Board Characteristics and Managerial Overconfidence in an Emerging Market

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ABSTRACT

This research investigates the relationship between board characteristics and managerial overconfidence of 107 listed companies in Tehran Stock Exchange during 2006-2012. In addition, financial data of the year 2005 have been used to calculate research variables. Furthermore, in order to examine the hypotheses, the research uses pooled/panel regression and ML-binary logit model. Capital expenditure and overinvestment on assets criteria have been used to measure managerial overconfidence, and board size, board independence (BI) and CEO duality have been considered as board characteristics. The findings indicate that only BI has negative and significant effect on managerial overconfidence. Besides, firm age as control variable has a direct and significant effect on capital expenditure.

Keywords: Board Size, Board Independence, CEO Duality, Managerial Overconfidence, Capital Expenditure, Overinvestment on Assets
JEL Classifications: D03, G32

1. INTRODUCTION

During last years, an increasing attention has been paid to the importance of different features of corporate governance as a supervising mechanism in order to control the managers` authorities. Most of investors and law drafters believe that some features of corporate governance, such as presence of unbound members in board or independence of board members, incorporate to maintenance of stockholders' rights, and decrease the conflicts between their interests and management`s interests (Sulong and Nor, 2010). The corporate governance is results from conflicts of interest between individuals in company structure.

Chairman of the board is the one in charge to hold and direct board meetings. In many countries, CEO is simultaneously the chairman of the board. For instance, in 70-80% of American countries, CEO and chairman of the board are the same person. While, current corporate governance procedures in Europe have separated these two positions, and only in 10% of British companies CEO and chairman of the board are the same one (Coles et al., 2001). In Asia situation is mixed.

In theoretical perspective, when CEO has the chairman of the board position too, there would be conflicts of interests. Moreover, in such a case, supervision performance of board of directors decreases. Combining CEO and chairman of the board positions indicates lack of separation of control and management (Fama and Jensen, 1983).

Overconfidence is an important modern financial, behavioral concepts, which has a special position in financial and psychological theories. Overconfidence causes that individual overestimates his knowledge and skills, and feels that he has control over problems and events, which may not be true (Nofsinger, 2001).

Issue of "irrationality" of management resulting from behavioral biases of executive managers is a great challenge in corporate governance literature. The role of corporate governance mechanisms in traditional literature of corporate governance results from agency costs, information asymmetry, and their impact on corporate decisions. After the emergence of managerial overconfidence, their roles should be in line with controlling such behavioral biases and limiting their potential effects on company's strategies (Baccar et al., 2013).

Heaton (2002) uses optimist term for those who systematically overestimate the profitability resulting from good companies and underestimate the profitability resulting from weak companies. Previous researches indicate that managerial overconfidence affect investment, financing and dividend policies of companies (Malmendier and Tate, 2005; Cordeiro, 2009; Deshmukh et al., 2010; Malmendier et al., 2011; Hirshleifer et al., 2012). Reviewing the impact of managerial overconfidence on company policies such as accounting policies is very important; because, managerial overconfidence may lead to decisions which destroy company's value. Any disturbance in investment, financing and accounting activities may be costly (Malmendier and Tate, 2005; 2008; Ben-David et al., 2010). On the other hand, managerial overconfidence in some cases can lead to some interests for company. For example, risk-taking motivation has lower costs for overconfident directors than other directors (Gervais et al., 2011; Campbell et al., 2011). According to above-mentioned issues, this research is aimed to answer the following questions:

1. Do board features (if assumed as rational) affect managerial overconfidence issue?
2. Is the impact of board features on managerial overconfidence positive or negative? It is assumed that if board members behave rational, it is negative.
3. Which one of board features has a better effect in prevention of managerial overconfidence?

