The Impact of Financial Flexibility on Investment Efficiency (Over-Investment and Under-Investment) With Respect to Managerial Ownership in the Firms Listed in Tehran Stock Exchange

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ABSTRACT

The purpose of this research is to study the impact of financial flexibility on investment efficiency (over-investment and under-investment) with respect to managerial ownership in the firms listed in Tehran Stock Exchange. In this regard, as a sample, a total of 79 firms among firms listed in Tehran Stock Exchange from 2010 to 2014 were selected in order to examine the impact of financial flexibility on both under-investment and over-investment of these firms. Notably, this study had two minor hypotheses. From the objective standpoint, this research was categorized as an applied study and from the nature and content standpoint, the research method was categorized as correlational. Research was conducted within the framework of inductive-apriority reasoning. In this study, panel analysis was used in hypothesis analysis. Findings of the two hypotheses indicated a significant and negative relationship between financial flexibility and both over-investment and under-investment considering managerial ownership. With an increase (decrease) in financial flexibility, both over-investment and under-investment would (increase) decrease.

KEYWORDS
Over-investment, Under-investment, Financial flexibility, Investment efficiency, Inefficient investment, Managerial ownership

INTRODUCTION

Financial flexibility indicates a firm’s capability for supplying the financial resources in order to have timely reaction to future unexpected events and to maximize the firm value. Commercial units with financial flexibility are able to resist financial pressures and provide required fund in order to make investment with minimum expenditure in the case of having profitable opportunities [1].

One of most challenging issues in the current era is economic development so that its realization has turned into one of the fundamental purposes in economic policymaking and decision-making of a country. To this end, an economic unit should take into account the extent of investment with regard to its resource limitations in order to make investment in various projects. This is done through assessment of the projecting e.g. their current net value. Accordingly, investment is made in one or more projects if their current net value is positive. Hence, the problem of the current study is that accepting projects with currently negative net value would lead to over-investment and ignoring projects with currently positive net value would result in under-investment, and thereby, the inefficiency of the investments [8].

This is why managers should make optimal investments in projects with value-making capability, i.e. projects with currently positive net value, and reject those with negative net value. Free cash flow of the firms is one of the main reasons underlying over-investment in firms (Yang & Jiang, 2008) and lead to such issues as decreasing the investment efficiency, increasing the inflation, and apparently macroeconomic development and would endanger the shareholders’ benefits [8].

LITERATURE REVIEW

Foreign literature:

Rappa et al. (2013) conducted a study regarding evaluating the financial flexibility and financial policy of the firms. They allocated an innovative method for measuring the shareholders’ value through financial flexibility and found out that from the shareholders’ viewpoints, firms with higher flexibility had lower dividend and preferred re-
buying of stocks to dividend and had lower debt ratio. In addition, these firms were interested in accumulating cash.

Beatty et al. (2007) concluded that although outside-organization (intra-organization) debtors would decrease the significance of accounting information through making confining contracts, limitations in financial supply would fundamentally increase the investment efficiency and decrease the influence of quality of accounting information on investment efficiency[3].

Marchica and Moora (2007) investigated the relationship between financial flexibility and investment decision-making and concluded that a significant relationship existed between these two variables. In other words, after a period of low leverage policy, firms with financial flexibility would have higher capability for fulfilling investment expenditures[5].

**Local literature:**

In his thesis entitled “The effective factors on the asset texture and financial leverage ratios in industrial firms listed in Tehran Stock Exchange Market”, Marmarchi (2011) found out that growth opportunities, firm size and managers’ power over financial leverage would have a positive influence and past profitability would have a strongly negative influence on financial leverage. Moreover, the power of pledging of the firm and income fluctuations would have a positive influence in the long run while their influence would be negative in the short-term sense[6].

Saghafi and Arab Mazar (2010) conducted a study entitled “The quality of financial reporting and investment inefficiency” and used Verdi’s (2006) moderated model in order to examine the relationship between investment efficiency and the quality of financial reporting. The results of examining 152 firms listed in Tehran Stock Exchange Market from 2000 to 2008 revealed no significant relationship between the quality of financial reporting and investment efficiency[7].

Poorheidari (2010) investigated the relationship between industry, size, profitability and bail properties and financial leverage of the firm. He found an inverse significant relationship between financial leverage and profitability. Moreover, the findings revealed a direct and significant relationship between financial leverage and firm size. However, no significant relationship was found between industry and bail properties and financial leverage of the firm.

