



Does Executive Compensation Restrict Firm Over-investment?

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Abstract: The current study examines the impact of executives' compensation on firm over-investment. It uses the panel data of 215 USA non-financial listed firms during the period 2007-2019, and it employs an explanatory research with secondary financial data. The study outcomes show that total executives' compensation is negatively associated with over-investment. It also found an insignificant relationship between over-investment and stock awards but a significant relationship with stock options, in addition to CEO compensation significantly reducing firms' over-investments. The inverse relationship between executive compensations and over-investment is consistent with the agency cost hypothesis. Accordingly, the hypothesis that states that there is a positive relationship between executive compensation and over-investment is accepted.

Keywords: Executive Compensation, Corporate Governance, Over-investment, Shareholders, Finance.

JEL Classification: G30; G31; G32; G34

Introduction

Executive compensation and its impact on firm's investment policy has been strongly discussed in the literature since late 1970s and early 1980s up to the present days. Executive compensation includes financial compensation and non-financial benefits received by an executive from the firm due to their services to the organization.

According to the firms' ability hypothesis, executive compensation is an effective tool that can be used to motivate CEOs to select the best growth projects and reject inefficient projects, thus executive compensation packages may explain executives' ability rather than entrenchment behavior (Rose and Shepard's, 1997). Moreover, executive compensation represents an important issue for investors to consider when they are making Investment decisions that involve a tradeoff between current expenditures and future revenues. The risk of the project to undertake is the main determinant of the change in owners' wealth and manager decision. Shareholders use executive compensation to broaden the field of project investigation for manager to increase stock market performance of the company by taking more risk. The equity compensation granted to manager provide strong incentives for managers to take risky project and over-invest in the company (Strobl, 2014).

The agency theory implies that executive incentive compensation is endogenously determined (Kang et al., 2006). Shareholders design executive compensation contract ex-ante to reduce agency costs while considering the impact of incentive compensation on managers' self-interested behavior (Smith and Watts, 1992). The agency conflicts may lead to conflicting effects of executive compensation on firm's investment policy. Firms under-invest if executives are warned about adverse selection behavior and constrained by short compensation horizons. On the other hand, over-investment is linked to private benefits that executive received from additional investments (Jensen, 1986).



Non-financial corporations (NFCs) principally engage in the production of market goods and non-financial services, and their financial transactions are wholly distinct from those of their owners. Non-financial corporations can be private and public corporations, holding companies, non-profits, or associations (Fiebiger B., 2016).

The current paper aims to examine how executive compensation characteristics are associated with firm over-investments. In perfect capital markets, there would be no link between executive compensation and firm level investments (Modigliani and Miller, 1958). However, most previous studies have demonstrated that larger executive compensation is often associated with over-investment (e.g., Myers and Majluf, 1984; Fazzari et al., 1988; Hoshi et al., 1991; Whited, 1992; Hubbard, 1998). Accordingly, the study tests the following hypothesis: There is a positive relationship between executive compensation and over-investment.

The current paper is organized as follows. Section 2 presents a review of the literature linking executives' compensation and over-investments. Section 3 presents data and methodology. The discussion of empirical results discussed in Section 4. Section 5 performs some check robustness. The last section concludes.

Literature review

The connection between the firm's over-investments and executives' compensation has been the subject of several theoretical and empirical studies

Tournament theory that developed by Lazear and Rosen (1981) state that "employees are driven by the chance of a possible promotion to get an increase in salary. Top executives often receive very high salaries, which are used to motivate lower-level-executives to compete for promotions". The tournament theory also states that "individuals are more motivated if there is a possible chance of promotion. Since CEOs have already reached the highest level in the organization they have to be compensated with extra incentives. Different components of compensation can make the total compensation of managers much larger than their fixed wage". The reason for a more incentive-based executive compensation system is that it must align the incentives of executives with the interests of their companies' shareholders (Magill and Quinzii, 2005).

Jensen & Meckling (1976) state in their agency theory that "there exists a separation of ownership and control when CEOs run a company on behalf of the shareholders". Because shareholders do not have all the information that managers have it is hard for the shareholders to monitor the actions taken by the managers of the firm. If compensation is more equity based instead of a fixed salary, actions taken by the CEO will be based more on increasing firm value (Fama and Jensen, 1983).

In line with this theory Jensen and Murphy (1990) suggest that in addition to the level of compensation, the form of compensation gives CEOs the correct incentives to maximize the value of a firm. They propose that companies whose executive compensation is more equity-based perform better than companies who favor compensation in cash. of compensation and firm performance. Jensen and Murphy (1990) conclude that equity compensation is more sensitive than cash incentive to motivate shareholders' value.

