

An investigation on the effect of the corporation governance structure and free cash flow on over- investment

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ABSTRACT

This study examines the impact of corporate governance structure and free cash flow on over-investment on 121 firms listed in Tehran Stock Exchange over the period 2008-2011. To measure over-investment, free cash flow and corporate governance variables based on available information reported on financial statements are gathered and using cross section regression method, different hypotheses of the survey are examined. The results indicate that among corporate governance mechanisms investigated in survey, there is a significant relationship between percentage of non-executive directors and ownership concentration with over-investment. However, there was no meaningful relationship among controlling shareholders and duality with over-investment. Furthermore, a significant relationship between free cash flow and over-investment has been found.

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1. Introduction

One of the primary concerns on stock market evaluation is to find suitable method for evaluating firms and there are literally different studies on firm evaluation and growth (Devine, 1983; Beneda, 2003; Lian & Cheng, 2007; Kildegaard, 2008). Richardson (2006) for instance, investigated the extent of firm level over-investment of free cash flow and reported that over-investment was concentrated in companies with the highest levels of free cash flow. Further investigation examined whether firms' governance structures were associated with over-investment of free cash flow or not. The evidence recommended that certain governance structures, such as the presence of activist shareholders, seemed to mitigate over-investment.

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Xuesong et al. (2007) performed an empirical investigation on over-investment behavior and its restriction systems in China's listed companies. The results show that there were over-investment behaviors in China's listed firms. In addition, cash dividends and liabilities were effective restriction systems on over-investment behavior. In general, corporate governance could restrict over-investment behavior. However, independent directors had no impacts on over-investment behavior. McMahon (2003) performed an exploratory study of under and over-investment amongst manufacturing SMEs from Australia's business longitudinal survey. They found some issues concerning the forms of manufacturing SME in terms of two disengagement configurations emerged in recent empirical development taxonomies for SMEs. Tao (2007) investigated the issue of corporate governance and over-investment of listed companies in China. Annual general meetings (AGMs) play essential role on corporate governance in the United Kingdom. Apostolides (2010) provided an analysis of AGMs and recommended different ways of making the event more effective from a stakeholder viewpoint such as providing a well balanced and independent range of skills and backgrounds on the board, accompanied by fair remuneration and reward schemes for the directors.

2. The proposed study

This study examines the impact of corporate governance structure and free cash flow on over-investment on 121 firms out of 389 listed firms in Tehran Stock Exchange over the period 2008-2011. To measure over-investment, free cash flow and corporate governance variables based on available information reported on financial statements are gathered and using cross section regression method, different hypotheses of the survey are examined.

2.1. Free cash flow

Free cash flow in this study is calculated as follows,

$$\text{Free cash flow} = \text{operating cash flow} - \text{capital expenditure} - \text{dividend}.$$

2.2. Over-investment

In order to calculate over-investment, we first need to calculate new investments $I_{\text{new},t}$, which is calculated through the following regression model

$$I_{\text{New},t}^* = \alpha + \beta_1 Q_{t-1} + \beta_2 \text{Leverage}_{t-1} + \beta_3 \text{Cash}_{t-1} + \beta_4 \text{Age}_{t-1} + \beta_5 \text{Size}_{t-1} + \beta_6 \text{Stock Returns}_{t-1} + \beta_7 \text{INew}_{t-1} + \varepsilon \quad (1)$$

where $I_{\text{new},t}$ is the investment appears in future, Q is the growth opportunities, Tobin Q , which is calculated as follows,

$$Q = \frac{\text{Market value} + \text{Net debt values}}{\text{Net asset values}}.$$

In addition, *Leverage* is the ratio of total liabilities to total assets, *Cash* represent total available cash, *Age* represents natural logarithm of the number of years the shares of the firm were traded on stock exchange, *Size* denotes the natural logarithm of total assets, *Stock Return* represents the return of firms, *INew_{t-1}* represents the previous year's new investments.

