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FINANCIAL CONSTRAINTS IN CASH MANAGEMENT

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ABSTRACT

Financial constraints are not directly observable, so empirical research relies on indirect measures. Firms are in financial constraints when they face a gap between internal and external cash use and allocated funds. Getting access to the resources of internal funds is of great importance for financially constrained firms. The present study aims to assess firm performance after spending cash holdings and find the extent of its relationship with financial constraints with an emphasis on cash-use in listed companies on Tehran Stock exchange. This study is an applied descriptive one which has used correlative methods. Criteria-Filtering Technique has been employed to examine listed companies on Tehran Stock Exchange over a period from 2003 to 2011, and 101 companies were selected. Three criteria of firm size, dividend payout ratio, and localized Kaplan and Zingales index in Iran were used to investigate companies' financial constraints. The obtained findings show that financial constraint is significantly and reversely effective in cash-use. In other words, more financial constraints bring about more control over cash-use. It also causes less investment in projects with negative net present value which can be considered as the positive effect of financial constraints on cash-use and firm performance.

Keywords: *Financial Constraint, Firm Performance, Investment, Over-Investment, Under-investment*

INTRODUCTION

Capital market plays a vital role in the economy. Not only does this market activate the dead stock, but also it serves as an indicator of economic prosperity. Therefore, this market and its decision-making bases must be paid more attention. Gaining more capital productivity and return is the main aim of investing. With regards to this issue, some questions are asked. Whether the separation of ownership and management, and conflict of interests can protect beneficiaries' interests or not? And which factors can enhance managers' performance to achieve organizational goals? Firms are in financial constraints when they face a gap between internal and external cash use and allocated funds (Fazzari et al., 1988). Faulkender and Wang (2006) believe that cash holdings are more valuable for financially constrained firms than for unconstrained firms. Denis and Sibilkov (2010) found that greater cash holdings are associated with higher levels of investment for constrained firms with high hedging needs and that the association between investment and value is stronger for constrained firms than for unconstrained firms. These findings imply that higher cash holdings allow constrained firms to undertake value-increasing projects that might otherwise be bypassed. Overall, their findings support the view that greater cash holdings of constrained firms are a value-increasing response to costly external financing. The current study aims to demonstrate that financially constrained firms invest in projects with negative net present value (NPV) less than unconstrained firms. According to Stulz (1990), investing in project with negative NPV decreases firm resources, while investing in projects with positive NPV increases them.

Review of Literature and Research Background

Chan and Rossana (2014) believes there is evidence that constraints bind when output price increases, that investment by constrained firms is countercyclical, and that output response to positive shocks is dampened for firms that are sometimes constrained. The results also are important for policy. In order to maximize growth, efforts to relieve credit constraints should be focused on periods when demand shocks are high.

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Denis and Sibilkov (2010) found that greater cash holdings are associated with higher levels of investment for constrained firms with high hedging needs and that the association between investment and value is stronger for constrained firms than for unconstrained firms. Although they did not discuss firm value assets, their findings imply that higher cash holdings allow constrained firms to undertake value-increasing projects that might otherwise be bypassed. Overall, their findings support the view that greater cash holdings of constrained firms are a value-increasing response to costly external financing.

Arslan et al. (2006) investigated the relationship between financing constraints and investment-cash Flow sensitivities by focusing on cash holdings of firms as the basic classification scheme to separate firms into financially constrained and unconstrained categories. They used a sample of non-financial Turkish companies that were publicly traded over a period covering both pre-crisis and the crisis periods. Their results were in line with their expectations and show that constrained firms exhibit greater investment to cash flow sensitivities than unconstrained firms. Also, there was strong evidence that cash stands as an effective device for firms mainly, during the crisis period.

Acharyaa et al. (2005) provide evidence that cash balances secure investment through hedging against cash flow deficits, and increase firms' ability and capacity to invest.

Almeida et al. (2004) conducted a research entitled "The cash flow sensitivity of cash" and concluded that constrained firms should have a positive cash flow sensitivity of cash, while unconstrained firms' cash savings should not be systematically related to cash flows.

Allayannis et al. (2004) investigated the relationship between financial constraints and cash flow sensitivity of investment, and found that financially constrained firms which cannot get access to external resources put more emphasis on cash flows when making decision about investing.