Rose and Shepard's (1997) provide evidence that executive compensation scheme positively explains executives' ability rather than entrenchment purposes for a sample of 416 firms from 1985 to 1990. It is shown that in an investment that creates the marginal return, an executive with higher ability will be rewarded with a higher compensation.



Aggrawal and Samwick (2003) confirm that insiders pursue investments in response to changes in private benefits rather than to reduce their exposures to business risks. Hence, a study on Malaysia firms' compensation is interesting as founders and family members who have controlling rights may intend to expropriate private benefits from firms.

Leuz et al. (2003) find that earnings management is profound in economies with a high concentrated ownership and weak investor protection. Fan and Wong (2002) argue that large controlling owners in East Asian economies protect their private interest via incredible reporting of accounting information. They also prove that investments accelerate less informative earnings and lower cumulative market returns. However, the study does not address the issue of executive compensation.

Chakraborty et al.'s (2007) state that over-investments are linked to greater compensation, perquisites and executives' promotions. Similarly, Cassell, et al., (2006) show that long-term business investment is positively related to the weight placed on equity-based incentive. Richardson (2006) examines over-investment of free cash flow and finds that firms with the highest levels of free cash flow tend to over-invest. This is consistent with the agency cost explanation. He also finds that over-investment can be mitigated by certain corporate governance structures. In the same vein, Chen et al., (2016) argued that certain corporate governance characteristics, such as larger board of directors, seem to mitigate over-investment. On contrary, Shi (2019) found no significant effect of corporate governance mechanisms to mitigate the corporate over-investment.

Goergen and Renneboog (2011) conclude that basic salary and bonus are short-term compensation which relate to firms' size and complexities of responsibility, whilst equity compensation emphasizes long term duration which aim to address the problem of risk aversion behavior. Therefore, equity compensation emphasizes pay for performance and incentivizes them to invest for long-term value because an increase in the equity value will increase dollar per dollar payout of executives' ownership.

Chu and Song (2012) examine the inter-relationship between executive compensation, earnings management and over-investment. Authors use a sample of 196 Malaysian public listed firms. the findings show a positive endogenous relationship between executive compensation and over-investment. Measuring equity compensation in incentive ratio, for each 1% of over-investment, one percent improvement in share prices will increase 23% of executive directors' equity value. Over-investment, however, leads to a decline in executive directors' equity value in large shareholders-controlled firms. In addition, 1% of over-investment can explain 12 % of earnings management. Nevertheless, earnings management does not explain executive directors' compensation.

Manders (2012) uses the executive compensation structure of 1397 different U.S. companies between 1999-2006; in order to examine the impact of incentive compensation on performance of a company. Author finds that the level of total compensation positively effects the performance of a company, as measured by Tobin's Q. in addition to firm performance is positively related to the percentage of compensation of CEOs that is equity-based. This implies that structure rather than the level tends to have a greater impact on the performance of a company.

Eisdorfer et al (2013) examine how the similarity between the executive compensation leverage ratio and the firm leverage ratio affects the quality of the firm's investment decisions. A larger leverage gap leads to more investment distortions. Managers with more debt-like compensation components tend to under-invest, whereas managers with larger equity-based compensation engage more in over-investment. Authors argue investment distortion is likely to increase the equity (debt) value when compensation leverage is lower (higher) than firm leverage. These findings suggest that managers can deviate from an optimal investment policy to increase the value of their portfolio, and that a lower leverage gap can reduce agency costs.



From the above studies, it is ambiguous to argue that a positive relationship between executive compensation and investment is due to entrenchment effects. This is because an increment in executive compensation can also align with executives' abilities to increase investments in firms. Nonetheless, following Jensen's (1986) notion, executives have incentives to apply firms' free cash flow and invest in negative net present value investment. Similarly, Pindado and de la Torre (2009) prove that firms with a lower free cash flow will under-invest vis-à-vis firms with higher cash flow.

Data and Methodology

The study uses secondary data of sample of 215 non-financial firm CEO observations from the United States over the period 2007-2019. The data includes eleven different industries and it collected from Standard and Poor's ExecuComp database.

ExecuComp database shows that the total executive compensation is typically a mixture of salary, bonus, stock awards, option awards, inside debt and other compensations. The study excludes financial companies from the selected sample for two reasons. First, capital expenditure information is almost unavailable for financial companies and that prevent Authors from calculating the dependent variable. Second, financial companies are heavily regulated and that affect their corporate governance systems.