2.3. Corporate Governance

The proposed study of this paper uses the following regression model,

$$OI_{i,t} = \beta_1 + \beta_2 \text{FCFF}_{i,t} + \beta_3 \text{BIND}_{i,t} + \beta_4 \text{BLOCK}_{i,t} + \beta_5 \text{CONTROL}_{i,t} + \text{DUAL}_{i,t} + \varepsilon, \quad (2)$$

where BLOCK is a dummy variable, which is equal to one if institutional investors hold more than 5% of total investment and 0, otherwise. In addition, CONTROL is another dummy variable, which is equal to one if an investor holds over 50% of the investment and zero, otherwise. DUAL is the next dummy variable, which is one if managing director is acting as chief executive simultaneously and zero, otherwise. Finally, BIND is the ratio of the number of non-duty members of the board of directors on total number of directors.

The proposed study of this paper considers the following five hypotheses,

1. There is a meaningful relationship between BIND and over-investment.
2. There is a meaningful relationship between BLOCK and over-investment.
3. There is a meaningful relationship between CONTROL and over-investment.
4. There is a meaningful relationship between DUAL and over-investment.
5. There is a meaningful relationship between FFCF and over-investment.

Table 1 demonstrates the summary of some basic statistics.

Table 1
The summary of some basic statistics

Statistics	$RET_{i,t-1}$	$SIZE_{i,t-1}$	$AGE_{i,t-1}$	$CASH_{i,t-1}$	$LEV_{i,t-1}$	$Q_{i,t-1}$	$I_{i,t-1}$	$I_{i,t}$
Mean	2.006083	13.28335	2.492617	0.032279	0.670322	4.745318	1.073610	0.678890
Median	0.380000	13.04376	2.484907	0.020219	0.656229	1.336609	0.035138	0.035367
Std. Dev.	12.49473	1.574960	0.637678	0.034493	0.341803	20.02128	11.00755	5.940940
Skewness	2.165369	0.800637	-0.116805	2.781021	2.584761	17.62807	17.30307	17.75449
Kurtosis	22.88949	4.172159	2.842776	16.96638	16.70249	370.1665	329.5957	352.5077
Jarque-Bera	10445.00	99.27136	1.998837	5696.987	5406.739	3429701.	2719029.	3111124.
Sig.	0.000000	0.000000	0.368093	0.000000	0.000000	0.000000	0.000000	0.000000
N	605	605	605	605	605	605	605	605

In order to perform regression analysis, the study needs to find out whether the data are normally distributed or not. Fig. 1 demonstrates the residual of different variables, which indicate the normality of parameters.

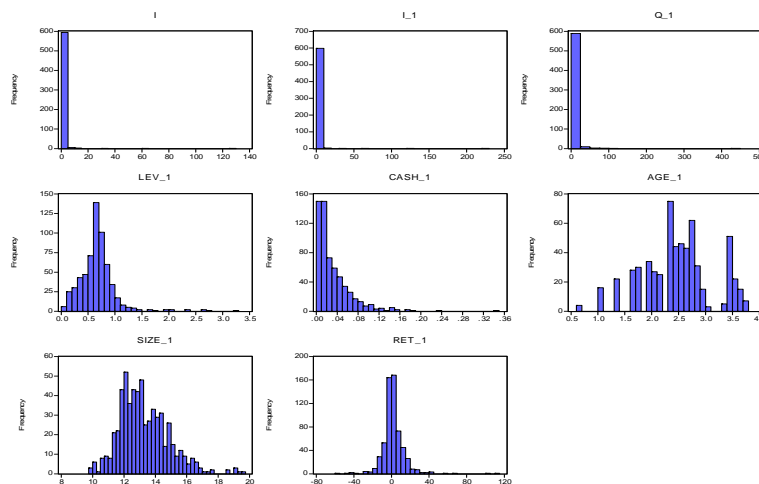


Fig. 1. The plot of residuals

The study also needs to make sure that there was no strong correlation among any pairs of independent variables. Table 2 demonstrates the results of our survey.