**RESEARCH HYPOTHESIS**

**Major hypothesis:**

There is a significant relationship between financial flexibility and investment efficiency (over-investment and under-investment) in firms with managerial ownership.

**Minor hypotheses:**

1. There is a significant relationship between financial flexibility and under-investment in firms with managerial ownership.
2. There is a significant relationship between financial flexibility and over-investment in firms with managerial ownership.

**THE STATISTICAL MODEL**

The statistical model of the study was adapted from Khodaei Valeza Gherad et al., (2010) study and estimated as follows:

**MODEL OF THE HYPOTHESES**

Over_Investment 

\[
\text{Over}_i \text{ Investment}_{i} = \beta_0 + \beta_1 \text{Lev}_{i} + \beta_2 \text{MC}_{i} + \beta_3 \text{Firm Size}_{i} + \beta_4 \text{ROA}_{i} + \beta_5 \text{FCF}_{i} + \beta_6 \text{Dividend}_{i} + \varepsilon_i
\]

Under_Investment 

\[
\text{Under}_i \text{ Investment}_{i} = \beta_0 + \beta_1 \text{Lev}_{i} + \beta_2 \text{MC}_{i} + \beta_3 \text{Firm Size}_{i} + \beta_4 \text{ROA}_{i} + \beta_5 \text{FCF}_{i} + \beta_6 \text{Dividend}_{i} + \varepsilon_i
\]

The components of the model were as follows:

- Over-investment of firm i in period t
- Under-investment of firm i in period t
- Financial flexibility
- Managerial ownership
- Size of the firm i in year t
- Profitability of firm i in year t
- Free cash flow of firm i in year t
- Dividend of firm i in year t
- Error of regression model

**RESEARCH VARIABLES**

**Dependent variables:**

- Investment efficiency (over-investment and under-investment).

**Independent variables:**

- Financial flexibility
- Managerial ownership

**Moderate variables:**

- Financial flexibility
- Managerial ownership

**Control variables:**

- Profitability ratio
- Free cash flow
- Financial leverage
- Head of the board of directors
- Dividend
- Gross domestic production of the country
- Firm size

**RESEARCH DOMAIN**

The temporal and spatial research domains were as follows:

**Topical research domain:**

The current study tried to examine the possible relationship between financial flexibility and investment efficiency (over-investment and under-investment) regarding managerial ownership.

**Spatial research domain:**

The study consisted of the firms listed in Tehran Stock Exchange Market.

**Temporal research domain:**

The study has been conducted since early 2009 till late 2014.
**DESCRIPTIVE STATISTICS**

In general, the methods to process and summarize the obtained data are called descriptive statistics. This merely describes the population or the sample and its underlying tendency.

Tab. 1. Descriptive statistics for the research variables

<table>
<thead>
<tr>
<th>Variables and their numbers</th>
<th>Measures of dispersion</th>
<th>Measures of central tendency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables Number Max Min kurtosis skew edness SD Median Mean</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over_Investment</td>
<td>395 0.00 -1.0 1.1 -0.85 0.2 0.2 -0.15</td>
<td></td>
</tr>
<tr>
<td>Under_Investment</td>
<td>395 1.95 0.0 1.5 0.51 0.3 0.09 0.14</td>
<td></td>
</tr>
<tr>
<td>Lev</td>
<td>395 5.68 1.0 3.1 1.82 0.8 1.62 1.93</td>
<td></td>
</tr>
<tr>
<td>MC</td>
<td>395 0.70 0.0 0.9 1.07 0.1 0.20 0.24</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>395 18.3 7 10.8 0.46 1.3 13.6 13.65</td>
<td></td>
</tr>
<tr>
<td>ROA</td>
<td>395 0.69 -5.8 2.27 0.1 0.05 0.10</td>
<td></td>
</tr>
<tr>
<td>FCF</td>
<td>395 1947 515 5.3 2.43 39 1035 2554</td>
<td></td>
</tr>
<tr>
<td>Dividend</td>
<td>395 6000 0.0 9.6 2.72 93 350.0 696.8</td>
<td></td>
</tr>
</tbody>
</table>

**VALIDATING MODEL 1-1**

In this section, validation of the first model of the study is presented.

