ASSESSING IMPACT OF FIRM SIZE ON THE RELATIONSHIP BETWEEN CASH FLOW AND INVESTMENT IN LISTED FIRMS IN TEHRAN STOCK EXCHANGE

Golnaz Safaei Kashani¹² and *Hossein Fakhari³

¹Department of Accounting, Gilan Science and Research Branch, Islamic Azad University, Rasht, Iran
²Department of Accounting, Rasht Branch, Islamic Azad University, Rasht, Iran
³Department of Accounting, Mazandaran University

*Author for Correspondence

ABSTRACT
The relationship between cash flow and investment has been constantly one of the most important issues in field of financial affairs and accounting. The discussion is resulted from existence of financial limitations and existence off investment opportunities among firms. Hence, the present study has been aimed in investigating effect of firm size on the relationship between cash flow and investment. For this purpose, the present study has studied two groups of limited company and unlimited companies. In order to determine firms with financial limitation and without financial limitation, sale variable has been applied. The study is in kind of descriptive-correlative study based on hybrid data analysis, in which financial data of 60 listed firms in Tehran Stock Exchange have been applied during 2008-2012. Obtained results from the study indicate the significant relation between cash flow and investment, which the impact in small firms is more than it in large firms. Findings of the study can be suitable for investors and creditors to select suitable portfolio and credit allocation and other similar decision makings.

Keywords: Investment, Cash Flow, Tobin’s Q Ratio, Financial Limitations

INTRODUCTION
Today, cash flow is one of the challenging and attractive issues in accounting and financial studies, since investors as consider cash flow values as one of the most important factors of decision making. In addition, relevant information of cash flows can enable shareholders and creditors to valuate profit unit with the assumption of continuing its activity. The valuation can be useful for making economically useful decisions for the investors and creditors. Carpenter et al believe that the relationship between cash flows and investment instead of being resulted from financial limitations can be rooted in the relationship between cash flows and eliminated investment opportunities that have been ignored in relevant studies of growth opportunities. They also believe that in most studies, effect of firm size on the relationship between cash flows and investment has been neglected (Carpenter and Guariglia, 2007).

In fact, a firm that is faced many problems in regard with access to foreign sources of capital market can supply major part of required financial resources from local resources of the firm. Such firm would be named as a firm with financial limitations. Arsalan (2006) believes that reliance of a firm on domestic resources can be determined through sensitivity of investment-cash flow of the firm (Arsalan et al., 2006). Guariglia et al believe that firms with financial limitation have higher investment-cash flow sensitivity than others (Guariglia, 2007).

According to the mentioned issues and importance of effect of cash flows on investment and also moderator effect of firm size on the mentioned relation, the present study has been aimed in investigating effect of cash flows on investment, along with Tobin’s Q, which can present existence of investment opportunities in firms. Hence, after research literature, the study has considered methodology and after presenting research hypotheses, data analysis and then results have been presented.

Research Literature
Hossien Pour has conducted a study under the title of investigating effective factors in sensitivity of investment of cash flow in listed firms in Tehran Stock Exchange. In this study, the author has investigated the relationship between size, value added, dividend percent, experience of the firm and
sensitivity of cash flow investment. The study has considered 87 firms during a 5-year period (2000-2004). Obtained results from the study indicated that there is positive and significant relationship among size, value added, dividend and sensitivity of investment and cash flow; although there is no significant relationship between experience of the firm and sensitivity of investment and cash flow. The study has also considered efficiency of traditional indices of financial limitation (Hossein, 2005).

Dastgir et al., (2012) have presented a study under the title of effect of operative cash flow and firm size on investment decisions in investment assets of listed companies in Tehran Stock Exchange. The study has investigated effect of operative cash flow and firm size on investment decision making. Studied sample included 104 listed firms in Tehran Stock Exchange during 10 years (2001-2010). Hypotheses have been tested using a multivariate linear regression model in level of 5%. Obtained results indicate that there is a significant correlation between operative cash flow and decisions of investment in investment assets. The relation is more in small firms than others. In addition, increase in firm size can result in decrease in gaining investment assets (Dastgir et al., 2012).