Table 2
The results of correlation among different pairs of variables

	$I_{i,t}$	$I_{i,t-1}$	$Q_{i,t-1}$	$LEV_{i,t-1}$	$CASH_{i,t-1}$	$AGE_{i,t-1}$	$SIZE_{i,t-1}$	$RET_{i,t-1}$
$I_{i,t}$	1.000000							
Sig.	-----							
$I_{i,t-1}$	0.009154	1.000000						
Sig.	0.8222	-----						
$Q_{i,t-1}$	-0.004986	0.006664	1.000000					
Sig.	0.9026	0.8701	-----					
$LEV_{i,t-1}$	0.055219	-0.007111	0.093185	1.000000				
Sig.	0.1750	0.8614	0.0219	-----				
$CASH_{i,t-1}$	-0.025708	0.010460	0.014590	-0.063225	1.000000			
Sig.	0.5280	0.7974	0.7202	0.1203	-----			
$AGE_{i,t-1}$	-0.007047	0.045928	0.022462	-0.083416	0.042200	1.000000		
Sig.	0.8627	0.2594	0.5814	0.0403	0.3001	-----		
$SIZE_{i,t-1}$	-0.048391	0.003709	-0.198407	-0.134381	-0.156756	0.179274	1.000000	
Sig.	0.2346	0.9275	0.0000	0.0009	0.0001	0.0000	-----	
$RET_{i,t-1}$	-0.021095	-0.000536	0.040029	-0.076030	0.045610	-0.002125	0.027455	1.000000
Sig.	0.6046	0.9895	0.3256	0.0616	0.2627	0.9584	0.5003	-----

The results of Table 2 show that there are not strong correlations between any pairs of data when the level of significance is five percent and we may perform the regression analysis.

3. The results

In this section, we present details of our survey on testing various hypotheses of the survey. First, we present the results of regression analysis on Eq. (1). Table 3 demonstrates the results of our survey.

Table 3
The results of regression analysis for the first model

Variable	β	Standard error	t-student	P-value
C	0.2723	0.070387	3.8686	0.0001
$Q_{i,t-1}$	-4E-04	0.000328	-1.22	0.2232
$LEV_{i,t-1}$	0.1638	0.059892	2.7344	0.0065
$CASH_{i,t-1}$	-0.944	0.277017	-3.408	0.0007
$AGE_{i,t-1}$	0.022	0.012886	1.7035	0.0891
$SIZE_{i,t-1}$	-0.017	0.004813	-3.545	0.0004
$RET_{i,t-1}$	-3E-04	0.001157	-0.238	0.8117
$I_{i,t-1}$	0.0052	0.002494	2.078	0.0382
$AR(1)$	0.0041	0.000328	12.361	0

F-value = 3.086 Sig. = 0.002 Durbin-Watson = 2.079 Adjusted R-Square = 0.19 Jarque-Bera = 753.33 Sig. = 0.000 F-Limer = 1.056

Next, we present the results of regression model for the second model. Table 4 shows the results of some basic statistics.

Table 4
The results of some basic statistics on the second model

Statistics	$DUAL_{i,t}$	$CONTROL_{i,t}$	$BLOCK_{i,t}$	$BIND_{i,t}$	$FCFF_{i,t}$	$OI_{i,t}$
Mean	0.089974	0.334190	0.987147	0.614396	0.504420	0.479054
Median	0.000000	0.000000	1.000000	0.600000	0.009079	0.062257
Std. Dev.	0.286513	0.472314	0.112787	0.163715	5.564294	6.454798
Skewness	2.865860	0.703021	-8.649452	-0.111910	8.912527	19.25929
Kurtosis	9.213156	1.494238	75.81302	2.648828	119.1951	376.4506
Jarque-Bera	1158.181	68.79257	90782.68	2.810799	223983.4	2284549.
Sig.	0.000000	0.000000	0.000000	0.245269	0.000000	0.000000
N	389	389	389	389	389	389

Our survey indicates that there are not strong correlations among different pairs of variables. Therefore, we could present details of our findings on performing regression analysis on Eq. (2). Note

that we have examined different types of regression techniques and Table 5 shows details of six different methods.