In this study, we examine Iran, a developing country with characteristics different from other countries, including emerging markets like China and Malaysia. Numerous factors motivate us to select Iran for this study. Iran is located in the Middle East, a politically troubled and unstable region of the world. Iran is an Islamic country; whereby it's social and business activities are based on a strict interpretation of Shariah (religious laws). The Iranian Revolution has altered its people's vision of social values and business concepts. For instance, collectivism as defined by Hofstede (1980) and the welfare of society are more important than individual needs and satisfaction. Both the Islamic faith and the revolution have changed the culture of business objectives in Iran, (Mashayekhi and Bazaz, 2008). Corporate governance in Iran appears to optimize the interests of a broader group of stakeholders rather than just maximizing the interests of shareholders. Unlike the UK and US, but similar to Germany, France, and Japan, however, in a stronger form, Iran's main objective of the corporation does not appear to be creating wealth for the shareholders (Allen, 2005). Thus, Iran is a good testing ground to examine whether corporate governance influences managerial overconfidence in a market where a religious-based central government has a significant role.

2. RESEARCH LITERATURE AND DEVELOPMENT OF HYPOTHESES

2.1. Theoretical Basics
Overconfidence is well-known and documented phenomenon in psychology. Psychologists define overconfident individuals as those who believe their knowledge is very precise. On Hvide's opinion, psychological articles have provided two definitions for overconfidence. First, individuals overestimate their capabilities. Second, individuals assume an event more certain that what it really is. To ensure board effectiveness, selecting unbound members is recommended. Assemblies shall assign enough unbound members so that they can judge independently when there is potential possibility of conflicts in interests. Some examples of such key responsibilities include: Ensuring the health of financial and non-financial reporting, reviewing the transactions with dependent individuals, introducing board candidates and executive managers, and decision-making about board salaries (OECD, 2004). Briefly, it is expected that unbound board members are aware supervisors of management performance and behaviors, so it is expected that there is a negative relationship between board independence (BI) and managerial overconfidence. On theoretical perspective, when CEO is in the position of chairman of the board, there is a conflict in interests. Moreover, supervision performance of board decreases. Combination of CEO and chairman of board indicates lack of separation of control and supervision (Fama and Jensen, 1983).

2.2. Research History
Malmendier and Tate (2005) after mentioning the potential role of corporate governance mechanisms specially on managerial overconfidence, recommended that corporate governance should pay attention to bad role of this behavioral bias in company's policies.

Raheja (2005) states that unbound managers have better independent supervision on managers but they are less aware of company.

Malmendier and Tate (2008) found out those individual features of managers, especially managerial overconfidence, lead to some deviations in investment decisions and such optimistic managers have more investment sensitivity to free cash flows especially in joint stock corporations. The results indicated that overconfident managers prefer financing through debt comparing to stock publication.

Bebchuk et al. (2009) believe that duality of CEO responsibility leads to weakness of corporate governance and increases conflicts in interests. So, duality of CEO responsibility may lead to increase in managerial overconfidence.

Deshmukh et al. (2010) concluded that overconfident managers distribute lower cash profit if they need more investments in future, because they believe that foreign financing is costly. They also concluded that this negative relationship is more intense in companies with lower growth opportunity and lower cash.

Huang et al. (2011) believe that managerial overconfidence is only effective in companies with high agency conflicts. They believe that an optimized structure of corporate governance can decrease or remove the effects of behavioral biases resulting from managerial overconfidence.

Wei et al. (2011) examined the impact of managerial overconfidence on decisions about debt due date structure in Chinese companies. The results indicated that oneness of CEO and chairman of the board positions as a variable of managerial overconfidence, leads to weaker debt due date structure.

Hribar and Yang (2011) believe that managerial overconfidence may lead to unintentional incorrect presentation of financial statements, because overconfident managers believe in unreal, optimistic assumptions in current accounting.

Kramer and Liao (2012) used measurement criteria for managerial overconfidence presented by Malmendier and Tate (2005; 2008), reviewed the impact of managerial overconfidence on analysts` perspectives. The results indicated that analysts consider profits of companies with overconfident managers optimistically.

