and its effects on firm financial performance. Additionally, it is investigated whether this effect has a link to the global financial crisis which has obviously related to the managers' extreme risk seeking behaviour especially in financial sector. In this study, 189 firms from S&P index are analysed utilizing the panel data analysis method between years 1998-2009. Additionally, regression method is used to measure each year. The data set is grouped as financial and non financial sector to better present the effects of global financial crisis. According to the results of this study, stock option compensation is positively related to investment magnitudes which are taken as indicators of risk taking behavior. On the other hand, it is negatively related to firm financial performance. According to the results of yearly comparison, in financial sector the invesment magnitudes are bigger than the non financial sector just two years before the financial crisis and net cash flow from the investing activities is significantly negative when compared with non financial sector. Therefore, it is aimed to find out the relation between the extreme risk seeking behavior before the global financial crisis and the incentive compensation structures.

Key Words: Agency Theory, Risk Taking Behavior, Stock Option Compensation, Firm Financial Performance, S&P 500, Panel Data Regression

JEL Classification: G, G01

1. Introduction

The essential points of this paper are based on agency theory and its assumptions. The theory has been searched a lot dating back to 1776. From the earliest studies, it is mentioned that it can not be expected that the managers elaborate while spending the owners' money instead of their own. Their behavior of negligence and wastage is accurate (Smith, 1776).The conflict of interests affects the firm financial performance in a negative way (Berle and Means 1932). In a corporation, the owners can be defined as 'principals' and managers as 'agents'. The principles can not watch out every behavior or decision of managers and thereby 'asymetric information' occurs(Arrow, 1971). Shareholders want managers be less risk averse but managers behave conversely. The managers have their own agendas and they first take into account their own goals and personal reputation instead of firm profits (Eisenhardt, 1989).At this point, it is necessary to define what we mean about business risk. *Business risk* is told to make it more difficult and complicated for decision makers -managers- to build up organizational strategies(Bloom and Milkovich 1998). Wright, Ferris, Sarin and Awasthi, 1996 described *corporate risk taking* as the analysis and selection of projects that have varying uncertainities associated with their expected outcomes and corresponding cash flows. Sitkin and Pablo 1992 defined risk under three headings; outcome uncertainty, outcome expectations and outcome potential are given as dimensions of risk. These dimensions let us characterize the risk behavior by the degree of risk associated with decisions made. Although managers are told to discuss risk through quantities most of them do not want to construct or structure risk as a quantifiable concept(March and Shapira 1987). The definition of risk is given under two headings, in the first one risk is described as the managerial choices and decisions associated with variable outcomes which can be named as managerial risk taking. In the second one risk is mentioned as a feature of organizations experiencing volatile income streams which can be named as organizational risk (Palmer and Wiseman 1999). Furthermore; in an organization, monitoring managers' behavior and decision making process is difficult and costly, so awarding them with incentives can be used as means to align the different interests and reduce agency costs. The managers can bear more risk instead of following their own agendas and being oppurtunistic, if they are

given incentive based compensation (Jensen and Meckling, 1976). The most effective solution to the agency problems are reported as giving managers incentives to align the interests of two parties. Granting managers could let managers think and behave like shareholders want them to (Hall and Liebman, 1998). *Stock options* have been used for granting managers and it is asserted that stock option compensation induce them to behave or act more risk averse (Rajgopal and Shevlin 2002). Devers et. al (2008) give the definition of stock options as the right but not the obligation to purchase a specific number of shares of firm stock, for a predetermined price within a specified future time range. A manager's gain from a stock option is the difference between the exercise price and the current market price of the stock. A manager derives profit when the current stock price is above the exercise price at the time that the stock option is exercise. Stock option compensation is structured in different ways according to different countries and regulations such as the managers have the right but not the obligation to buy firm stocks (Tuschke,2009).