Arslan et al., (2006) have investigated the hedging analysis for an emerging market, before and during a financial crisis to test the hypothesis that the hedging role of cash is more critical in states of the world characterized by high asymmetric information and excessive costs of external finance. The results are in line with our expectations and show that constrained firms exhibit greater investment–cash flow sensitivities than unconstrained firms. Also, there is strong evidence that cash stands as an effective device for firms, mainly during the crisis period (Arslan et al., 2006).

Hovakimian et al., (2009) have investigated cash flow sensitivity of investment in 7176 firms listed during 1985-2000 in New York Stock Exchange. The accessibility of external capital is positively correlated with cash flows, intensifying investment cash flow sensitivity. Managers actively counteract the variations in internal and external liquidity by accumulating working capital when liquidity is high and draining it when liquidity is low. These results imply that cash flow sensitive firms face financial constraints, which are binding in low cash flow years. While financial constraints have an economically significant impact on investment timing, cash flow sensitive firms alleviate their effects and, actually, overinvest, on aggregate (Hovakimian et al., 2009).

Lewellen (2009) has conducted a study under the title of cash flow and investment. The study has investigated the relationship between cash flow of firms and their investment during 1971-2006. Obtained results indicate that there is significant relationship between cash flow and investment of firms after controlling their investment opportunities. The relationship is in high range for those firms that have financial limitation. In this study, it has been mentioned that firms with financial limitation have the highest sensitivity to cash flows.

**MATERIALS AND METHODS**

**Methodology**

The present study is in kind of descriptive-regressive study, in which statistical regression test using combined data analysis method has been applied for purpose of finding relations between variables. In addition, the study is an applied research in terms of objective and in terms of data collection; the study is after-event causal research, since has applied previous information of sample firms. The studies have been estimated using combination of time series and cross-sectional data during 2008-2012 and applied software in this study has been E.views.

At the present study, applied models for testing hypotheses arreas follows:

**First Model**

\[ I_t/K_{it(1)} = a_0 + a_1 I_{it(1)}/K_{it(2)} + a_2 Q_{it(2)} + a_3 CF_{it} / K_{it(1)} + a_4 \text{convariable}_i / K_{it(1)} + \varepsilon_{it} \]

**Second Model**

\[ I_t/K_{it(1)} = a_0 (I_{it(1)} / K_{it(2)}) + a_2 (I_{it(1)}/K_{it(2)}) * (1 - \text{SMALL}) + a_3 Q_{it(1)} * \text{SMALL} + a_4 Q_{it(1)} * (1 - \text{SMALL}) + a_5 (CF / K_{it(1)}) * \text{SMALL} + a_6 (CF / K_{it(1)}) * (1 - \text{SMALL}) + a_7 (\text{CONK} / K_{it(1)}) * \text{SMALL} + a_8 (\text{CONK} / K_{it(1)}) * (1 - \text{SMALL}) + \varepsilon_{it} \]

In these models:
Cash flow: refers to increase or decrease in cash flow resulted from transactions with real or legal entities independent from legal entity of business unit and resulted from other events. In fact, cash flow is the difference between available cash at the beginning and the end of accounting course, which can be obtained through sale, income gained by loan, investment and selling assets and can be decreased through paying original debts, direct costs and purchasing assets. In addition, cash flow can be also defined as after tax profit in addition to depreciation CF=PBIT-T+D. 

Investment: investment is a kind of asset that can be maintained by investor unit for increasing economic interests through distribution of resources in form of (dividend, guaranteed profit, rent, increase in value and other advantages like interests resulted from relations).

Investment includes two parts:
1. Fixed assets purchased by firm
2. Liquidity paid by the firm for purchasing fixed assets.