Table 5

The results of regression analysis for the second model of the survey

		1 st model	2 nd model	3 rd model	4 rd model	5 th model	6 th model
<i>C</i>	Coefficient	0.268477	0.272410	-0.060269	0.679954	0.521904	0.161066
	Sig.	(0.1488)	(0.0001)	(0.0000)	(0.2263)	(0.2111)	(0.3818)
<i>FCFF_{i,t}</i>	Coefficient	0.629090	0.839978	0.591928	-0.005630	-0.004905	0.478696
	Sig.	0.0001	(0.0000)	(0.0000)	(0.3921)	(0.4003)	(0.3542)
<i>BIND_{i,t}</i>	Coefficient		-0.476102				-0.381839
	Sig.		(0.0000)				(0.3837)
<i>FCFF_{i,t} × BIND_{i,t}</i>	Coefficient		-2.512934				-0.202325
	Sig.		(0.0000)				(0.2590)
<i>BLOCK_{i,t}</i>	Coefficient			-0.784403			0.841285
	Sig.			(0.0000)			(0.1947)
<i>FCFF_{i,t} × BLOCK_{i,t}</i>	Coefficient			-0.247945			-0.373660
	Sig.			(0.0000)			(0.3837)
<i>CONTROL_{i,t}</i>	Coefficient				-0.573390		-0.646161
	Sig.				(0.2749)		(0.2246)
<i>FCFF_{i,t} × CONTROL_{i,t}</i>	Coefficient				0.001314		-0.075890
	Sig.				(0.8860)		02703
<i>DUAL_{i,t}</i>	Coefficient					-0.380335	-0.462823
	Sig.					(0.2584)	(0.2240)
<i>FCFF_{i,t} × DUAL_{i,t}</i>	Coefficient					-0.127452	-0.171235
	Sig.					0.4156	(0.7135)

For all models, all necessary statistics such as F-value, Durbin-Watson, Jarque-Bera are within acceptable limits and we can examine the hypotheses of the survey based on the results of different types of regression model presented in Table 5.

3. The results

In this section, we present details of our findings on testing various hypotheses of the survey.

3.1. The first hypothesis: The relationship between BIND and over-investment

The first hypothesis of this survey investigates the relationship between BIND and over-investment. Based on the results of Table 5 we have $\beta = -0.476102$, $p\text{-value} = 0.0000 < p_c = 0.05$, $t = 5.7252 > t_c = 1.96$.

Therefore, we can conclude that there was a meaningful and negative relationship between BIND and over-investment and the first hypothesis of this survey is confirmed.

3.2. The second hypothesis: The relationship between BLOCK and over-investment

The second hypothesis of this survey investigates the relationship between BLOCK and over-investment. According to Table 5 we have $\beta = -0.784$ $P\text{-value} = 0.00 < p_c = 0.05$ $t = 4.298070 > t_c = 1.96$.

Therefore, we can conclude that there was a meaningful and negative relationship between BLOCK and over-investment and the second hypothesis of this survey is confirmed.

3.3. The third hypothesis: The relationship between CONTROL and over-investment

The third hypothesis of this survey investigates the relationship between CONTROL and over-investment. According to Table 5 we have $\beta = -0.57$, $P\text{-value} = 0.2749 > p_c = 0.05$, $t = -1.093415 < t_c = 1.96$.

Therefore, we can conclude that there was not any meaningful relationship between CONTROL and over-investment and the third hypothesis of this survey is not confirmed.

3.4. The fourth hypothesis: The relationship between DUAL and over-investment

The fourth hypothesis of this survey investigates the relationship between DUAL and over-investment. According to Table 5 we have $\beta = -0.38$ P-value = 0.2584 $> p_c = 0.05$ $t = 0.336032 < t_c = 1.96$. Therefore, we can conclude that there was not any meaningful relationship between DUAL and over-investment and the third hypothesis of this survey is not confirmed.

3.5. The fifth hypothesis: The relationship between FFCF and over-investment

The first hypothesis of this survey investigates the relationship between FFCF and over-investment. Based on the results of Table 5 we have $\beta = 0.629$ P-value = 0.0001 $< p_c = 0.05$ $t = 3.979 > t_c = 1.96$. Therefore, we can conclude that there was a meaningful and negative relationship between FFCF and over-investment and the first hypothesis of this survey is confirmed.

4. Conclusion

We have examined the effect of corporate governance structure and free cash flow on over-investment on selected firms listed in Tehran Stock Exchange over the period 2008-2011. The results have indicated that among corporate governance mechanisms investigated in survey, there was a significant relationship between percentage of non-executive directors and ownership concentration with over-investment. However, there was no meaningful relationship among controlling shareholders and duality with over-investment. Furthermore, a significant relationship between free cash flow and over-investment has been found.

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