Consistent with Richardson (2006), the study defines Total investment (I_{total}) as the sum of capital expenditure (CAP_Exp) and acquisition expenditure ($Acquisitions$) minus the sale of property, plant, and equipment ($SalePPE$). According to Strong and Meyer (1990), Total investment is formed by two components: (1) investment expenditure to maintain assets in place ($I_{maintenance}$), and (2) investment expenditure on new projects (I_{new}). Investment expenditure on new projects can then be divided into two components: expected investment expenditure in new positive NPV projects, and abnormal (or unexpected) investment ($I_{new,t}$). The abnormal component of investment can be positive or negative. Positive values correspond to over-investment, and negative values correspond to under-investment. The relations among those components are as follows:

$$I_{total} = CAP_Exp_t + Acquisitions_t + SalePPE_t \quad (1)$$

$$I_{new,t} = I_{total,t} - I_{maintenance} \quad (2)$$

$$I_{new,t} = I^*_{new,t} + I^E_{new,t} \quad (3)$$

To test the impact of executives' compensation on over-investment, Authors use the following model.

$$I^E_{new,t} = a_0 + B_i \text{ Control_Variables} + C_i \text{ Execu_Comp_Variables}_t + E_t \quad (4)$$

Table 1 shows the descriptive statistics of all the study variables, where $Other_Comp$ represents the different compensation compounds served to Executives. $Total_Comp$ stands for total compensation. Firm size is the natural log of the firm's equity value. Cash is the amount of cash and short-term investment scaled by total assets. LEV is a financial leverage measured by book debt-to-equity ratio. ROE is Return on equity measured by net income divided by average total equity.

The table reports that, the average investment expenditure of firms is 12.07% of the total asset base, of which capital expenditure represents 8.49%. The findings indicate that 2.9% of the total investment expenditure is spent on maintaining existing assets in place and 9.1% is spent on new investments. The current statistics are different from the Chen, Sun and Xu (2015)'s findings in the United States, where 6.1% of the total investment expenditure is spent on maintaining existing assets in place and only 4.4% is spent on new investments. Regarding executives' compensation, Authors find that, CEO equity rewards exceed CEO debt rewards. The firms under study have in average board size of around 10 members. 73.5% of companies have CEO as member of the Board of director.



Table 1. Summary statistics.

	Mean	Median	Max	Min	Std. Dev.	Skew.	Kurt.	Jarque-Bera
Inv Total	0.1207	0.081	1.330	-0.325	0.262	0.465	2.879	13.45
Cap_Exp	0.0849	0.042	0.743	-0.021	0.398	7.201	9.548	37.28
Inv_Maintenance	0.0291	0.023	0.912	-0.021	0.316	1.110	3.980	23.09
Inv_New	0.0912	0.041	0.965	-0.673	0.214	8.995	14.819	54.13
Salary	0.2095	0.185	1	0.012	0.138	2.157	11.185	898.963
Bonus	0.0316	0	0.719	0	0.104	4.381	23.885	5386.593
Stock awards	0.3413	0.324	0.970	0	0.216	0.395	2.850	6.817
Option awards	0.1361	0.102	0.969	0	0.155	1.715	7.401	327.051
Inside Debt	0.0624	0	0.796	-0.405	0.133	2.409	11.018	918.897
Other Comp	0.0591	0.027	1.229	0	0.110	6.157	55.997	31084.16
Total Comp	53839	28403	46071	3425	72397	3.053	12.782	1479.661
Size	21.9295	21.531	26.665	18.406	1.620	1.302	5.203	80.082
Cash	0.2316	0.219	0.513	0.052	0.114	0.714	3.194	14.316
LEV	0.5474	1.425	34.773	0.029	6.186	0.037	18.889	1735.838
ROE	0.3223	0.183	2.842	-1.104	0.590	2.211	8.606	350.658

Table 2 reports Pearson and Spearman correlations among CEO inside debt variables, investments variables and control variable. Inside debt and total investment variable are significantly and negatively correlated. However, inside debt variables and new investments insignificantly positive correlated. Moreover, options awards are negatively correlated with total investment but positively correlated with new investment. However, the correlations between total investment and both cash and stock awards are negative but insignificant.