There are several studies which assert the effects of incentive based compensation on managerial risk taking behavior and firm financial performance. Haugen and Senbet (1981) asserted that, in order to change managers' risk averse behavior and act like the owners want them to, incentives are vital means. Agrawal and Mandelker, (1987) mentioned that managerial incentives like stock options encourage managers to behave and take actions like the shareholders want them to. Stock options are also founded to be related to firm asset structure. In another research by Jensen and Murphy (1990), the compensation structure of a firm is highly related to organizational success. Hall and Liebman (1998) mention that, conversely to the common aspect that there is little correlation between managerial compensation and firm financial performance, the results of the study showed significant relationship between managerial payment and firm performance. The relationship is effected by the managerial stock options. Especially since the year of 1980, the sensitivity of the relationship between the managerial stock options and firm performance is founded to be increased because of the intensive usage of stock option compensation by firms. The results of Sanders(2001) also asserted that, although executive stock ownership and stock option compensation are assumed to align the goals of managers and shareholders; these type of incentives have asymmetrical risk properties, and under different circumstances executives may react in different ways. In addition to conceptualizing the managerial risk taking, Sanders and Hambrick 2007 establish evidence that firm strategic behavior and company performance are effected by the managerial stock option compensation. Managerial stock options

generate high levels of investment magnitudes - which are taken as the indicators of managerial risk taking behavior - and end up with high volatile firm financial performance which called in the paper 'big gains and big losses'. The more that managers paid with stock options, the more extreme a company's financial performance be (Sanders and Hambrick 2007). Although these findings, grantings create extreme risk taking behavior and let the managers behave risk loving (Shavell, 1979). Holmström 1979 also mentioned that "The principal may or may not be risk-neutral".

In sum, we can say that managers prefer risky options when they are given stock options. This leads us to think and link this situation to the global financial crisis which is highly caused by the extreme risk taking behavior of managers. *Global Financial Crisis* in 2007–2008 caused by the U.S. subprime mortgage problems, the Great Depression in the U.S., and the financial crisis of East Asia in 1997, have a significant negative impact on asset prices, firms' investment and financing policies, investor attitudes, and consumer demands. An unexpected economic shock tends to create different incentives among controlling shareholders, outside shareholders, and creditors concerning restructuring policies, since the agency problems among investors tend to increase significantly during the shock (Jun-Koo Kang Inmoo Lee, Hyun Seung Na,2009). The study of Okamoto and Edwards 2010 agrees that just before the recent financial crisis executives in financial industry made poor decisions, showed excessive risk taking. Prudent risk taking is told to be a component of financial stability but the study rejects this point of view on compensation. Executive compensation can not be the only cause of financial unstability, but if the executive compensation is restructured, the managers can respond in different or unexpected ways. The study of Fahlenbrach and Stulz 2010, give some evidence that banks with CEOs whose incentives were better aligned with the interests of shareholders performed worse and no evidence that they performed better. Banks with higher option compensation and a larger fraction of compensation in cash bonuses for their CEOs did not perform worse during the crisis. The common finding which can be summarized from the given previous literature is that the managerial incentives could have unexpected results if they are not structured efficiently. The time period in which the unstable firm performances are seen very often is the time of global financial crisis in 2008, which encouraged us to examine whether this effect changes just before the global financial crisis.

This study aims to assert the effects of stock option compensation on managerial risk taking behavior and firm financial performance. A comparison between years

is done in order to figure out the effects of stock option compensation on risk taking behavior and financial performance just before the global financial crisis.

2. RESEARCH METHODS

2.1. Research Sample

The data set included 189 firms from S&P 500 index between the years 1998-2009. The firms are selected as started being in the index in 1998 and continued being as the year of 2009. All firms are indexed in S&P in 1998 and the dates of firm establishments are before 1998. The 189 firms which met this criteria were analysed. For the last part, the seperation of financial and non financial sector is done depending on the Naics codes of firms. Firm financial data were drawn from COMPUSTAT. Executive compensation data were collected from Execucomp.[1]