Johansson and Olvebrink (2013) review 375 cases of acquirement with overconfidence in 2000-2007 time span in Sweden, concluded that unbound board (BI) lead to decrease in CEO's overconfidence. While, duality of CEO responsibility has no significant impact on managerial overconfidence.

Baccar et al. (2013) concluded that board features such as BI, low members of board, and lack of CEO duality lead to decrease in behavioral biases including managerial optimism and overconfidence. They believe that results of this study incorporate in corporate governance literature, because it can be the basic of modern role of corporate governance as an strong factor in removing or decreasing company's diversion decisions based on behavioral factors except for traditional role of corporate governance.

Ahmed and Duellman (2013) believe that overconfident managers overestimate the return resulting from company's investments. So, they predict that overconfident managers intend to delay in loss recognition and; in general, they have lower conditional conservatism in accounting. For instance, a weak project with negative current value may be assumed as a project with positive current value by overconfident managers, and it leads to delay in recognition of project's losses. Moreover, overestimate of future returns resulting from projects may cause that overconfident managers overestimate the value of assets such as inventories, receivable accounts and non-current assets, which leads to decrease in unconditional conservatism.

Hribar and Yang (2015) reviewed the relationship between management overconfidence and predictions by managers. The results indicated that overconfidence increases the possibility to perform predictions by managers, optimism level in predictions and accuracy and predictions.

2.3. Development of Hypotheses

As explained, this research aims to clarify the impact of board features on managerial overconfidence in companies listed in Tehran stock exchange; so, based on above-mentioned literature, research hypotheses include:
1. The impact of number of board members on managerial overconfidence is positive
2. BI leads to decrease in managerial overconfidence
3. CEO duality has a positive and significant impact on managerial overconfidence.

3. RESEARCH METHODOLOGY

3.1. Research Population and Sample

Research population includes total companies listed in Tehran stock exchange in 2005-2012 time spans, which have below qualifications:
1. They have been listed in Tehran stock exchange up to end of March, 2004, and their fiscal year ends in March
2. They have not changed their fiscal year during research time span
3. They have been active in research time span and their stocks have been traded
4. They have provided financial information required by this research in 2005-2012 time span
5. They are not investment companies, banks or financial intermediates.

It should be mentioned that information regarding 2005 has been only used in calculation of research variables.

According to above-mentioned qualifications, 107 companies were selected as sample.

3.2. Measurement of Variables

In order to test the hypotheses, the variables have been divided into three groups: Independent, dependent, and control variables.

3.2.1. Independent variables

Research independent variables are board features which include below items:
1. Board size (BS): This variable equals to the number of total members of board at the end of fiscal year.
2. BI: It is calculated through unbound board members to total board members ratio at the end of fiscal year.
3. Duality of CEO: It is a dummy variable. If CEO and chairman of the board are the same person, it is equal to 1, unless it is equal to 0.

3.2.2. Dependent variable

Dependent variable is managerial overconfidence index that have been calculated based on two criteria (Malmendier and Tate, 2005 and 2008; Ben-David et al., 2010):
1. Capital expenditures: It is a dummy variable. If investment (net value paid for purchase of fixed assets and other investments mentioned in cash flow) to total assets of previous year in a company is more than average of this ratio in relevant industry, it is equal to 1 and otherwise it is equal to 0.
2. Overinvestment in assets: This variable is calculated from residuals of regression model of assets growth on sales based on year-industry and according to the following model:

$$AG_{it} = \beta_0 + \beta_1 * SG_{it} + \varepsilon_{it}$$

In which:
SG_{it} = Sales growth at the end of fiscal year t for company I
AG_{it} = Assets growth at the end of fiscal year t for company I
E_{it} = Regression residuals at the end of fiscal year t for company

I positive value of these residuals indicates overinvestment in assets.