Table 2. Correlation matrix

	Inv_Total	Inv_New	Cash awards	Stock awards	Option awards	Inside Debt	Total_Comp	Size	Cash	LEV.	ROE
Inv New	0.342***										
Cash awards	-0.125	-0.360									
Stock awards	-0.195	0.346	-0.195								
Option awards	-0.075**	0.215***	-0.011	0.083							
Inside Debt	-0.187*	0.011	0.141	0.146	0.242						



Total Comp	-0.092	0.081	0.087	0.407	-0.050	-0.315					
Size	-0.077	-0.036	0.085	0.361	0.088	-0.405	-0.121				
Cash	-0.110**	0.235	0.034***	0.293	-0.203	-0.170	-0.214	-0.108			
Leverage	-0.130	-0.178	-0.145	-0.029	-0.157	0.312	0.157	0.044	-0.148		
ROE	-0.099	0.208	0.153	0.345	-0.181	-0.089	-0.369	-0.058	0.416	-0.064	

Values between parentheses are t-students. * Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

Empirical results discussion

The impact of total compensation on over-investment reported in table 3. The results show that over-investment is negatively associated with total compensation. The coefficient of Total Comp is negative and statistically significant at the 5% level. *Ceteris paribus*, every \$1 million increase in total compensation reduces restrict investment by 0.0176, while every \$1 million increase in total compensation of CEO reduces investment by 0.1491. The negative association between all executive compensation and over-investment is consistent with Fenn and Liang (2001). However, we are not aware of any study that documents a negative association between CEO compensation and over-investment.

This result is in line with the findings of Eisdorfer et al. (2013) who suggest that managers with high compensation tend to under-invest and deviate from an optimal investment policy to increase the value of their portfolio. This shows that executive compensation appears to mitigate agency cost since high compensation indicates that management is less likely to invest in projects which are beneficial from a management perspective but may not be good for corporate owners.

The leverage of the firm also significantly restricts over-investment. The leverage coefficient appears highly significant at a level of 1% in the case of CEO only, whereas it appears significant at 10% only when the sample groups all the executives. This result relating to leverage is explained by two main theories. First, according to the Trade-Off Theory, each company must consider in its financing policy that an excess of debt will increase the risk of the shares and the costs associated with these borrowings, and that an insufficiency of debt with respect to equity also constitutes a problem in that it would be in a situation of lack of liquidity and access to expensive financing. Thus, a balance between these two situations will define an optimal level of indebtedness that can be perceived as a target guiding the firm in its financing policies. This theory assumes the existence of an optimal lever of leverage which results from an arbitration between the tax savings generated by the deductibility of the interest charges and the financial distress costs generated by the increase of the risk of the company by taking on more debt. Such imperfections mean that the firm's level of investment will be affected by the optimal level of debt appropriate to each firm.

Secondly, according to the agency's theory, the level of leverage is among the solutions proposed to solve the agency problems that exist within the company, and that be a governance mechanism forcing managers to honor their commitments by paying cash to bondholders, so debt financing reduces the opportunistic behavior of managers, since any default in the payment of debt will automatically lead to bankruptcy of the firm. As a result, Diamond (1984) believes that the agent has an interest in increasing the debt in order to optimize its control over the agent's management activity. Also, the payment of fixed-term interest on the debt reduces the possibility of sub-optimal investment for the manager who will not find enough free cash flow.



In line with Eisdorfer et al., (2013) the results show that firm size has significant impact on firm over-investment. The impact of size appears more significant for CEO only. Where a small and growth firms tend to invest more than large, mature firms with fewer growth opportunities. The effect of cash is negative but insignificant.

Table 3. Total compensation and over-investment.

		All Executives			CEO only		
		Model (1)	Model (2)	Model (3)	Model (1)	Model (2)	Model (3)
Total Comp	-			-0.0176**			-0.1491**
				(2.027)			(2.632)
Size	+	-0.9891***	-0.3974***	-0.1521***	-0.2161***	-0.4451***	-0.0523***
		(2.122)	(3.082)	(3.717)	(6.062)	(6.475)	(11.095)
Cash	+	-0.4591	-0.0731	-0.5659	0.0170	0.5731	-0.0091
		(2.710)	(0.310)	(0.123)	(0.052)	(0.037)	(0.249)
LEV	-	-0.0042*	-0.0017	-0.4560	-0.0162**	-0.6497***	-0.0996***
		(1.352)	(0.705)	(0.322)	(2.084)	(3.747)	(4.042)
ROE	+	-0.0291	0.0048	-0.6114	0.0320	0.0291	-0.7525
		(0.055)	(0.004)	(0.167)	(0.068)	(0.032)	(0.054)
R ²		0.518	0.510	0.518	0.520	0.521	0.522

Robustness checks

In order to assess the robustness of the results, Authors test the impact of executive compensations on over-investment and under-investment. Consider the structure of firms’ investments, first identifying the residuals, and then considering the top one-third sample as over-investment firms and the bottom one-third sample as under-investment firms. Table 4 shows the results of the tests of difference in mean and median between the two sub-samples.