2.2. Measures

Dependent variables measured in this paper are selected from different kinds of firm investments and financial performance indicators. In a similar prior research, Sanders and Hambrick 2007 used the magnitude of investments as indicators of managerial risk taking behavior. The study examined three distinct type of investment spendings; R&D investment, capital investment and acquisition investment. In another research, Beckman and Haunschild 2002 used acquisition investments as an indicator of risky invesment behavior. Hoskisson, Hitt and Hill 1993 also analysed the relationship between incentive based compensation and R&D investments. The magnitude of the investment were taken as the indicators of risk taking behavior. In common with other researchers, Sanders 2001 measured acquisitions as the risk preference indicator too. In parellel with the literature, the different types of investments are used as given in Compustat database in this study. Different types of investments measured in this analysis are; Acquisitions, Capital Expenditures, Cash and Short term Investments, Invested Capital-total, Investment and Advances-Equity, Investment and Advances-Other, Increase in Investments, Investing activities-net cash flow, short term investments-total, Short term Investments-change. For the financial performance indicators, ROA and ROI were measured in paralel with the literature (Bloom and Milkovich 1998, Sanders and Hambrick 2007). The analysis dealt with the effects of stock option compensation on some types of investments

[1] In this paper the dataset is used by the kind permission of Asis. Prof. Ozkan Eren from UNLV, Las Vegas, Nevada, USA. Special thanks to Dr. Eren for his support.

and financial performance, a lagged measure is implemented. The lagged measures let us see the effects within one year period of time.

Independent variable analysed in this study is the *percentage of stock options in total compensation*. Sanders and Hambrick 2007 also used this variable in their study in which they analysed the effects of stock options. It presents the proportion of stock options in total compensation. It ranges from 0 to 100 percent theoretically. Stock option values based upon the Black-Scholes method were calculated from Execucomp.

Control variables The total other compensation is taken as a control variable. It is taken to represent the effect of other types of compensation.

2.3. Estimation Method

Depending on the literature, for this kind of panel data structure, the usage of OLS (Ordinary Least Squares) regression could end up with inconsistent results, understated standard errors (Devers et.2008, Sanders and Hambrick 2007). As a result, the estimation method used in this study is random effects model in STATA. The usage of random effects model is due to the prior research which analysed same type of data. For this kind of dataset random effects models and GLS estimators are used. Regression method is used for each year to compare the results of each year.

3. RESULTS

Table 1 presents the symbols and explanations of the variables.

According to the results of the panel data regression analysis; the results of the analysis of the effects of stock option compensation on investment magnitudes for different types of investments is given in Table 2. The results show us that; the percentage of stock option pay in total compensation has *significant positive impacts* on the investment types; acquisitions(aqc), capital expenditures(capx), Cash and Short term investments(che), invested capital-total(icapt), investment and advances-other(ivao), short term investments-total(ivst) and short term investments-change(ivstch). The results were supporting and consisting with the results of Sanders and Hambrick 2007, Larcker 1983, Sanders 2001, which are demostrating that investment magnitudes are positively related to stock option compensation.

Table 3 provides the results of the analysis of the effects of stock option compensation on financial performance indicators. The percentage of stock option pay is founded to be negatively and significantly related to ROA. The value of the

variable *percentage* one year before (one lagged), showed significant negative coefficient too, but the value of the same year demostrate not significant but positive coefficient. This result is consisting with the analysis of Sanders and Hambrick 2007 which provides that the more managers are paid with stock options, the more volatile and inconsistent of the firm financial performance is. It is reported that the inconsistency is more like to be in a negative way, rather than a positive impact.

For the last part, regression analysis is done in order to compare the results of the years and find out whether this positive and negative impacts change in years 2006 and 2007, just before the global financial crisis. The regression analysis is implemented by dividing the data set into two groups as financial and nonfinancial firms. The results are obtained as follows.

In financial sector, the years 2006 and 2007 the percentage of stock option pay show bigger positive relations with some types of investments like; capital expenditures, invested capital, short term investmens-change, increase in invesments, investment and advances-other. There is a significant negative relation obtained for the variable investing activities-net cash flow.For the non financial sector, the years 2006 and 2007 did not show any distinct results when compared with other years. In financial sector, in the year 2006 the percentage of stock option pay was negatively related to ROA and no relation with ROI. For the financial performance indicators in non financial sector we did not obtain any significant relations.