Tobin’s Q: the scale is equal to value of asset market compared to its book value. Tobin’s q can be also defined as value of stock market of firm on value of asset replacement.

\[ Q_t = \frac{MV}{BV} \]

Capital commitments: contracts for purchasing capital items in future like land, building and equipment

Replacement value: expenses that should be tolerated for purchasing or making a completely similar item, which can be obtained as follows: day value of fixed assets= book value of fixed asset \((1+\text{annual change percent (inflation rate)})\)

Small: size of sale in firms that can be considered as a criterion for firm size.

**Research Hypotheses**

Based on theoretical literature, research hypotheses would be as follows:
- Hypothesis 1: there is significant correlation between cash flow and investment.
- Hypothesis 2: firm size has moderator impact on the correlation between cash flows and investment.

**Statistical Population and Sampling Method**

Time scope of the study is during 2008-2012 and location of the study is also Tehran Stock Exchange. Statistical sample of the study includes listed companies in Tehran stock exchange during 2008-2012, which have been selected, based on following criteria.
1. In terms of increase in comparability, their fiscal year was ended to march and their fiscal year has not been changed during the mentioned years.
2. During the mentioned fiscal years, they should not change their activity or fiscal year.
3. Relevant information of audited financial statements for the studied period should be available.
4. Because of specific nature of activity, the firm should not be included in active firms in financial mediation industry.
5. Their acceptance year should be before 2006. Accordingly, statistical population of the study includes 100 firms per year, which includes 60 firms due to the access to information of statistical sample.

**Applied Methods for Data Analysis and Testing Hypotheses**

At this study, in order to test hypothesis 1, GMM panel method has been applied because of existence of interval dependent variable. Models of constant or random effects can result in presenting non-adapted estimator, since error sentence may be correlated to delay variables. When in the model of combined data independent variable is appeared in form of interval in the model, estimations of OLS would not be adapted. Under such conditions, it is necessary to use Generalized Method of Moments (GMM). GMM method can be considered as a powerful and correct tool and can be applied with using a weighted matrix for variance diversion and unknown correlations (Mahdi, 2011).

Afterwards, for purpose of estimating significance coefficients of \(a1, a2, a3\) and \(a4\) using obtained \(p\)-value, the hypothesis would be confirmed or rejected. In order to test hypothesis 2, firstly the firms would be divided to two groups of small and l-small firms based on their selling rate. Then, GMM panel method would be applied to validate the model because of existence of interval dependent variable. Finally, in
order to investigate effect of firm size on relationship of cash flow and investment, Wald Test has been applied.

RESULTS AND DISCUSSION

Analysis of Results

Hypothesis 1 is as follows:

- Hypothesis 1: there is significant correlation between cash flow and investment.

In order to test the hypothesis, applied regression model would be as follows:

\[ \frac{I_{it}}{K_{i(t-1)}} = a_0 + a_1 \frac{I_{it-1}}{K_{i(t-2)}} + a_2 Q_{it-1} + a_3 \frac{CF_{it}}{K_{i(t-1)}} + a_4 \text{convar}_it + \varepsilon_{it} \]

In order to validate the model, GMM panel model has been applied because of existence of interval dependent variable in the model.

Table 1: Summary of obtained results from regression model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Value</th>
<th>SD</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>\frac{I_{it}}{K_{i(t-2)}}</td>
<td>a_1</td>
<td>-0.001</td>
<td>0.001</td>
<td>-0.570</td>
<td>0.569</td>
</tr>
<tr>
<td>Q_{i(t-1)}</td>
<td>a_2</td>
<td>0.037</td>
<td>0.033</td>
<td>1.109</td>
<td>0.269</td>
</tr>
<tr>
<td>\frac{CF_{it}}{K_{i(t-1)}}</td>
<td>a_3</td>
<td>0.122</td>
<td>0.010</td>
<td>11.800***</td>
<td>0.0001</td>
</tr>
<tr>
<td>\text{convar}_it</td>
<td>a_4</td>
<td>0.420</td>
<td>0.001</td>
<td>300.161***</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