Firms are in financial constraints when they face a gap between internal and external costs and allocated funds. Getting access to the resources of internal funds is of great importance for financially constrained firms. Thus it is assumed that fluctuations in cash flows cause many problems for financially constrained firms. Furthermore, due to easy access to external funds, unconstrained firms are not as sensitive as constrained firms when investing. Based on different conducted researches, there are various criteria for defining and classifying financial constraints. Some of these classifications can be listed as follows: firm size, firm age, divided profit ratio, business group, cash holdings level, and model of optimal cash holdings. Following Almeida (2004) and Wang (2006), in this study, three criteria of firm size, dividend payout ratio, and localized KZ-index (Kaplan and Zingales) in Iran have been used to investigate companies' financial constraints.

Firm size can affect financing. Natural logarithm of book value of total assets can be used to measure firm size (George et al., 2008). Firms whose size is less than the median of total firms' sizes are considered as financially constrained firms, otherwise they are unconstrained firms. In addition, large firms exhibit fewer information asymmetries and face lower costs of external financing than small firms. It is also assumed that large firms hold less cash because they are more likely to be diversified and, hence, less likely to experience financial distress (Ozkan, 2004). Peterson and Raman (1994) stated that smaller firms enjoy less transparency in proportion to bigger firms. Morchica and Mura (2007) believed that low information transparency increases the risk of financing and costs. Moreover, it increases the capital costs and thus, lots of investment opportunities are lost according to NPV rules.

Firms which pay dividend are less probable to face financial constraints in proportion to the firms which do not pay dividend, since if they have difficulty in financing from external resources, they can stop paying dividends (Arsalan et al., 2006). However, stopping dividends reduces the companies' reputation among investors outside the organization, and brings about more difficulties in financing from external resources (Morchica & Mura, 2007).

In this study, firms whose paid dividends are less than the median of total firms' dividends in the sample are considered as financially constrained firms, otherwise they are unconstrained firms. Furthermore, payout ratio was calculated based on total payouts (including dividends and buy backs) divided by total revenues. So, firms which paid dividends during the studied year are considered as financially unconstrained firms, otherwise they are financially constrained firms.

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Kaplan and Zingales (1997) concluded that different criteria such as profitability, growth opportunities, leverage ratio (change ratio), dividend ratio and cash assets determine that a firm is financially constrained.

Kaplan and Zingales (KZ) index is a set of variables which can demonstrate a firm's financial constraints in financing from external resources. Financial constraints can mean frictions that prevent the firm from funding all desired investments. This disability to fund investment might be due to credit constraints or inability to borrow, inability to issue equity, dependence on bank loans, or illiquidity of assets which force firms to issue their stocks. The KZ index is higher for the firms that are more constrained. Due to the fact that this study is being conducted in Iran, the localized model by Jahankhani and Kanani Amiri (2006), which was accomplished on the basis of 723 samples over a 14-year period, has been employed in the current study.

Research Hypotheses
Considering research objectives and reviewed literature, research hypotheses can be listed in the following manner:
H1: Financial constraints significantly affect the relationship between cash-use and firm performance.
H2: Despite strong liquidity, financial constraints significantly affect the relationship between cash-use and firm performance.
H3: Despite weak liquidity, financial constraints significantly affect the relationship between cash-use and firm performance.

RESEARCH METHODOLOGY
The present study is an applied descriptive one which used correlative methods due to the existence of more than two variables. This study aims to assess the relationship between dependent and independent variables. Having selected the research sample, firm adjusted performance was considered as dependent variable, and variables of cash-use, financial constraint, and interaction between cash-use and financial constraints were considered as independent variables. Multiple regression models, coefficient of determination (R^2), Eviews software (version 7) and SPSS software (version 19) were used to test research hypotheses.

Research sampling in this study was conducted considering the following criteria and applying Criteria-Filtering Technique:
The company was listed on Tehran Stock Exchange from 2003 to 2011.
The company's fiscal year should be leading to March during the process of research period.
Needed data related to financial statements were accessible during the process of research period, and their market value was available each year at the end of March.
The company did not have a trading halt for more than 6 months.
Finally, 101 firms were chosen as the research sample.