Methods of calculation of sales growth and assets growth are:
$$SG_{it}=(S_{it}-S_{it-1})/S_{it-1}$$

$$AG_{it}=(TA_{it}-TA_{it-1})/TA_{it-1}$$

In which:
S_{it} = Sales amount at the end of fiscal year t for company I
S_{it-1} = Sales amount at the end of fiscal year $t-1$ for company I
TA_{it} = Amount of total assets at the end of fiscal year t for company I
TA_{it-1} = Amount of total assets at the end of fiscal year $t-1$ for company I.

3.2.3. Control variables
The following control variables have been used as other factors affecting managerial overconfidence:
1. Firm age: This variable is based on the number of years of activity of the company since its establishment in research time span.

3.3. Method of Data Analysis and Testing the Hypotheses
In this research, pooled/panel regression model have been used to test research hypotheses (Baccar et al., 2013):

$$MOC_{it}=\beta_0+\beta_1*BS_{it}+\beta_2*BI_{it}+\beta_3*Duality_{it}+\beta_4*FirmAge_{it}+\varepsilon_{it}$$

In which:
MOC_{it} = Managerial overconfidence index at the end of fiscal year t for company I, for calculation of which two criteria have been used: (1) Capital expenditures; (2) overinvestment in assets.
BS_{it} = Board size of company I at the end of fiscal year t;
BI_{it} = Board independence of company I at the end of fiscal year t;
$Duality_{it}$ = CEO duality of company I at the end of fiscal year t;
$FirmAge_{it}$ = Age of company I at the end of fiscal year t;
E_{it} = Regression residual of company I at the end of fiscal year t.

It should be mentioned that before estimation of regression models (overinvestment in assets as managerial overconfidence index), an appropriate pattern was selected to test research hypotheses. First, pooled data model were selected against panel data model using F-Limer test. If possibility of F-test is less than significance level of 5%, using pooled data model is rejected otherwise, using pooled data model is appropriate.

If pooled data model is not selected against panel data model, Hausman test has been used to select combinational fixed affects pattern against combinational random effects pattern. If possibility of Hausman test is less than significance level of 5%, there is no enough reason to reject fixed effects pattern, and fixed effects pattern shall be used to test the mentioned hypothesis, otherwise, random effects pattern is used.

Moreover, if capital expenditures are used as managerial overconfidence index, regression analysis of Logit-binary

maximum likelihood is used; because in this condition research dependent variable (managerial overconfidence) is dummy variable. In maximum likelihood models of Logit-binary, determination coefficient of McFaden and likelihood ratio (LR) test are used to determine the significance of total regression. It should be mentioned that determination coefficient of McFaden in regression model of Logit-Binary maximum likelihood is equal to determination coefficient in normal regression. Logistic regression model is similar to normal regression, the only difference is that coefficients estimation method is not the same. In logistic regression model the possibility of an event is maximized instead of minimizing square errors. The most important feature of logistic regression model is that it does not need to establish assumptions of normality and homogeneity of covariance matrices.

So, the estimation can be chosen through different tests. After selection of appropriate model, it should be ensured that time series are stable and regression is not false (Baltagi, 2005). Jarque-Bera test is used to determine the normality of research variables in EViews 6, so that if possibility of mentioned test for a variable is more than 5%, the distribution of that variable is normal, otherwise, it is not normal.

4. RESULTS

4.1. Access of Variables Stability
The results regarding stability test of research variables are presented in Table 1. According to unit root test in type of Levin, Lin and Chu test, since P < 5%, total research variables have been stable during research period. Stability means that variables average and variance and also variable covariance have been stable during time. It should be mentioned that performing stability test for dummy variables of capital expenditures and CEO duality is unclear; so, it is not presented. Moreover, performing stability test for firm age variable cannot be performing due to its procedures.

4.2. Descriptive Statistics
Descriptive statistics of research variables are presented in Table 2. By comparing coefficient of changes of different criteria of determination of managerial overconfidence in research period, it is concluded that among mentioned variables, capital expenditure variable has had the lowest coefficient of changes and dispersion, and subsequently highest level of stability. It indicates that capital expenditures variable has more reliability in determination of managerial overconfidence in research period.

