The Relation between Stock Liquidity & Cash Holdings in Tehran Stock Exchange

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Abstract

Corporations have a tendency to hold large proportion of their assets in the form of cash . This subject has attracted researchers to determine factors that influence it. The current study shows that there is a financial markets channel that affects corporations' cash holdings ; so according to the rapid growth of the capital market in Iran, the necessity of such investigations is obvious. This present study uses panel data for a sample of 200 firms listed in the Tehran Stock Exchange over the period from 2007 to 2012 to analyse the relation between cash holdings and liquidity factors included value of transactions, number of transactions, turnover rate and trading probability. Our results show that value of transactions, number of transactions and turnover rate are positively related to cash holdings at a 95% confidence level; so that an increase in each of these variables will lead to increasing in cash holdings; however we find no significant relation between trading probability and firms' tendency to accumulate cash.

Key Words: Cash holdings; Liquidity; Value of transactions; Number of transactions; Turnover rate; Trading probability

1. Introduction

Corporations hold a significant amount of cash. In the UK context, Al-Najjar and Belghitar (2011) find that cash represents, on average, 9% of the total assets. Dittmar and Mahrt-Smith (2007), using US data, find that around 13% of total assets are cash and near-cash assets. Thus, cash is a sizeable asset for firms. Cash is the lifeblood of a business that enables it to survive and prosper. Managing efficiently is integral to the success of corporations. On the other hand, managing poorly can cause to undermine the business's short-term stability and its long-term survival. Poor cash management is causing more business failures today than ever before.

According to Keynes, money is demanded because of three motives -transaction, precautionary and speculative. The first two motives provide yield of convenience and certainty. The third motive provides money yield. Corporations hold cash to satisfy normal disbursement and collection activities associated with a firm's ongoing operations. The necessity for cash on this account arises to bridge the gap between the receipt of incomes and its spending. This motive for holding cash has been called by Keynes as 'transaction motive'. Besides day-to-day transactions, there are many unforeseen contingencies in the life of corporations for which they hold money as a safety margin to act as a financial reserve. The third and the last motive for liquidity preference is the desire to earn profits.

Many companies may think that the rate of interest in the future will be higher and in order to take advantage of this future increase in the rate of interest, they may like to keep money in the liquid form to be invested in securities when the rates of interest actually rise. In the opposite case when the feeling is that interest rates would decline, they will invest in the present. Keynes has called this as 'Speculative Motive'.

Also, when a firm holds cash in excess of its requirements, it incurs an opportunity cost. The opportunity cost of excess cash is the interest income that could be earned in the next best use. Another important cost of holding high levels of cash is the agency problems between firm's management and shareholders (Jensen,1986). So to determine the appropriate cash balance, the firm must weigh the benefits of holding cash against these costs.

Studying factors that affect the firm's cash holdings decision, can helps financial managers to make necessary adjustments about the levels of holding cash and reach target level. One of these factors is stock liquidity.

The goal of this paper is to examine whether the liquidity position of firms on the Tehran stock market is related to the level of cash reserves in corporations. To address this issue, we use four different liquidity measures; namely, value of transactions (VT), the number of transactions (NT), the turnover rate (TR), and the trading probability (TP).

The rest of the paper is organized as follows. In Section 2, we provide a brief account of the related literature and discuss our main motivations for undertaking this study. In Section 3, we discuss the data and present our method. In Section 4, the main results are presented and discussed, while in the final section, we provide some concluding remarks.