Research Variables
Dependent Variable Measurement, Operational Performance (ExROAi,t+2-ExROAi,t-1)

In order to assess operational performance, excessive return on assets (ExROA) was considered as performance index, since it is assumed that ExROA can report the effects of industry on performance. Furthermore, adjusted operational performance was investigated during a three-year period, from a year before cash-use (t-1) to two years after cash-use (t+2); therefore, final operational performance in year t equals the equation 1:

$$ExROA_{i,t+2} - ExROA_{i,t-1} = (ROA_{i,t+2} - med(ROA_{ind,t+2})) - (ROA_{i,t-1} - med(ROA_{ind,t-1})) \qquad \textbf{Equation 1}$$

Where;

$$ROA_{it} = \frac{E_{it}}{TA_{it}}$$

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Eit: net earnings of firm i at the end of year t

TAit: book value of total assets of firm i at the end of year t

In order to measure the variable of $med(ROA_{ind,t+2})$, returns on current assets in industry i (i= 1,2,...10) in year t+2 were sorted and their median was calculated in each industry. The obtained number was considered as the index for industry returns in regarded year.

Independent Variables Measurement

Cash-use - Cash-use is one of independent variables of the research which includes any changes in cash holdings during different years. Changes between cash and cash equivalent assets such as short-term investment and short-term accruals receivable were used to measure cash-use from the beginning of year (t-1) to the end of year t.

Financial Constraints (FC) - Three criteria were used to measure the variable of financial constraints which are firm size, payout ratio and Kaplan-Zingales (KZ) index.

Firm Size - Firm size equals logarithm of total assets:

$$SIZE_{it} = \log TA_{it}$$

When firm size is calculated, if size of firm i is larger than median of total firms' sizes, it is an unconstrained firm whose dummy variable of financial constraints (DFC) is zero. Firms whose sizes are smaller than others are considered as financially constrained firms, and their DFC equals 1.

Payout Ratio - Payout ratio can show the extent of financial constraints a firm is faced with. Firms which cannot conveniently get access to capital market keep more cash flows. Thus following Almeida et al. (2004), payout ratio can be calculated through total payouts to shareholders (including dividend and paid cash for buy backs) divided by total revenues. If payout of firm i is more than median of total firms' payouts, it is considered as an unconstrained firm whose DFC value is zero. Other firms whose payout is less than median of total firms' payouts are financially constrained firms whose DFC equals 1.

KZ index - KZ index was introduced by Kaplan and Zingales and can be calculated as follows:

$$KZ_{it} = -1.002 \times CashFlow_{it} + 3.139 \times Lev_{it} + 0.283 Q_{it} - 39.368 \times Div_{it} - 1.315 \times Cash_{it}$$

The localized model by Jahankhani and Kanani Amiri (2006), which was accomplished on the basis of 723 samples over a 14-year period, has been employed in the current study. The localized KZ index for Iranian companies can be assessed as follows:

$$KZ = +2.85351 \frac{C_{it}}{A_{it-1}} - 0.02605 \frac{CF_{it}}{A_{it-1}} + 4.11457 \frac{DIV_{it}}{A_{it-1}} + 2.22050 LEV_{it}$$

Where;

Cit/Ait-1: book value of total assets at the beginning of the year divided by cash holding in year t

CFit/Ait-1: book value of total assets at the beginning of the year divided by operational cash flow in year t

DIVit/Ait-1: book value of total assets at the beginning of the year divided by dividends in year t

LEVit: book value of total assets at the beginning of the year divided by total debts

Since this study is being conducted in Iran, the localized model has been used.

Having assessed KZ index, median of KZ indexes were calculated for all firms and dummy variable of DFC was defined in the following manner. Firms whose DFC is less than median are considered as financially constrained firms, so their FC equals 1, otherwise they are unconstrained firms whose FC equals zero.

$$DFC_{it} = \{ \begin{matrix} 1 & FC_{it} \leq medFC \\ 0 & otherwise \end{matrix}$$

Firms' Classification on the Basis of Their Liquidity

Firms were classified into two groups: firms with strong and weak liquidities, and were assessed through equation 2:

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Equation 2

$$Liq_{it} = \frac{CASH_{it} + REC_{it} + INV_{it}}{TA_{it}}$$

CASHit: cash holdings at the end of year t
RECit: accruals receivable at the end of year t
Invit: short-term investment at the end of year t
TAit: firm's total assets at the end of year t
If the ratio of cash and cash equivalents to total assets for firm i in year t is more than median of total firms, firm i will be considered as a firm with strong liquidity, otherwise it is a firm with weak liquidity.