***: significance in 1% confidence level; **: significance in confidence level of 5%; *: significance in 10% level. Source: estimations of the study

Mean value of dependent variable | SD of dependent variable | Model SD | Total square error | J-value |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0.138</td>
<td>3.923</td>
<td>14.543</td>
<td>38.826</td>
<td>3631.906</td>
</tr>
</tbody>
</table>

Source: research estimations

Table 2: Summary of results of regression model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Value</th>
<th>SD</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(I_{i(t-1)} /k_{i(t-2)}) \times(1-MALL)</td>
<td>a_1</td>
<td>172.519</td>
<td>294.864</td>
<td>0.585</td>
<td>0.559</td>
</tr>
<tr>
<td>(I_{i(t-1)} /k_{i(t-2)}) \times\text{SMALL}</td>
<td>a_2</td>
<td>-0.004</td>
<td>0.003</td>
<td>-1.393</td>
<td>0.165</td>
</tr>
<tr>
<td>Q_{i(t-1)}/(1-\text{SMALL})</td>
<td>a_3</td>
<td>0.248</td>
<td>0.089</td>
<td>2.802***</td>
<td>0.005</td>
</tr>
<tr>
<td>Q_{i(t-1)}/(1-\text{SMALL})</td>
<td>a_4</td>
<td>0.572</td>
<td>0.594</td>
<td>0.962</td>
<td>0.337</td>
</tr>
<tr>
<td>(CF_{it}/K_{i(t-1)}) \times(1-MALL)</td>
<td>a_5</td>
<td>23.746</td>
<td>11.368</td>
<td>2.574***</td>
<td>0.007</td>
</tr>
<tr>
<td>(CF_{it}/K_{i(t-1)}) \times\text{SMALL}</td>
<td>a_6</td>
<td>0.014</td>
<td>0.098</td>
<td>0.139</td>
<td>0.889</td>
</tr>
<tr>
<td>(CONK_{it}/K_{i(t-1)}) \times(1-MALL)</td>
<td>a_7</td>
<td>-28.905</td>
<td>68.154</td>
<td>-0.424</td>
<td>0.672</td>
</tr>
<tr>
<td>(CONK_{it}/K_{i(t-1)}) \times\text{SMALL}</td>
<td>a_8</td>
<td>-0.078</td>
<td>0.166</td>
<td>-0.472</td>
<td>0.637</td>
</tr>
</tbody>
</table>

***: significance in 1% confidence level; **: significance in confidence level of 5%; *: significance in 10% level. Source: estimations of the study

Mean dependent variable | SD of dependent variable | Model SD | Total square error | J-value |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0.138</td>
<td>12.758</td>
<td>0.420</td>
<td>37.826</td>
<td>37764.540</td>
</tr>
</tbody>
</table>

Source: research estimations

According to variable coefficient, \( \frac{CF_{it}}{K_{i(t-1)}} \) is equal to 0.122 and is significant statistically. Hence, hypothesis 1 has been confirmed; meaning that there is a significant correlation between cash flow and investment.

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Results of testing hypothesis 1 have been in consistence with findings of study of Arslan et al., (2006) and Hossein (2005).

Hypothesis 2 would as follows:

- Hypothesis 2: firm size has moderator impact on the correlation between cash flows and investment.

In order to test the hypothesis, firstly firms should be divided to two small and large groups in terms of size. For this purpose, median income of firms has been applied. In this regard, firms with income higher median are large and firms with income lower than median are small firms. Here, two variables of SMALL and 1 - SMALL would be obtained. To test hypothesis 2, applied model would be as follows:

\[ I_{it}/k_{it-1} = \alpha_1(I_{it-1}/k_{it-2})\text{SMALL} + \alpha_2(I_{it-1}/k_{it-2})*(1-\text{SMALL}) + \alpha_3(Q_{it}/K_{it-1})*\text{SMALL} + \alpha_4(Q_{it}/K_{it-1})*(1-\text{SMALL}) + \alpha_5(CF_{it}/K_{it-1})*\text{SMALL} + \alpha_6(CF_{it}/K_{it-1})*(1-\text{SMALL}) + \alpha_7(\text{CONK}_{it}/K_{it-1})*\text{SMALL} + \alpha_8(\text{CONK}_{it}/K_{it-1})*(1-\text{SMALL}) + \epsilon_{it} \]