Table 1: Variables stability test in research time period

Test type	Levin, Lin and Chu test	Possibility of Levin, Lin and Chu
Variables		
Dummy variable of capital expenditures	-	-
Overinvestment	−19.06	0.0000
BS	−9.58	0.0000
BI	−11.38	0.0000
Dummy variable of CEO duality	-	-
Firm age	-	-

BS: Board size, BI: Board independence

Table 2: Descriptive statistics of research variables

Criteria	Number	Average	Maximum	Mean	Minimum	Standard deviation	Jarque-Bera test	Coefficient of changes	Posibbility of Jarque-Bera
Variable									
Capital expenditures	749	0.37	1	0	0	0.48	12.67	1.3	0.000
Overinvestment	749	0.19	1.04	0.15	0	0.84	2.788	1.52	0.000
BS	749	5.28	7	5	5	0.67	752.5	0.13	0.000
BI	749	0.59	0.86	0.6	0	0.2	78.03	0.34	0.000
CEO duality	749	0.93	1	1	0	0.26	3536	0.28	0.000
Firm age	749	37.07	60	40	8	11.47	41.38	0.31	0.000

BS: Board size, BI: Board independence

Table 3: Correlation between research variables

Variables	Capital expenditures	Overinvestment	BS	BI	CEO duality	Firm age
Capital expenditure	1	0.03	−0.02	−0.09	0.01	0.08
Overinvestment		1	0.008	−0.11	−0.006	−0.12
BS			1	0.09	−0.06	0.03
BI				1	−0.003	−0.05
CEO duality					1	0.05
Firm age						1

BS: Board size, BI: Board independence

By comparing coefficient of changes of different criteria of determination of managerial overconfidence ad board features in research period, it is concluded that board features comparing to different criteria of managerial overconfidence has higher coefficient of changes and dispersion and subsequently lower stability. It indicates that different criteria of managerial overconfidence in companies being reviewed should be affected by other factors other than board features. Some of them are mentioned in this research as control variables.

By comparing coefficient of changes of board features in research period, it is concluded that among mentioned variables, BS variable has had the highest coefficient of changes and dispersion ad subsequently lowest level of stability in research period. It indicates that sample companies being reviewed, despite relative stability in the number of board members, have more dispersion in board combination (bound and unbound). Other results of descriptive statistics indicate that the age of companies being reviewed have been 37 years on average, and the average of BI has been 59%. Results regarding Jarque-Bera test indicate that dependent variable of overinvestment has been normal during research period. Normality of dependent variable is an assumption of regression models of least normal squares.

4.3. Review of Correlations between Research Variables

The results of reviewing correlations between variables in research period are presented in Table 3. Correlations between variables shown in Tables 3 and 4 indicate that correlations between different criteria of managerial overconfidence (capital expenditures and overinvestment) and BI have been −0.09 and −0.07, respectively, but just the relationship between BI and capital expenditures has been significant. It indicates that as BI increases, managerial overconfidence decreases significantly. In other words, in listed companies as the number of unbound members of board increases, capital expenditures as a criteria of managerial overconfidence decreases significantly. Other important results of correlation

indicate that firm age and capital expenditures are positively correlated. It indicates that older companies have higher capital expenditures.

BI and BS are positively correlated. It indicates that as the number of board members increases, the number of unbound members of board increases significantly, as well. Other results have been shown in Table 3.

4.4. Testing the Hypotheses

The first hypothesis has been tested by both capital expenditures and overinvestment variables. Regression model of Logit-Binary maximum likelihood has been used to test this hypothesis. Regression model of impact of BS on capital expenditures have been presented in Table 4. Results indicate that the impact of BS on capital expenditures is negative (−0.06), but according to possibility of Z-test it is not significant (0.6134). It indicates that BS does not affect capital expenditures. In other words, establishment of capital expenditure as a criteria of managerial overconfidence is independent from the number of board members of listed companies.