Research Model
The model 1 was used to test research hypotheses:
Model 1:

$$ExROA_{i,t+2} - ExROA_{i,t-1} = \alpha + \beta_1 Cash\_Use_{it} + \beta_2 DFC_{i,t-1} + \beta_3 (Cash\_Use_{it} \times DFC_{i,t-1}) + \beta_4 Size_{it} + \beta_5 MTB_{it} + \beta_6 PPE_{it} + \varepsilon_{it}$$

ExROAi,t+2-ExROAi,t-1:

$$ROA_{it} = \frac{EARN_{it}}{TA_{it}}$$

Where;
ROAit: returns on assets for firm i in year t
EARNit: earnings before interest and taxes for firm i in year t
TAit: total assets for firm i in year t
Thus the firm's operational performance equals the subtraction of the firm's returns on assets from median of the industry's returns.

$$ExROA_{it} = ROA_{it} - med(ROA_{ind,t})$$

ROAit: return on assets of firm i at the end of the year t
Med(ROAind,t): median of industry's return on assets
Cash-use: changes in cash holdings, accruals receivable and short-term investments for firm i at the end of year t in proportion to the beginning of year t
Financial constraints (FC): dummy variable which equals one in case of being financially constrained, otherwise it equals zero. Three criteria of firm size, dividend and KZ index have been considered as financial constraints indexes.
Size:

$$SIZE_{it} = \log TA_{it}$$

TAit: total assets of firm i at the end of year t
MTB: opportunities for future growth

$$MTB_{it} = \frac{MVE_{it}}{BVE_{it}}$$

MVEit: market value of shareholders' equity for firm i at the end of year t which equals the multiplication of firm's issued shares by the final price of traded shares at the end of year t
BVEit: book value of total shareholders' equity for firm i at the end of year t
PPE: structure of assets

$$PPE_{it} = \frac{FA_{it}}{NCA_{it}}$$

FAit: book value of fixed assets for firm i at the end of year t
NCAit: total non-current assets for firm i at the end of year t

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Weak and strong liquidity:
If ratio of cash and cash equivalents to total assets for firm i in year t is more than median, firm i in year t is considered as a firm with strong liquidity, otherwise, it is weak.

Data Collection
Needed data, statistics and information were collected through financial statements of listed companies on Tehran Stock Exchange over an eight-year period, annual reports, website www.seo.ir, and Rahavard Novin software. Desk methods were applied to study theoretical bases.

Data Analysis
When needed data were collected and dependent and independent variables were studied, they were classified and sorted by Excel software, and then, they were analyzed by SPSS and Eviews software.
Regression models were assessed through F statistic, and their significance was tested through T statistic. However, coefficient of determination (R2) and Durbin-Watson (DW) were applied for analyzing the results, and results of F-Limer test and Hausman test were used to sort the data (cross-sectional or synthetic data).

RESULTS
Results of First Hypothesis Testing
First hypothesis: Financial constraints significantly affect the relationship between cash-use and firm performance.
The statistical hypothesis can be written as follows:
H0: Financial constraints do not significantly affect the relationship between cash-use and firm performance.
H1: Financial constraints significantly affect the relationship between cash-use and firm performance.
In order to assess the abovementioned hypothesis, regression model 1 has been written in the Model number 1 :
Model 1:

$$ExROA_{i,t+2} - ExROA_{i,t-1} = \alpha + \beta_1 Cash\_Use_{it} + \beta_2 DFC_{i,t-1} + \beta_3 (Cash\_Use_{it} \times DFC_{i,t-1}) + \beta_4 Size_{it} + \beta_5 MTB_{it} + \beta_6 PPE_{it} + \varepsilon_{it}$$

Three criteria of firm size, payout ratio and KZ index were used to define dummy variable of financial constraint (DFC). Thus, results of each hypothesis were presented according to each criterion. If coefficient of β_3 is significant at the confidence level of %95, the above hypothesis will be confirmed.
Owing to the fact that needed data were collected from 101 companies over an eight-year period (from 2003 to 2011), before estimating the above model, F- Limer test was used to select one of the methods of cross-sectional or synthetic data. If H0 is confirmed, cross-sectional data method is utilized, and if it is rejected, synthetic data method is applied. Results of this test are presented in table 1.