In order to validate the model, because of existence of interval dependent variable in the model, GMM panel model has been applied. Finally, in order to investigate effect of firm size on the relationship between cash flow and investment, Wald test has been applied.

According to variable coefficient, \((CF_{it}/K_{it-1})*\text{SMALL}\) is equal to 23.746 and is significant statistically. In addition, \((CF_{it}/K_{it-1})*(1-\text{SMALL})\) is equal to 0.014 that is not significant statistically. In order to compare the two coefficients, Wald test has been applied.

**Wald Test**

In this section, in order to test hypothesis 2, Wald test has been applied. In regression model, in order to test significance of effect of firm size on relationship between cash flow and investment, equality of cash flow rate of large and small firms can be tested. The test would be as follows statistically:

\[ H_0: \alpha_5 = \alpha_6 \quad H_1: \alpha_5 \neq \alpha_6 \]

According to table 3, as p-value id lower than \(\alpha\), H0 has been rejected; meaning that firm size can affect significantly relationship of cash flow and investment. The value for large firms is more than it for small firms. Hence, hypothesis 2 has been confirmed; meaning that firm size can affect significantly relationship of cash flow and investment.

Results of testing hypothesis 2 have been in consistence with studies of Lewellen (2009) and have not been in consistence with study of dastgir et al., (2012).

**Conclusion**

Obtained results from the study have been presented as follows:

**Table 4: Results of testing hypotheses**

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is significant correlation between cash flow and investment.</td>
<td>Confirmed</td>
</tr>
<tr>
<td>firm size has moderator impact on the correlation between cash flows and investment</td>
<td>Confirmed</td>
</tr>
</tbody>
</table>
Obtained Results from Testing Hypothesis 1
There is significant correlation between cash flow and investment. Hypothesis 1 aims in finding the relationship between cash flow and investment. Obtained results from the study indicate that the *t*-value equal to 11.800 and variable coefficient of CF/Ki(t-1) equal to 0.122 and due to *p*-value equal to 0.0001 in significance level of 0.01, existence of the relationship between cash flow and investment has been confirmed.

Obtained Results from Testing Hypothesis 2
Firm size has moderator impact on the correlation between cash flows and investment.
Hypothesis 2 aims in investigating effect of firm size on relationship of cash flow and investment. Using Wald test and X2 test equal to 2.3279 and *p*-value of 0.0669 in significance level of 0.1, effect of firm size on relationship of cash flow and investment can be confirmed. The value for large firms is more than small firms.

Conclusion
The main objective of the present study is investigating the relationship between cash flow and investment. Obtained results from the study indicate significant impact of cash flow in investment, which can indicate that cash flow can be considered as a stimulant for increasing investment for managers. However, due to the adjustment coefficient, one can’t neglect role of Tobin’s Q variables and investment commitments in investment. In addition, significance of effect of firm size on the relationship between cash flow and investment indicates that income variable can be suitable criterion for measurement of limitation of firms.

Research Limitations
Some limitations for implementation of the present study that should be generalized are as follows:
1- According to limitation of statistical population in listed firms in Tehran Stock Exchange that their fiscal year was ended to March, generalization of the results to other firms should be conducted carefully.
2- Time scope of the study has been 2008-2012. Hence, generalization of these results to other time scopes should be conducted carefully.
3- In order to estimate value of replacement of fixed assets in different years, inflation rate has been applied. Due to the high inflation rate in the mentioned years, the variable may not have high accuracy.

REFERENCES