Table 4. Descriptive statistics between over-investment firms and under-investment firms.

	Mean		t	Median		Wilcoxon Z
	Over-investment	Under-investment		Over-investment	Under-investment	
Cash awards	0.1895	0.214	3.05***	0.1791	0.1934	2.36**
Stock and option awards	0.2911	0.1736	0.02	0.1497	0.1681	0.05
Inside Debt	0.0719	0.0622	5.17***	0.042	0.061	3.46**
Total Comp	54821	42715	4.18***	53296	42065	2.73
Size	23.78	24.599	3.45***	21.264	34.198	3.83**
Cash	0.315	0.217	0	0.265	0.203	0.07
Leverage	0.5821	0.4718	-1.61*	0.4629	0.4687	-0.69
ROE	0.3102	0.2459	0.02	0.2941	0.2251	0.05



Table 5 presents the regression results of the two sub-samples. The regressions largely confirm the results on the impact of executive compensation on over-investments. The comparison between the impact of executives' compensation on over-investment firms and under-investment firms shows that the size affects significantly and negatively over-investment and under-investment. The impact on over-investment seems greater. The leverage shows negative and significant impact on over-investment. However, the leverage effect does not appear to be significant on under-investment.

Regarding the effect of executives' compensation on under-investment and over-investment, the table shows that total executive compensation significantly affects the under-investment and over-investment. Inside debt show opposite impact on over-investment and under-investment. In line with previous regressions, inside debt significantly decreases over-investments. The impact of Inside appears to affect positively under-investment at 10% level. Stock and option rewards have opposite impact on under-investment, but the impact on under-investment is not significant.

Table 5. Impact of Executives' compensation on over-investment firms and under-investment firms

		Over-investment			
		Model (1)	Model (2)	Model (3)	Model (4)
Size	+	-0.1671***	-0.2539***	-0.1844***	-0.1213***
		(-3.183)	(-3.290)	(-3.402)	(-3.953)
Cash	+	-0.0281	-0.0183	-0.0142	-0.0146
		(-0.042)	(-0.002)	(-0.398)	(-0.981)
Leverage	-	-0.0013*	-0.0024	-0.0018	-0.0018**
		(-1.543)	(-0.293)	(-0.045)	(-1.891)
ROE	+	-0.0019	0.0082	-0.0073	-0.0039
		(0.002)	(0.981)	(0.322)	(0.237)
Total Comp	-	-0.0826***			
		(-3.086)			
Cash awards			-0.0396**		
			(-2.534)		
Stock and Option awards				-0.0237*	
				(-1.69)	
Inside Debt					-0.2918***
					(-4.190)
R ²		0.516	0.528	0.520	0.492
		Over-investment			
		Model (1)	Model (2)	Model (3)	Model (4)
Size	-0.0328***	-0.0245***	-0.0239***	-0.0183***	
	(-4.090)	(-5.288)	(-6.213)	(-5.042)	
Cash	-0.0541	0.0321	-0.0194	-0.0032	



	(-0.007)	(0.000)	(-0.002)	(-0.004)	
Leverage	-0.0203	-0.0032	-0.0049	-0.0531	
	(-0.694)	(-0.708)	(-0.910)	(-0.321)	
ROE	0.0018	0.0027	-0.0084	0.0065	
	(0.577)	(0.083)	(0.002)	(0.032)	
Total Comp	-0.0718**				
	(-2.571)				
Cash awards		-0.0825**			
		(-2.729)			
Stock and Option awards			0.0942		
			(-0.384)		
Inside Debt				0.0251*	
				(-1.603)	
R ²	0.524	0.514	0.518	0.520	

Conclusions

Using the data of 215 US non- financial companies from 2007 to 2019 in order to examine how executives’ compensation affects over-investment in the firm. In line with the agency theory, we showed that companies’ over-investment decreases with the magnitude of executives’ compensation. The current paper contributes to the literature by analyzing the relationship between executives’ compensation and over-investment. Although there is extensive literature focusing on the separate impact of executives’ compensation on investment, studies examining the impact on over-investment are limited. Authors checked the robustness of results by examining both over-investment and under-investment. The results of the study indicate that the hypothesis which states that there is a positive relationship between executive compensation and over investment is accepted.

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