Table 1 Results of Limer and Hausman tests

Test	Financial constraint index	Size		Payout		KZ	
	Effects Test	Statistic	Probability	Statistic	Probability	Statistic	Probability
Limer	Cross-section F	1.427697	0.0000	1.585965	0.0000	1.493680	0.0032
	Limer test's results	Panel data		Panel data		Panel data	
Hausman	Cross-section random	36.572921	0.0000	43.831666	0.0000	35.448133	0.0000
	Hausman test's results	Fixed effects method		Fixed effects method		Fixed effects method	

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Considering the results of table 1 demonstrates that significance probability is less than %5, thus H1 which emphasizes on panel data is confirmed.

Table 2 Results of first hypothesis testing

Dependent Variable: NEXROA
Method: Panel Least Squares
Sample: 1382-190
Periods included: 8
Cross-sections included: 101
Total panel (balanced) observations: 458

$$ExROA_{i,t+2} - ExROA_{i,t-1} = \alpha + \beta_1 Cash\_Use_{it} + \beta_2 DFC_{i,t-1} + \beta_3 (Cash\_Use_{it} \times DFC_{i,t-1}) + \beta_4 Size_{it} + \beta_5 MTB_{it} + \beta_6 PPE_{it} + \varepsilon_{it}$$

Financial constraint index	Size			Payout			KZ		
Variable	Coefficient	Statistic	Probability	Coefficient	Statistic	Probability	Coefficient	Statistic	Probability
C	9.76	4.33	0.00	10.55	5.43	0.00	10.83	5.55	0.00
CASH_Use	2.76	1.58	0.12	1.03	0.60	0.55	0.71	0.48	0.63
DFC	0.39	1.76	0.08	0.35	2.04	0.04	0.04	0.29	0.77
CASH_U* DFC	-4.73	-1.93	0.05	-0.38	-0.16	0.87	-1.62	-3.22	0.00
SIZE	-1.68	-4.50	0.00	-1.82	-5.56	0.00	-1.83	-5.58	0.00
MTB	-0.08	-4.64	0.00	-0.08	-4.28	0.00	-0.08	-4.46	0.00
PPE	0.10	0.28	0.78	0.15	0.40	0.69	0.12	0.33	0.74
Adjusted R2	-	0.23	-	-	0.11	-	-	0.24	-
Durbin-Watson	-	1.76	-	-	1.71	-	-	1.68	-
Fisher (F) statistic	-	1.61	0.00	-	1.63	0.00	-	1.55	0.00

Second and Third Hypotheses Testing
Second hypothesis: Despite strong liquidity, financial constraints significantly affect the relationship between cash-use and firm performance.
Statistical hypothesis can be written in the following manner:
H0: Despite strong liquidity, financial constraints do not significantly affect the relationship between cash-use and firm performance.
H1: Despite strong liquidity, financial constraints significantly affect the relationship between cash-use and firm performance.
Third hypothesis: Despite weak liquidity, financial constraints significantly affect the relationship between cash-use and firm performance.
H0: Despite weak liquidity, financial constraints do not significantly affect the relationship between cash-use and firm performance.
H1: Despite weak liquidity, financial constraints significantly affect the relationship between cash-use and firm performance.

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Table 3 Results of Limer and hausman tests for the firms with weak and strong liquidity

Group	Financial constraint index	Size		Payout		KZ	
	Effects Test	Statistic	Probability	Statistic	Probability	Statistic	Probability
Strong liquidity	Limer test	1.493043	0.0155	1.505928	0.0137	1.496682	0.0149
	Hausman test	22.348822	0.0010	39.067143	0.0000	26.941232	0.0001
	Results of Limer and Hausman tests	Panel data with Fix effects		Panel data with Fix effects		Panel data with Fix effects	
Weak liquidity	Limer test	0.946097	0.6026	0.988964	0.5110	0.968976	0.5536
	Hausman test	-	-	-	-	-	-
	Results of Limer test	Applying cross-sectional data method (Pooled data)		Applying cross-sectional data method (Pooled data)		Applying cross-sectional data method (Pooled data)	

Results of Limer test for firms with weak liquidity are more than %5, thus cross-sectional data method should be employed and there is no need to Hausman test, and regression model of Pooled Least Square is used. Durbin-Watson statistics can be observed in table 4.