Results also indicate that firm age has a positive and significant impact on capital expenditures. It indicates that older companies have higher level of capital expenditures. That is; in older companies, the level of managerial overconfidence, based on capital expenditures is higher. According to determination coefficient of McFaden, only 0.005 of changes in capital expenditures in research period has been under influence of BS and control variable of firm age. Results regarding possibility of LR (0.0867) indicate that regression model is only significant in assurance level of 90%. Since the impact of BS on capital expenditures is not significant, the first hypothesis in level of capital expenditures is not supported.

Before testing the first hypothesis in condition that overinvestment in assets is considered as managerial overconfidence criteria, an

appropriate pattern was selected for regression model. Result of F-Limer test is shown in Table 5. Amount of F-Limer possibility shown in Table 5, is more than significance level of 5%; so, it is appropriate to use pooled data method to test this hypothesis in level of overinvestment.

Due to selecting pooled data model against panel data model, Hausman test has not been used to select fixed effects pattern against random effects pattern. Pooled regression model of impact of BS on overinvestment in total companies has been presented in Table 6. Results in Table 6 indicate that the impact of BS on overinvestment is positive (0.001), but considering possibility of t-test, it is not significant (0.9160). It indicates that BS does not affect overinvestment. In other words, overinvestment as another criteria of managerial overconfidence, is independent from the number of board members of listed companies. Results also indicate that firm age does not affect overinvestment.

Results regarding F-test indicate that model is not significant but considering Durbin-Watson test it does not have auto-correlation problem. Moreover, results regarding adjusted determination coefficient indicate that in research period only 0.1% of changes in overinvestment in total companies has been under influence of impact of BS and control variable of firm age. Values of regression

residuals of mentioned model have Jarque-Bera equal to 2.643, and possibility of Jarque-Bera equal to 0.267, which indicate that regression residuals are normal. Considering that the impact of BS on overinvestment is not significant, first hypothesis in level of overinvestment is not supported.

Second hypothesis has been tested using both capital expenditures and overinvestment variables. Regression model of impact of BS on capital expenditures has been presented in Table 7. Results indicate that the impact of BI on capital expenditures is negative (−0.85), and considering Z-test possibility (0.0218) it is significant. It indicates that BI has a reverse impact on capital expenditures. In other words, in companies with more unbound board members, establishment of capital expenditures as a criteria of managerial overconfidence, is lower.

According to McFaden determination coefficient, about 0.01 of changes in capital expenditures in research period has been under influence of BI ad control variable of firm age. Results regarding possibility of LR (0.0071) indicate that regression model is significant in general.

Since the impact of BI on capital expenditures is negative and significant, the second hypothesis in level of capital expenditures is not supported.

For testing second hypothesis where overinvestment is considered as managerial overconfidence criteria, first appropriate pattern was selected for regression model. Value of F-Limer possibility in Table 8 is more than significance level of 5%; so, using pooled data model is appropriate for testing second hypothesis in level of overinvestment.

Pooled regression model of impact of BI on overinvestment in total companies, shown I Table 9, indicates that impact of BI on overinvestment is negative (−0.08), and considering possibility of t-test (0.0683), it is only significant in assurance level of 90%. It indicates that BI affects overinvestment (of course in assurance level of 90%). In other words, in companies with more unbound board members, overinvestment as another criteria of managerial overconfidence is lower. But this impact is just approved in assurance level of 90%.

Results regarding F-test indicates that model is not generally significant, but considering Durbin-Watson test, it has not auto-correlation problem. Moreover, results regarding adjusted

Table 4: Regression model of maximum Logit-binary likelihood of impact of BS on capital expenditures

Dependent variable: Capital expenditures	Fixed amount	BS	Firm age
Regression coefficients	−0.77	−0.06	0.01
Amount of Z-test	−1.19	−0.51	2.15
Amount of Z possibility	0.2346	0.6134	0.0314
LR	Amount of LR test		Amount of possibility
	4.89		0.0867
Determination coefficient of McFaden	0.005		