2. Literature Review

Numerous studies have focused on cash holdings. These include Opler et al. (1999) using US data in the 1971 to 1994 period from 1048 firms to find the determinants and implications of corporate cash holdings. Through time-series and cross-section tests, they found that firms with strong growth opportunities and riskier cash flows hold relatively high ratios of cash to total non-cash assets. Firms that have the greatest access to the capital markets tend to hold lower ratios of cash to total non-cash assets. Opler et al. also found that firms that do well tend to accumulate more cash; Dittmar et al. (2003) using an international sample of 45 countries; Ozkan and Ozkan (2004) and Al-Najjar and Belghitar (2011) in the UK setting; Ferreira and Vilela (2004) within an EMU context; Nguyen (2005) in Japanese firms; Saddour (2006) collecting data from 297 French firms; Afza and Adnan (2007) and Rizwan and Javed (2011) in Pakistani firms;

Drobetz and Grüninger (2007) and Nyborg and Wang (2013) in Swiss firms, Nyborg and Wang used a sample of 92,169 firm-year observations to determine the relation between stock liquidity (the relative effective bid-ask spread and Amihud's ILLIQ) and the level of cash holdings. They found that a higher level of stock liquidity leads to more cash holdings, and vice versa. Furthermore, the cash ratio sensitivity to stock liquidity is increasing in growth opportunities, measured by the market-to-book ratio or R&D expenditures normalized by total assets. They also introduced two new control variables, namely firm age and equity beta. Their findings show that the age of a firm is negatively associated with its cash ratio but the beta of a firm's stock is positively related with its cash reserves; Hardin III et al. (2009) within REITs context; Lakshman Alles et al. (2012) among Chinese firms; Chen et al. (2012) collected a sample of 8626 firms. They show a significant positive relation between stock liquidity and the value of cash holdings. Their findings show that stock liquidity improves blockholders monitoring and threat of exit and promotes efficient management compensation contracts.

In addition to the determinants of cash holdings, other researchers have investigated the link between cash holdings and firm value. For example, Martinez-Sola, Garcia-Teruel, and Martinez-Sola (2010) use US data and show that there is a concave relationship between cash holdings and firm value. In a similar vein, Tong (2009) finds that cash value is lower in diversified than in non-diversified firms. Pinkowitz, Stulz, and Williamson (2006) detect a weak relationship between cash holdings and firm value in countries that suffer from lower investor protection compared with countries with stronger protection.

Yet, there is limited evidence of corporate cash holdings in relation to stock liquidity. We aim to bridge this gap in the literature.

3. Corporate Cash Holdings: Theory and Empirical Hypotheses

There are three theoretical models that can help to explain which firm characteristics influence cash holdings decisions. First, the trade-off model postulates that firms identify their optimal level of cash holdings by weighting the marginal costs and marginal benefits of holding cash (Ferreira and Vilela, 2004).

Second, the pecking order theory of Myers (1984), supported by the theoretical foundation of Myers and Majluf (1984), states that to minimize asymmetric information costs and other financing costs, firms should finance investments first with retained earnings, then with safe debt and risky debt, and finally with equity.

This theory suggests that firms do not have target cash levels, but cash is used as a buffer between retained earnings and investment needs (Ferreira and Vilela, 2004).

Finally, the free cash flow theory of Jensen (1986) suggests that managers have an incentive to build up cash to increase the amount of assets under their control and to gain discretionary power over the firm investment decision. Cash reduces the pressure to perform well and allows managers to invest in projects that best suit their own interests, but may not be in the shareholders best interest (Ferreira and Vilela, 2004).

The determinants of cash holdings used as control variables in our model are as follow:

Leverage

According to the trade-off theory, it is generally accepted that leverage increases the probability of bankruptcy. To reduce the probability of experiencing financial distress, firms with higher leverage are expected to hold more cash. On the other hand, to the extent that leverage ratio acts as a proxy for the ability of the firms to issue debt it would be expected that firms with higher leverage (higher ability to raise debt) hold less cash. Thus, the predicted relationship between cash holdings and leverage is ambiguous.

In a pecking order world, debt typically grows when investment exceeds retained earnings and falls when investment is less than retained earnings. Consequently, cash holdings fall when investment exceeds retained earnings and grow when investment is less than retained earnings. This relationship between cash holdings, debt and investments suggests that there is a negative relation between leverage and cash holdings.