Table 4 Durbin-Watson statistics

Financial constraint index	Size	Payout	KZ
Durbin-Watson statistic	1.493043	1.505928	1.496682
Result	Autocorrelation between remained of the model		

In order to remove the autocorrelation problem, time delay estimation technique was used, and the results of model's re-estimation were presented in table 5 and6

Table 5 Results of hypotheses testing according to strong liquidities

	Dependent Variable: NEXROA Method: Panel Least Squares Cross-sections included: 50							
Group	Firms with strong liquidity							
Financial constraint index	Size			Payout			KZ		
Variable	Coefficient	Statistic	Probability	Coefficient	Statistic	Probability	Coefficient	Statistic	Probability
C	0.03	0.03	0.97	0.83	1.43	0.15	12.71	4.43	0.00
CASH_Use	1.76	0.84	0.40	-3.71	-2.29	0.02	-1.76	-0.91	0.37
DFC	0.37	2.05	0.04	-0.34	-2.21	0.03	0.03	0.13	0.89
CASH_U*DFC	-1.01	-1.94	0.05	4.36	1.86	0.06	-1.79	-2.53	0.00
SIZE	-0.04	-0.28	0.78	-0.11	-1.14	0.25	-2.17	-4.49	0.00
MTB	-0.05	-2.07	0.04	-0.06	-2.33	0.02	-0.08	-2.13	0.03
PPE	0.90	2.48	0.01	0.98	2.69	0.01	-0.05	-0.05	0.96
AR(1)	-	-	-	-	-	-	-	-	-
Adjusted R2		0.14			0.13			0.34	
Durbin-Watson		1.92			1.93			1.88	
Fisher (F) statistic		1.64	0.00		1.64	0.00		1.58	0.00

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Table 6 Results of hypotheses testing according to weak liquidities

Dependent Variable: NEXROA								
Method: Pooled Least Squares								
Cross-sections included: 51								
Firms with weak liquidity								
Size			Payout			KZ		
Coefficient	Statistic	Probability	Coefficient	Statistic	Probability	Coefficient	Statistic	Probability
-0.96	-4.94	0.00	0.54	3.54	0.00	0.78	4.96	0.00
0.42	1.35	0.18	3.17	7.02	0.00	-1.02	-3.11	0.00
0.35	7.95	0.00	0.19	5.63	0.00	-0.31	-9.58	0.00
2.47	3.47	0.00	-4.17	-7.33	0.00	5.99	9.56	0.00
0.11	3.68	0.00	-0.13	-5.35	0.00	-0.13	-5.26	0.00
-0.01	-2.63	0.01	-0.01	-3.81	0.00	-0.01	-4.10	0.00
0.30	6.51	0.00	0.30	6.50	0.00	0.30	6.43	0.00
0.32	36.09	0.00	0.33	36.66	0.00	0.33	37.06	0.00
	0.13			0.11			0.12	
	1.73			1.70			1.71	
	237.2			201.31	0.00		229.8	0.00

Model's Validity and Residuals

Non-existence of autocorrelation: Durbin-Watson test was used in the present study to examine autocorrelation of variances in different periods. The most appropriate Durbin-Watson statistic should be between 1.5 and 2.5, and the results of table 2 were all between these two amounts. Thus, residuals' independency is accepted. Results of table 5 and 6 show that such problems do not happen for firms with strong liquidity. But in firms with weak liquidity, all Durbin-Watson statistics were less than 1.5, so time delay estimation technique was used. After that, all statistics were put in the permissible range, and residuals' independency was accepted.

Non-existence of col linearity: Variance inflation factor (VIF) for variables were less than 10, so non-existence of col linearity was confirmed among total variables in firms with weak or strong liquidities.

Fisher (F) statistic: Fisher test was applied to test the linear relationship and examine whether the research model's linearity or non-linearity is accepted. H0 of this test confirms non-linearity of the model, while H1 confirms linearity of the model. Results of tables 2 and 5 reject H0 with the significance probability of zero (less than %5) and confidence level of %99. In other words, there is a significant linear relationship between dependent and independent variables.