Model 1-1: There is a significant relationship between financial flexibility and under-investment in firms with regard to managerial ownership.

**CHOOSING AN APPROPRIATE MODEL**

As it was earlier said, first an appropriate model is chosen (mixed model, model with fixed effects and/or model with random effects). The results of Chow’s test and Houseman’s test are presented in Table 2.

Tab. 2. The results of Chow’s and Houseman’s test for choosing an appropriate model

<table>
<thead>
<tr>
<th>Models</th>
<th>Chow’s or Limer’s test</th>
<th>Houseman’s test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st model</td>
<td>F value</td>
<td>7.38 78.31</td>
<td>0.0 0.00 0</td>
</tr>
</tbody>
</table>

The probability value of Chow’s model for the first models is less than 0.05; hence, the models had separate effects on the firms, i.e. either the model with fixed effects or the model with random effects should be used. In order to determine which model was more appropriate to be chosen, Houseman’s test was run. The probability values for Houseman’s test was lower than 0.05 for the first models (=0.000); hence, the model with fixed effects was accepted.

Tab. 3. Validating and estimating parameters of the first model

<table>
<thead>
<tr>
<th>VIF</th>
<th>Result</th>
<th>Probability value</th>
<th>t value</th>
<th>Coefficient value parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>Insignificant</td>
<td>0.361</td>
<td>0.915</td>
<td>0.346</td>
</tr>
<tr>
<td>1.0</td>
<td>Significant and positive</td>
<td>0.000</td>
<td>12.637</td>
<td>0.161</td>
</tr>
<tr>
<td>1.0</td>
<td>Significant and negative</td>
<td>0.327</td>
<td>-0.981</td>
<td>-0.121</td>
</tr>
<tr>
<td>1.4</td>
<td>Significant and negative</td>
<td>0.033</td>
<td>-2.142</td>
<td>-0.059</td>
</tr>
<tr>
<td>1.3</td>
<td>Insignificant</td>
<td>0.055</td>
<td>-1.930</td>
<td>0.202</td>
</tr>
<tr>
<td>1.5</td>
<td>Insignificant</td>
<td>0.711</td>
<td>-0.371</td>
<td>0.000000</td>
</tr>
<tr>
<td>1.3</td>
<td>Insignificant</td>
<td>0.242</td>
<td>1.172</td>
<td>0.00000174</td>
</tr>
</tbody>
</table>

The validated model was as follows (coefficients of Table 3 were inserted in it): Under Investment =0.346 +0.161 LEV -0.121 MC -0.00000002FCF +0.202ROA +0.0000001740 Div +0.059 Size +E it

**THE RESULTS OF THE FIRST MINOR HYPOTHESIS**

The purpose of the first minor hypothesis was to examine the relationship between financial flexibility, under-investment in firms with regard to managerial ownership.

The statistical hypothesis of the study was posed as follows:

H0: There is no significant relationship between financial flexibility and under-investment in firms with regard to managerial ownership.

H1: There is a significant relationship between financial flexibility and under-investment in firms with regard to managerial ownership.
\[
\begin{align*}
H_0 : \beta_1 = \beta_2 = \ldots = \beta_5 &= 0 \\
H_1 : \beta_i &\neq 0 \ i = 1,2,3,4,5
\end{align*}
\]

Diagram 1. The area for rejecting or confirming null hypothesis

The t value for financial leverage was 637.12 (significant and positive). It was -121.0 (insignificant), -059.0 (significant and negative), -930.1 (insignificant) for managerial ownership, firm size and ROA, respectively. The t value was 0.371 (insignificant) and 172.1 (insignificant) for free cash flow and dividend, respectively. It was also 0.91 for intercept located in the area of H$_0$ rejection at 95% degree of certainty, i.e. intercept is insignificant.

Since financial leverage was measured by means of debt ratio, i.e. ratio of debt to asset, and under-investment was positively associated with debt ratio, it had a significant negative relationship with financial flexibility, which is the inverse of debt ratio.

Hence, an increase (or decrease) in financial flexibility would lead to an increase (or decrease) in under-investment.

**VALIDATING THE MODEL 1-2**

In this section, the validation of the second model of the study is presented.

Model 1-2. There is a significant relationship between financial flexibility and over-investment in firms with regard to managerial ownership.

