

## **Study of the relationship among the firm's cash holding level on the relationship between cash flow volatilities and investment in Tehran Stock Exchange**

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**Abstract.** The aim of this study is to investigate the relationship between the firm's cash holding level on the relationship between cash flow volatilities and investment in companies with financial limitations. The assumptions of this research are based on information gathered from 144 companies listed in Tehran Stock Exchange during the years 2000 to 2012 and it was tested by using a combinatorial regression analysis, and Eviews software was applied to analyze the data. The result of the used Univariate regression analysis showed that there is no significant relation among volatility of cash flows, cash holding level and cash flow positive growth. Among the important points of the variable was the operating cash flow relation to assets which had a significant and positive impact on the firms' investments of the current year and the leverage had an adverse effect on investments of the current year.

**Keywords:** cash holding level, cash flow volatilities, investment.

### **1. Introduction.**

In this study, the relationship between cash flow volatility and investment has been examined due to factors such as the cash holdings level and financial limitations are discussed. Because of the importance of cash flows in economic health and durability of the activities of the business units, forecasting it as one of the inseparable financial planning and also with effects on the other financial statements, it is one of the important issues that are under the particular attention of managers of the economic units. One of the determinant factors of cash flows affecting on the company's liquidity situation are the nature of firms' activities, methods of financing and managing demands. When companies face a positive cash flow, they will react due to the manager's incentives in using the appropriate investment opportunities to reduce cash holdings level and to direct the cash resources toward the investments. In contrast, the firm confrontation with negative cash flow situation, leads the managers to an increase in cash holdings due to the need to support the existent detrimental projects and to prevent the spread of bad news arising from negative cash flows to market.

As stated by Kife and Tate (2013), in firms with financial limitations, the cash holdings level provides a shield against the cash flow volatilities which reduces the possibility of cash shortage that is the limiter of firm ability in using investment opportunity. The fact that cash holdings level is important in firms with financial constraints, has been approved by Bates et al (2009). They found that small and young firms keep more cash. Almeida et al (2004) found that in firms with financial constraints, cash sensitivity to cash flow is positive, indicating that corporates keep cash flows instead of investment financing. The experimental results show that the negative correlation between the cash flow volatilities and investment holdings level will weaken by cash.

In contrast, Boyle and Gadry (2003) expressed that the positive correlation between the cash flow volatility and investing in companies with high cash holdings level is weaker. Despite disagreement about the relationship between the cash flow volatility and investing in companies with financial constraints, if cash holdings level is high enough, the investment behavior of a company with financial constraints will converge toward a company without financial constraints. Therefore, Kife and Tate (2013) claimed that in companies with financial constraints, when cash holdings increases, the relationship power between the volatility of cash flow and current investment decreases. They also said that since the cash holdings level protects the company from downside risk (negative cash flow development), the impact of accomplishment of positive and negative cash flow on investment of firms with financial constraints will weaken due to the high cash holdings level.

This paper proceeds as follows: Section 2 develops our hypotheses. Section 3 reviews the data set, constructs the variables, and examines variable properties. Section 4 tests our hypotheses. Section 5 provides concluding remarks.

### 2. Development of hypotheses.

In fact, the question is whether the cash holdings level can effect on relationship between the volatility of cash flows and investment or not? Boyle and Gadry (2003) said that the positive correlation between the volatility of cash flow and investing in companies that have high cash holdings level, is weaker. Despite the disagreement about the relationship between the volatility of cash flow and investing in companies with financial constraints, if cash holdings level is sufficiently high, the investment behavior of a company with financial constraints will onverge towards a company without any financial constraints. Therefore, Kife and Tate (2013) claimed that in companies with financial constraints, when the cash holdings level increases, the relationship power between the volatility of cash flow and current investment decreases. So we represent the first hypothesis of this study as follow:

Hypothesis 1. Within financially constrained firms, the strength of the negative relationship between cash flow volatility and investment weakens with the level of the firms' cash holdings.

Cash holdings buffer firms from downside risk (negative cash flow growth realisations). Therefore the effect of either positive or negative cash flow realisations on investment for constrained firms is attenuated by high cash holdings.

Hypothesis 2. Within financially constrained firms, the mediating effect of cash flow growth realization's (either positive or negative) on the investment-cash flow volatility linkage weakens with the level of firms' cash holdings.

### 3. Data and Empirical Methods.

To test this hypothesis, that "in companies with financial constraints, cash holdings level has a moderating effect on the relationship between the volatility of cash flows and investment", and that "in companies with financial constraints, intensity of moderating effect of positive or negative growth in cash flows on the relationship between investment and cash flow fluctuations will weaken due to the cash holdings level", the following model is used:

$\text{LnCAPXtoAsts}_{i,t}$

$$\begin{aligned} &= \alpha_0 + \alpha_1 \text{CFV}_{i,t-1}^{\text{high}} + \alpha_2 \text{CONS}_{i,t} + \alpha_3 \text{CFRel}_{i,t-1}^+ + \alpha_4 \text{CH}_{i,t}^{\text{high}} \\ &+ \alpha_5 \left( \text{CFV}_{i,t-1}^{\text{high}} * \text{CONS}_{i,t} \right) + \alpha_6 \left( \text{CFV}_{i,t-1}^{\text{high}} * \text{CH}_{i,t}^{\text{high}} \right) \\ &+ \alpha_7 \left( \text{CFV}_{i,t-1}^{\text{high}} * \text{CFRel}_{i,t-1}^+ \right) + \alpha_8 \left( \text{CONS}_{i,t} * \text{CH}_{i,t}^{\text{high}} \right) \\ &+ \alpha_9 \left( \text{CONS}_{i,t} * \text{CFRel}_{i,t-1}^+ \right) + \alpha_{10} \left( \text{CH}_{i,t}^{\text{high}} * \text{CFRel}_{i,t-1}^+ \right) \\ &+ \alpha_{11} \left( \text{CFV}_{i,t-1}^{\text{high}} * \text{CONS}_{i,t} * \text{CFRel}_{i,t-1}^+ \right) + \alpha_{12} \left( \text{CFV}_{i,t-1}^{\text{high}} * \text{CONS}_{i,t} * \text{CH}_{i,t}^{\text{high}} \right) \\ &+ \alpha_{13} \left( \text{CFV}_{i,t-1}^{\text{high}} * \text{CH}_{i,t}^{\text{high}} * \text{CFRel}_{i,t-1}^+ \right) + \alpha_{14} \left( \text{CONS}_{i,t} * \text{CH}_{i,t}^{\text{high}} * \text{CFRel}_{i,t-1}^+ \right) \\ &+ \alpha_{15} \left( \text{CFV}_{i,t-1}^{\text{high}} * \text{CONS}_{i,t} * \text{CH}_{i,t}^{\text{high}} * \text{CFRel}_{i,t-1}^+ \right) + \text{CONTROLS}_{i,t} + \varepsilon_{i,t} \end{aligned}$$

where:

I.  $\text{LnCAPXtoAsts}_{i,t}$ : Investment company

$$\text{LnCAPXtoAsts}_{i,t} = \text{Ln} \left[ \left( \text{CAPX}_{i,t} / \text{Assets}_{i,t} \right) + 1 \right]$$

$\text{CAPX}_{i,t}$ : That is, the Amounts capital expenditures buy fixed assets, intangible assets and other long-term assets annually

$\text{Assets}_{i,t}$ : Total assets

- II.  $CFV_{i,t-1}^{high}$  : SD cash flows over the past three years.
- III.  $CONS_{i,t}$  : To calculate the index, introduced by Hdlak and Pierce (2010) is used  
 $SA\ Index_{i,t} = -0.737 * Firm\ Size_{i,t} + 0.043 * (Firm\ Size_{i,t})^2 - 0.040 * Firm\ Age_{i,t}$ .  
 $Firm\ Size_{i,t}$  : It is the natural logarithm of total assets.  
 $Firm\ Age_{i,t}$  : The number of years the company's activity.
- IV.  $CFRel_{i,t-1}^+$  : The positive growth of the company's cash flow. To calculate the cash flow growth from the following formula is used  
 $(OCF_{i,t-1} - OCF_{i,t-2}) / OCF_{i,t-2}$   
 $OCF$  : Operating cash flow.
- V.  $CH_{i,t}^{high}$  : The high level of cash holdings
- VI.  $CONTROLS_{i,t}$ : includes  $Size_{i,t}$  ,  $Sales\ Growth_{i,t}$  ,  $Assets\ Return_{i,t}$  ,  $OCF\ to\ Assets_{i,t}$  ,  $Leverage_{i,t}$  ,  $G\&A\ Costs\ to\ Assets_{i,t}$

The considered sample was studied during the period of 2000 to 2012 and in a 12-years period and included 144 companies on the companies listed in Tehran Stock Exchange.. In this section, mean, median (central criteria), standard deviation, maximum and minimum (scattering parameters) variables used are calculated and presented in Table1.

Before the study of Table1 It worth's to be noted that most of the final key variables used in this study were dummy variables (zero and one) and for this reason, in order to provide clear information in the section of descriptive statistics, the data on the basis of false information provided above are discussed. Meanwhile, although the primary firm-year value was 1872, but it faced a reduction after sorting and removal of outliers.

Table 1: Summary statistics

Variable	Number	Mean	Middle	Std Dev	Min	Max
$LnCAPXtoAsts_{i,t}$	1500	0	0	0	4	6
$CFV_{i,t-1}^{high}$	1358	0/47	0/3	0/55	0/83	4/24*10 <sup>-6</sup>
$CONS_{i,t}$	1762	2	6	9	4	5
$CH_{i,t}^{high}$	1632	88789/8	19745/3	323315/	221349	191/1
$Sales\ Growth_{i,t}$	1519	4	4	3	6	8
$Assets\ Return_{i,t}$	1706	-3/9	-3/3	0/71	-2/4	-4/2
$OCF\ to\ Assets_{i,t}$	1497	0	0	0	2	0
$Size_{i,t}$	1762	0/39	0/3	0/34	0/6	0/1
$Leverage_{i,t}$	1756	1	1	4	6	8
$G\&A\ Costs\ to\ Assets_{i,t}$	944	0/96	0/5	0/58	7/8	-0/5
		8	7	9	4	0
		0/72	0/59	0/	12/74	0/2
		0/5	0/3	0/63	0/22	4/24*10 <sup>-6</sup>
		6	6	5	0	2
		5/86	5/5	0/66	8/1	4/6
		7	6	2	3	1
		0/09	0/9	0/83	3/4	0/3
		0	0	0	5	0
		0/57	0/5	0/522	0/	0/1

Summary statistics including the number of observations, mean, Middle, standard deviation, minimum, maximum, are reported for variables. For all variables there are 1872 observations.