Adjusted coefficient of determination (R2): coefficient of determination shows some changes of the dependent variable which is explained through independent variables of the model. The achieved results of model's estimation show that applying localized KZ index enhanced the model's strength for explaining adjusted returns on assets on the basis of mean of industry's return on assets.

First hypothesis findings: Considering the results of significance of regression coefficients which were mentioned in table 2 and regarding T statistic for coefficient of interaction between financial constraint (DFC) and cash-use which was less than 0.05 (0.00), it can be concluded that financial constraint can significantly affect returns on cash-use at confidence level of %95. Thus, the first hypothesis is confirmed. Negativity of this variable's coefficient for three criteria shows the reverse effect of financial constraint on cash-use. In other words, more use of cash in financially constrained firms decreases return on investments. It shows that financially constrained firms face more difficulties when planning for their investments.

Second and third hypotheses findings: Considering the results of significance of regression coefficients which were mentioned in table 5 and 6 and regarding T statistic for coefficient of interaction between financial constraint (DFC) and cash-use for the firms with weak liquidity which was less than 0.05 (0.00),

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it can be concluded that financial constraint can significantly affect returns on cash-use at confidence level of %95. Thus, the first hypothesis is confirmed. The achieved findings show that firms with weak liquidity are more sensitive to financial constraints, since coefficient of variable DFC*Cash-Use is more than the firms with strong liquidity. It proves that financially constrained firms with weak liquidity face more problems when planning for investments. In firms with strong liquidity, negativity of this variable's coefficient for three criteria shows the reverse effect of financial constraint on cash-use. In other words, financially unconstrained firms can take more advantage of their opportunities and gain more returns based on NPV rules.

Results of hypotheses testing can be observed in table 7.

Table 7 Results of hypotheses testing

	Hypothesis	Result of hypothesis testing
1	Financial constraints significantly affect the relationship between cash-use and firm performance.	Confirmed
2	Despite strong liquidity, financial constraints significantly affect the relationship between cash-use and firm performance.	Confirmed
3	Despite weak liquidity, financial constraints significantly affect the relationship between cash-use and firm performance.	Confirmed

CONCLUSION AND DISCUSSION

The present study mainly aimed to assess firm performance after using the cash and measure the extent of its relationship with financial constraints with emphasis on liquidity power in listed companies on Tehran Stock Exchange. To achieve this goal, three hypotheses were designed and 101 listed companies were studied over a period from 2003 to 2011. At confidence level of %95, the obtained findings show that financial constraints significantly and reversely affect cash-use and firm performance. Thus, first hypothesis is confirmed. Findings of this hypothesis testing are consistent with findings of Almeida et al. (2004), allayannis et al. (2004), Huang (2002), Denis and Sibilkov (2007), and Mi Luo (2011). More level of cash-use in financially constrained firms decreases returns on investments. It shows that financially constrained firms face more difficulties when planning for investments. Furthermore, firms with strong liquidity, financial constraints significantly and reversely affect cash-use and firm performance. Thus, second hypothesis is confirmed at confidence level of %95. In other words, financially unconstrained firms can take more advantage of their opportunities and gain more returns based on NPV rules. Findings of this hypothesis testing are consistent with the findings of Denis and Sibilkov (2007) and Mi Luo (2011). Considering research findings and collected and analyzed data, this conclusion can be drawn that firms with weak liquidity significantly affect cash-use and firm performance, so third hypothesis is confirmed at confidence level of %95. Thus, liquidity cannot be considered as an important and effective financial constraint in the relationship between cash-use and firm performance. Findings of this hypothesis testing are against findings of Denis and Sibilkov (2007) and Mi Luo (2011). Regarding first hypothesis findings which shows significant effect of financial constraint on the relationship between cash-use and firm performance, and due to the fact that firm size is reversely associated with financial constraints, and also considering this fact that financially constrained firms face more difficulties when planning for investments, it is suggested that investors pay more attention to firm size when making decision about listed companies on Tehran Stock Exchange. Considering second and third hypotheses findings which show significant effect of financial constraint on relationship between cash-use and firm performance for firms with weak and strong liquidities, it is suggested to regard firms with both weak and strong liquidities when assessing the effectiveness of financial constraints on the relationship between cash-use and firm performance.

Research Article

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