**CHOOSING AN APPROPRIATE MODEL**

As it was earlier said, first an appropriate model is chosen (mixed model, model with fixed effects and/or model with random effects). The results of Chow’s test and Houseman’s test are presented in Table 4.

The probability value of Chow’s model for the second models is less than 0.05; hence, the models had separate effects on the firms, i.e. either the model with fixed effects or the model with random effects should be used. In order to determine which model was more appropriate to be chosen, Houseman’s test was run. The probability values for Houseman’s test was lower than 0.05 for the first models (=0.000); hence, the model with fixed effects was accepted.

**Diagram 2. The area for rejecting or confirming null hypothesis**

**Table 5. Validating and estimating parameters of the second model**

<table>
<thead>
<tr>
<th>VIF</th>
<th>Result</th>
<th>Probability value</th>
<th>t value</th>
<th>Coefficient value</th>
<th>parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>Insignificant</td>
<td>153.0</td>
<td>-433.1</td>
<td>-876.0</td>
<td>Constant</td>
</tr>
<tr>
<td>09.1</td>
<td>Significant and positive</td>
<td>000.0</td>
<td>207.1</td>
<td>376.0</td>
<td>Lev</td>
</tr>
<tr>
<td>07.1</td>
<td>Insignificant</td>
<td>340.0</td>
<td>-956.0</td>
<td>-191.0</td>
<td>MC</td>
</tr>
<tr>
<td>48.1</td>
<td>Insignificant</td>
<td>523.0</td>
<td>639.0</td>
<td>029.0</td>
<td>Size</td>
</tr>
<tr>
<td>30.1</td>
<td>Insignificant</td>
<td>681.0</td>
<td>411.0</td>
<td>-07.00</td>
<td>ROA</td>
</tr>
<tr>
<td>59.1</td>
<td>Significant and negative</td>
<td>003.0</td>
<td>989.2</td>
<td>0</td>
<td>FCF</td>
</tr>
<tr>
<td>35.1</td>
<td>Insignificant</td>
<td>766.0</td>
<td>298.0</td>
<td>000000716.0</td>
<td>Dividend</td>
</tr>
<tr>
<td>000.</td>
<td>Probability value of F</td>
<td>41.5</td>
<td>F value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33.2</td>
<td>Durbin-Watson</td>
<td>59.0</td>
<td>Determination coefficient</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49.0</td>
<td>Moderated determination coefficient</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The validated model was as follows (coefficients of Table 5 were inserted in it):

Over Investment = -0.876 +0.376 LEV -0.191 mc -0.00000023FCF +0.070ROA +0.00000716 div -0.029 Size it +\( \varepsilon \)

**THE RESULTS OF THE SECOND MINOR HYPOTHESIS**

The purpose of the second minor hypothesis was to examine the relationship between financial flexibility, over-investment in firms with regard to managerial ownership.

The statistical hypothesis of the study was posed as follows:

H$_0$: There is no significant relationship between financial flexibility and over-investment in firms with regard to managerial ownership.

H$_1$: There is a significant relationship between financial flexibility and over-investment in firms with regard to managerial ownership.

\[
\begin{align*}
H_0 : \beta_1 = \beta_2 = \ldots = \beta_5 &= 0 \\
H_1 : \beta_i &\neq 0 \ i = 1,2,3,4,5
\end{align*}
\]
The t value for financial leverage was 207.18 (significant and positive). It was -956.0 (insignificant), 639.0 (insignificant), -411.0 (insignificant) for managerial ownership, firm size and ROA, respectively. The t value was -989.2 (significant and negative) and 298.0 (insignificant) for free cash flow and dividend, respectively. It was also -1.43 for intercept located in the area of H_0 rejection at %95 degree of certainty, i.e. intercept is insignificant.

Since financial leverage was measured by means of debt ratio, i.e. ratio of debt to asset, and over-investment was positively associated with debt ratio, it had a significant negative relationship with financial flexibility, which is the inverse of debt ratio. Hence, an increase (or decrease) in financial flexibility would lead to an increase (or decrease) in over-investment.

**CONCLUSION**

Considering the results for the first and second minor hypotheses, a significant negative relationship was found between financial flexibility and investment efficiency with regard to managerial ownership.

**REFERENCES**