Table 1. The Symbols Explanations and Computations of the Variable

Variables	Symbol	Computations and Explanations
Dependent Variables		
Acquisitions	aqc	A dependent variable that represents cash outflow of funds used for and/or the costs relating to acquisition of a compant in the current year or effects of an acquisition in a prior year carried over to the current year
Capital Expenditures	capx	A dependent variable that represents the funds used for additions to property,plant, and equipment excluding amounts arising from acquisitions . This item includes property and equipment expenditures.
Cash and Short term investments	che	This item represents cash and all securities readily transferable to cash as listed in the current asset section. It is the sum of Cash and Short-term investments.
Invested Capital(Total)	icapt	This item represents the sum of ; Long term debt(total), Preferred Stock (Carrying Value); Minority Interest (Balance Sheet); Common Equity(Total)
Investment and Advances-Equity	ivaeq	This item represents long-term investments and advances to unconsolidated subsidiaries and affiliates in which the parent company has significant control. It includes All investments at equity, Goodwill related to investments at equity, Receivables from investments at equity. This item is a component of total assets.
Investment and Advances-Other	ivao	This item represents long-term Receivables and other investments and advances including investments in unconsolidated companies in which there is no control.
Increase in Investments	ivch	This item represents funds used to increase a company's long-term investments. It includes increase in long term receivables, increase in investments in unconsolidated subsidiaries, long-term investments combined with short term investments
Investing Activities-Net Cash Flow	ivncf	This item represents net cash received or paid for all transactions classified as investing activities on a statement of cash flows. It is the sum of; Sale of Investments, Short-Term Investments-Change, Sale of Property, Investing Activities-Other.
Short term Investments-Total	ivst	This item represents currently marketable investments as presented in the current asset section of the Balance Sheet. Such investments may be converted to cash within a relatively short period of time.
Short term Investments - Change	ivstch	This item represents changes in marketable securities and cash equivalents reported in the Investing Activities section on a Statement of Cash Flows.
Return on Assets	ROA	Net income divided by total assets
Return on Investments	ROI	Net income divided by total investments
Independent Variables		
The percentage of stock option pay in total compensation	percentage	The proportion of stock options in total compensation. It ranges from 0 to 100 percent.
Control Variables		
Total other compensation	toc	The total value of the compensation excluding stock options.

4. DISCUSSION

The agency problems and agency costs are searched a lot in the litearature. There has been always an effort to find solutions to agency problems and decrease the agency costs to minimum levels. As discussed in the paper, managerial incentives were accepted as a means to solve agency problems caused by the principal and agent relations. Stock option compensation has been used as incentives to managers since 1950's in USA. Incentives were used to overcome the problems caused by different risk preferences between the shareholders and managers. They were seen a way to make managers behave like the shareholders want them to be instead of being oppurtunistic agents. This can happen only if the interests of managers and owners are aligned.

When the concept is analysed deeply, the other side of the story tells us different findings. The researchers came to the conclusion that the incentives given to motivate managers can end up with unexpected results when incentive compensation systems are not configurated efficiently. The common finding was, when the managers are highly compensated with incentives like stock options, they can behave risk loving and this could bring a decreasing firm performance. It was certain that the incentive compensation based on stock options could end up with converse results when they are not bounded or when they are exaggerated. At this point, we can link the agressive risk taking behavior with the global financial crisis started in the mortgage sector in USA. It was obvious that especially in financial sector the managers behaved imprudent about risk taking and the financial unstability were its highest levels. When we think about the causes of this excessive risk taking behavior, it could have related to managerial incentives which let them take large-scale risks. That is the reason that the relationship between the stock option compensation and investment magnitudes, financial performance indicators is searched in this paper to understand if the magnitude of the relationship changes just two years before the global financial crisis in 2008. The financial and non financial sector firms were also compared to see the results better. The first and key finding was that the different types of investment spendings are effected positively by stock option compensation. Consistent with the literature, the stock options encourage invesment spending and increase investment magnitudes which are taken as the indicators of risk taking behavior. The financial performance indicators are effected negatively which can be interpreted that the more the total compensation consists of stock options the more firm financial performance indicators decrease.