According to Jensen's (1986) free cash flow theory, Low leverage firms are less subject to monitoring, allowing superior management to amass cash . Thus, we expect that less levered firms hold more cash (Ferreira and Vilela, 2004).

Dividend Payments

Based on the trade off theory, the association between dividend payments and cash should be negative, since firms that distribute dividends to their shareholders are more able to raise funds at lower costs when needed by reducing their dividend payments (Al-Najjar,2012).

However, in contrast to this view, Ozkan and Ozkan (2004) suggest that fears of being caught short of cash and unable to pay their promised dividends leads dividend-paying firms to hold more cash.

Profitability

Profitable firms usually have more cash flows. These firms will be reluctant to hold large amount of cash. On the other hand, creditors tend to lend money to companies that are more profitable to reduce their risk. So consistent with trade-off theory, the relation between two is negative.

Based on the pecking order theory, internal funds are the first option for financing; so, profitable firms that have high cash flows try to accumulate more cash. In addition, managers in this situation have better flexibility in financial policies and in turn such firms will hold more cash.

Size

The trade-off theory contends a negative relationship between firm size and levels of cash holdings. large firms are generally more diversified, a cash shortfall in one segment of a firm can easily be resolved through re-allocating cash flow from another segment or by liquidating assets in a non-core segment (Opler, et al., 1999; Titman & Wessels, 1988).Furthermore, large firms have usually been in an industry for a longer period, with their size itself the result of continuous growth over past years. Features associated with large firms, such as higher profitability, better corporate governance, less information asymmetry, and lower likelihood of financial distress and bankruptcy, make them more appealing to external financial providers (Brennan & Hughes, 1991).

Overall, their low cost of external financing, great access to internal financial markets, low possibility of financial distress and bankruptcy, and few financial constraints all lead large firms to accumulate lower levels cash reserves.

The pecking-order theory posits that large firms generally maintain large cash reserves and that a firm's size is a good indicator of its business success (Lakshman et al.,2012).

Investment Opportunities

The cost of incurring in a cash shortage is higher for firms with a larger investment opportunity set due to the expected losses that result from giving up valuable investment opportunities.

Also, a large investment opportunity set creates a demand for a large stock of cash, because cash shortfalls imply that unless a company engages in costly external financing it must forego profitable investment opportunities. Therefore, a positive relation between the investment opportunity set and cash holdings is expected (Ferreira and Vilela, 2004).

Ownership Concentration

Based on the free cash flow theory, firms' managers are willing to hold larger target cash reserves, as free cash flow would provide managers with many private benefits.

Major shareholders, having claims on a large fraction of the firm's cash flows, can have more incentives to monitor managers. Consequently, concentrated ownership diminishes managers' authority and would not allow managers to accumulate cash reserves. So, we expect to observe a negative relation between ownership concentration and cash holdings.

Stock Liquidity and Cash Holdings

Our study is motivated by two opposing views regarding the relation between stock liquidity and the value of cash holdings. One view advocates a positive relation between the two, and the other advocates a negative relation. According to the view on the positive relation between stock liquidity and the value of cash, high liquid stock can indicate the ability of management in value creation for the company and increase shareholders' wealth, gain maximum returns with minimum risk, sustainability and forecasting a clear prospect for the future of the company. This firm has a wide range of investment opportunities so it is expected to hold more cash in order to use these opportunities. On the other hand, Subrahmanyam and Titman (2001) and Khanna and Sonti (2004) show liquidity can positively affect firm performance even when agency conflicts are absent. Fang, Noe and Tice (2009) also found that firms with liquid stocks have better performance. Therefore, this better performance can lead to growth in cash flows. Consequently, we expect a positive relation between stock liquidity and cash reserves.