BS: Board size, LR: Likelihood ratio

Table 5: Choosing pooled data model against panel data model

Model	$OVERINVEST_{it}=\beta_0+\beta_1 BS_{it}+\beta_2 AGE_{it}+\varepsilon_{it}$		
Test type	Test value	Freedom degree	Test possibility
F-Limer	0.542	(106 and 640)	0.9999

BS: Board size

Table 6: Impact of BS on overinvestment

Tests	Regression coefficients	t-test value	t-test possibility
Variables			
Fixed amount	0.01	0.14	0.8920
BS	0.001	0.11	0.9160
Firm age	−0.0006	−0.80	0.4225

Determination coefficient	Adjusted determination coefficient	Value of Jarque-Bera residuals	Possibility of Jarque-Bera residuls	F-test possibility	Durbin-Watson test
0.002	0.001	2.643	0.267	0.7225	2.353

BS: Board size

determination coefficient indicate that in research period, only 0.3% of changes in overinvestment in total companies has been under influence of BI and control variable of firm age.

Values of regression residuals of mentioned model have Jarque-Bera equal to 3.937, and possibility of Jarque-Bera equal to 0.140, which indicate that regression residuals are normal. Since the impact of BI on overinvestment (in assurance level of 90%) is significant, the second hypothesis in level of overinvestment is supported only in assurance level of 90%.

Third hypothesis has been tested by both capital expenditures and overinvestment variables. Regression model of impact of CEO duality on capital expenditures in Table 10, indicates that impact of CEO duality on capital expenditures is positive (0.02), but considering Z-test possibility, it is not significant (0.9408). It indicates that CEO duality has no impact on capital expenditures.

Results also indicate that the impact of firm age on capital expenditures is positive and significant. It indicates that older listed companies, have higher capital expenditures. Considering McFaden determination coefficient, only 0.005 of changes in capital expenditures in research period has been under influence of CEO duality and control variable of firm age. Results regarding possibility test of LR (0.0983) indicate that generally only in assurance level of 90%, regression model is significant. Since the impact of CEO duality on capital expenditures is not significant, the third hypothesis is not supported.

Table 7: Regression model of maximum likelihood of Logit-Binary of impact of BI on capital expenditures

Dependent variable: Capital expenditures	Fixed amount	BI	Firm age
Regression coefficients	−0.54	−0.85	0.01
Z-test value	−1.56	−2.29	2.02
Z-test possibility	0.1197	0.0218	0.0438
LR test	LR test value	Possibility value	
	9.89	0.0071	
McFaden determination coefficient	0.019		

LR: Likelihood ratio

Table 8: Choosing polled data model against panel data model

Model	$OVERINVEST_{it}=\beta_0+\beta_1 BI_{it}+\beta_2 AGE_{it}+\varepsilon_{it}$		
Test type	Test value	Freedom degree	Test possibility
F-Limer	0.536	(106 and 640)	0.9999

For testing third hypothesis where overinvestment is considered as managerial overconfidence criteria, first appropriate pattern was selected for regression model. Value of F-Limer possibility in Table 11 is more than significance level of 5%; so, using pooled data model is appropriate for testing third hypothesis in level of overinvestment.

Pooled regression model of impact of CEO duality on overinvestment in total companies, shown in Table 12, indicates that impact of CEO duality on overinvestment is negative (−0.003), and considering possibility of t-test (0.9342), it is not significant. It indicates that CEO duality does not affect overinvestment. Results regarding F-test indicate that model is not significant in general, but considering Durbin-Watson test it has not auto-correlation problem. Moreover, results regarding adjusted determination coefficient indicate that in total research period, only 0.1% of changes in overinvestment has been under influence of CEO duality and control variable of firm age.

Regression residuals value of mentioned model have Jarque-Bera equal to 2.163, and possibility of Jarque-Bera equal to 0.339, which indicate that regression residuals are normal. Since the impact of CEO duality on overinvestment is not significant, the third hypothesis in level of overinvestment is not supported.