Table 2: Testing Hypothesis 1 and 2

Variable	Coefficients	SE	Statistics t	Significance level
Constant	0/005	0/002	1/945	0/052
$CFV_{i,t-1}^{high}$	-0/0001	0/0005	-0/271	0/786
$CONS_{i,t}$	0/0006	0/0008	0/772	0/739
$CFRel_{i,t-1}^+$	-0/0008	0/0005	-1/545	0/122
$CH_{i,t}^{high}$	-0/0005	0/0008	-0/735	0/462
$CFV_{i,t-1}^{high} * CONS_{i,t}$	0/0004	0/001	0/252	0/8
$CFV_{i,t-1}^{high} * CH_{i,t}^{high}$	0/0005	0/001	0/498	0/618
$CFV_{i,t-1}^{high} * CFRel_{i,t-1}^+$	0/0008	0/0007	1/104	0/269
$CONS_{i,t} * CH_{i,t}^{high}$	0/0003	0/001	0/168	0/866
$CONS_{i,t} * CFRel_{i,t-1}^+$	0/001	0/001	1/488	0/137
$CH_{i,t}^{high} * CFRel_{i,t-1}^+$	0/001	0/001	1/631	0/103
$CFV_{i,t-1}^{high} * CONS_{i,t} * CFRel_{i,t-1}^+$	-0/002	0/002	-1/104	0/269
$CFV_{i,t-1}^{high} * CONS_{i,t} * CH_{i,t}^{high}$	-0/002	0/003	-0/747	0/454
$CFV_{i,t-1}^{high} * CH_{i,t}^{high} * CFRel_{i,t-1}^+$	-0/001	0/001	-1/394	0/163
$CONS_{i,t} * CH_{i,t}^{high} * CFRel_{i,t-1}^+$	-0/001	0/002	-0/593	0/552
$CFV_{i,t-1}^{high} * CONS_{i,t} * CH_{i,t}^{high} * C$	0/004	0/004	1/061	0/288
Sales Growth <sub>i,t</sub>	0/0005	0/0003	1/732	0/083
Assets Return <sub>i,t</sub>	0/0001	0/0002	0/452	0/65
OCF to Assets <sub>i,t</sub>	0/864	0/002	358/961	0/000
Size <sub>i,t</sub>	-2/02*10 <sup>-5</sup>	0/0004	-0/044	0/964
Leverage <sub>i,t</sub>	-0/001	0/0006	-2/861	0/004
G&A Costs to Assets <sub>i,t</sub>	0/0004	0/004	0/101	0/919
coefficient of determination	0/994		Statistics F	6391/595
coefficient of modified determination	0/994			
Durbin - Watson statistic	1/943	Chance statistics F		0/000

Since the t-statistic of the variables

$$CFV_{i,t-1}^{high} * CONS_{i,t} * CH_{i,t}^{high}$$

and

$$CFV_{i,t-1}^{high} * CONS_{i,t} * CH_{i,t}^{high} * CFRel_{i,t-1}^+$$

in the table was smaller than 1/965 and their importance level is larger than 0/05, so assumptions of the research are not acceptable. As it is evident, Durbin - Watson statistic is 1/943 that is between 1/5 and 2/5, so it has a very good value. In addition, the importance level of F statistic is 0.000, which is significantly less than 0.05 and represents a significant model. Another significant point in Table 2 is that the coefficient of determination and the coefficient of modified determination is 0.944 model.

#### 4. Conclusion.

In order to test the hypothesis of this research that "in firms with financial constraints, cash holdings level of the firm contains a moderating effect on the relationship between the volatility of cash flows and investment", and that "companies experiencing financial constraints, the intensity of the regulating effects of positive or negative growth of cash flow on the relationship between investment and cash flow fluctuations will weaken due to the level of cash holdings ", the model proposed by Kife and Tate (2013), random effects model and generalized least squares method were applied. In this model, in addition to the independent and dependent variables, six control variables were also included and used.

The survey result showed that there is no significant relation between volatility in cash flows and conditional volatility of cash flow in the coming year. The meaning of conditional volatility of cash flow is the regulating effect of no financial limitations, cash holdings level and the positive growth of cash flow on this relationship. Therefore the study assumptions are not plausible. It should be noted that operating cash flow ratio to assets variable had a positive and significant impact on current year investment of firms and financial leverage had an adverse effect on the firm's current investment.

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