In order to figure out how this effect changed before the financial crisis, regression measures are held. As a result of the comparison between years and sectors, in the years 2006 and 2007 - two years before the global financial crisis in 2008 - , the magnitude of the effects on invesment spendings in financial sector is bigger in some types of investments. This conclusion can be interpreted as the cause of the excessive risk taking behavior of the managers of financial sector before the financial crisis. Another significant result obtained was the variable 'net cash flow from investing activities' was negatively effected by stock options when compared with other years and non financial sector. In financial sector in years 2006 and 2007 the negative relation between the stock options and the net cash flow from investing activities were its highest levels which can be interpreted as the leading indicators of global financial crisis.

In sum, we can tell the story from the beginning and say that, firms implemented stock option compensation structures in order to align the interests of managers and shareholders. That seemed like a good idea in the beginning, but the things did not work like the way they were expected. Because of the structure of stock option compensations, the managers faced unlimited upside but no downside risk which let them behave risk loving and take unreasonable, large risky actions. Furthermore, large risky actions are related to negative firm financial performance and resulted with deficiencies. That is the point that stock option compensation structures can be related to global financial crisis, which is the time that the managers showed excessive risk taking behavior and extreme, unstable financial performance especially in US with the consequence of collapsing the financial sector.

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Table 2.Results for the Panel Data Regression Analysis-Investment Types-Risk Taking Behavior

	Dependent Variables									
Variables	**aqc**	**capx**	**che**	**icapt**	**ivaeq**	**ivao**	**ivch**	**ivncf**	**ivst**	**ivstch**
he percentage of stock option pay in total compensation	0.0116*** (3.60)	0.0024*** (3.26)	0.0011 (1.05)	0.0011* (1.92)	0.0041* (1.70)	0.0043** (2.44)	0.0029 (1.21)	-4.4078* (-1.80)	0.0041** (2.07)	0.0067 (1.10)
The percentage of stock option pay in total compensation t-1	-0.0021 (-0.68)	0.0020*** (2.74)	0.0023** (2.15)	0.0021*** (3.84)	0.0046* (1.87)	0.0034** (2.00)	0.0039* (1.65)	-4.4223* (-1.86)	0.0041** (2.13)	0.0151** (2.47)
Total other compensation	0.3222*** (2.62)	0.2870 (9.32)	0.3754*** (8.57)	0.3049*** (13.33)	0.2440*** (3.02)	0.2058*** (2.88)	0.2869*** (3.25)	-174.2085* (-1.80)	0.2765*** (3.56)	0.3664 (1.33)
Total other compensation t-1	0.0581 (0.50)	0.3573 (12.63)	0.4023 (9.88)	0.3260*** (15.36)	0.2680*** (3.59)	0.1668** (2.56)	0.2269*** (2.78)	-308.4248*** (-3.42)	0.1612** (2.23)	0.6273** (2.28)
Number of observations	923	1662	1848	1846	614	1123	938	1813	1052	280
Number of groups	168	173	189	189	99	155	150	189	152	91
Wald chi2(4)	20.59	562.24	415.62	965.26	35.44	29.54	34.36	31.29	32.15	19.02
Prob > chi2	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008
Legend	** p<0.10; ** p<0.05; *** p<0.01*									

Table 3. Results for the Panel Data Regression Analysis – Firm Financial Performance

	Dependent Variables	
Variables	**ROA**	**ROI**
The percentage of stock option pay in total compensation	-0.0589** (-2.07)	0.3412* (1.90)
The percentage of stock option pay in total compensation t-1	-0.0592** (-2.09)	-0.4037** (-2.24)
The percentage of stock option pay in total compensation t-2	0.0318 (1.21)	0.0236 (0.14)
Total other compensation	-1.7759 (-1.60)	1.8971 (0.27)
Total other compensation t-1	-1.0787 (-0.90)	-2.1975 (-0.28)
Total other compensation t-2	3.2452*** (3.12)	5.1600 (0.78)
Number of observations	1656	1656
Number of groups	189	189
Wald chi2(6)	26.49	7.95
Prob > chi2	0.0002	0.2420
Legend	** p<0.10; ** p<0.05; *** p<0.01*	