5. CONCLUSION

Irrationality of management resulting from behavioral biases of executive managers is a great challenge in corporate governance literature. Overconfidence of management is one of the best example of it. managerial overconfidence may lead to decisions which destroy company's value. On the other hand, risk-taking motivation has lower costs for overconfident directors than other directors (Gervais et al., 2011; Campbell et al., 2011). Generally, this kind of behavior must be under control. Some features of corporate governance, such as presence of unbound members in board or independence of board members, incorporate to maintenance of stockholders` rights, and decrease the conflicts between their interests and management`s interests (Sulong and Nor, 2010). This research tries to examine the impact of board features on managerial overconfidence in Iran. Capital expenditure and overinvestment on assets criteria have been used to measure managerial overconfidence, and BS, BI and CEO duality have been considered as board characteristics. According to the results, BI has reverse impact on different criteria of managerial overconfidence. In other words, BI leads to decrease in behavioral biases such as optimism and managerial overconfidence. This result is consistent with previous researches by Baccar et al. (2013), and Johansson

Table 9: Impact of BI on over investment

Tests	Regression coefficients	t-test value	t-test possibility
Variables			
Fixed amount	0.07	1.66	0.0967
BI	−0.08	−1.83	0.0683
Firm age	−0.0007	−0.89	0.3695
Determination coefficient	Adjusted determination coefficient	Value of Jarque-Bera residuals	Possibility of Jarque-Bera residuls	F-test possibility	Durbin-Watson test
0.005	0.003	3.937	0.140	0.1377	2.356

Table 10: Regression model of Logit-binary maximum likelihood of impact of CEO duality on capital expenditures

Dependent variable: Capital expenditures	Fixed amount	CEO duality	Firm age
Regression coefficients	−1.09	0.02	0.01
Z-test value	−2.97	0.07	2.13
Z-test possibility	0.003	0.9408	0.0331
LR test	LR test value	Possibility value	
	4.64	0.0983	
McFaden determination coefficient		0.005	

LR: Likelihood ratio

Table 11: Choosing pooled data against panel data

Model	$OVERINVEST_{it}=\beta_0+\beta_1DUALITY_{it}+\beta_2AGE_{it}+\varepsilon_{it}$		
Test type	Test value	Freedom degree	Test possibility
F-Limer	0.539	(106 and 640)	0.9999

Table 12: Impact of CEO duality on overinvestment

Tests	Regression coefficients	t-test value	t-test possibility
Variables			
Fixed amount	0.02	0.47	0.6377
CEO duality	−0.003	−0.08	0.9342
Firm age	−0.006	−0.79	0.4273
Determination coefficient	Adjusted determination coefficient	Value of Jarque-Bera residuals	Possibility of Jarque-Bera residuls	F-test possibility	Durbin-Watson test
0.002	0.001	2.163	0.339	0.7240	2.353

and Olvebrink (2013). On the other hand, BS does not affect those criteria. This outcome is inconsistent with previous researches by Baccar et al. (2013). Finally, CEO duality is not important either. It is inconsistent with previous researches by Bebchuk et al. (2009), and Baccar et al. (2013), but consistent with previous researches by Johansson and Olvebrink (2013).

These results can help investors and owners of companies in process of decision-making from deferent aspects. First, they should not be concern about duality of managers` responsibilities. Second, impact of firm age on capital expenditures as sub results of the research implies that investing in old companies need more care. Third, from BI aspect, the number of unbound board members can help in evaluation of the capability of listed companies to pay back the investment. In addition, assemblies should assign enough unbound board members, so that they can judge independently in fields in which there might be some potential conflicts. Furthermore, audit institutions can decrease the testing of internal controls of companies with enough unbound board members based on effectiveness of corporate governance mechanisms, especially BI, in prevention of managerial overconfidence.

For interpreting the results, it should be considered that there is no common agreement on definition of board features of companies, and managerial overconfidence. Therefore, there are different methods to measure them that may affect research results.

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