The opposing view, which advocates a negative relation between stock liquidity and the value of cash holdings, is derived from two strands of research. In the first strand of research, studies highlight the role of liquidity in relaxing financial constraints. Butler, Grullon and Weston (2005) find that firms with more liquid stocks pay substantially lower costs to external financing. In the second strand of research, Almeida, Campello and Weisbach (2004) document that constrained firms display significantly positive cash-cash flow sensitivities while financially unconstrained firms do not exhibit this relation.

Faulkender and Wang (2006) argue that financially constrained firms face higher costs to raise external capital. Cash holdings enable these firms to avoid higher costs for raising external funds and thus are more valuable. They empirically find that the value of cash is higher for financially constrained firms than it is for firms that can easily raise additional capital. Denis and Sibilkov (2010) show that cash is more valuable for financially constrained firms because it allows these firms to undertake value-increasing projects that may otherwise be bypassed. Taken together, the findings in these two strands of research imply a negative relation between stock liquidity and the value of cash.

Our aim is to test four hypothesis as follows:

H1. There is a significant association between value of transactions and cash holdings.
H2. There is a significant association between number of transactions and cash holdings.
H3. There is a significant association between turnover rate and cash holdings.
H4. There is a significant association between trading probability and cash holdings.

4. Data, Variables, and Descriptive Statistics

For our empirical investigation we use a sample of listed firms from Tehran stock exchange select non-financial stocks over the period 2007-2012. The sample is an unbalanced panel dataset. Finally, our selection left us with 200 firms, which represents 581 firm-year observations.

The dependent variable (CASH) is defined as the natural logarithm of cash and equivalent . In this paper, to gauge the robustness of the effect of liquidity on cash holdings, we consider four liquidity measures. Following Narayan and Zheng (2011) we consider the number of transactions, the turnover rate and the trading probability as measures of liquidity. In addition, we also consider the value of transactions as an additional measure of liquidity, which are calculated as:

Value of transactions = the natural logarithm of value transactions per year.

Number of transactions = the natural logarithm of total number of transactions per year.

Turnover rate = calculated by dividing the total number of shares traded over a period by the average number of shares outstanding for the period.

Trading probability = The number of days in a year that shares traded at least once divided by the total number of trading days in bourse.

The control variables consist of the following: Leverage is measured by total debt to total assets ratio; Dividend payout is measured by dividend per share divided by earning per share. Consistent with Al_Najjar (2012), profitability is measured by ROE representing return on equity ratio calculated by net income divided by owners equity.

Size is the natural logarithm of total sales; We use Tobin Q to measure investment opportunities which is calculated as follow,

Q= (market value of equity+book value of debts)/(book value of total assets)

Where market value of equity is calculated by multiplying the company's current stock price by its number of outstanding shares.

And according to Tehran stock exchange, investors that hold at least 5 percent of equity ownership within the firm are the major shareholders so ownership concentration is equal to the sum of major shareholders' equity ownership.

Table 1 Descriptive Statistics of Variables (2007- 2012)

	Mean	Min	Max	Std. dev.	Skewness	kurtosis
Cash	24/2474	17/9899	30/4273	1/9275	0/538	3/608
VT	24/8728	19/3685	30/3189	1/9058	0/370	2/917
NT	8/1435	4/6913	12/068	1/4743	0/484	2/693
TR	0/2323	0/0010	2/5708	0/3203	3/546	19/681
TP	0/6807	0/3305	0/9917	0/1815	-0/175	1/853
Lev	0/6305	0/0405	2/0131	0/2307	1/167	8/593
DPO	1/0924	0	52/9322	3/9308	8/398	85/751
ROE	30/1161	-199/344	212/314	32/9953	-1/008	16/398
SIZE	27/2154	23/2564	32/8022	1/5458	0/807	4/030
QTOBIN	1/3634	0/5814	3/4401	0/5049	1/593	5/762
OC	73/387	9/520	100	14/772	-0/939	4/431

Note: Cash is the natural logarithm of cash and equivalents; VT is value of transactions; NT is number of transactions; TR is turnover rate; TP is trading probability; LEV is the leverage ratio, measured by total debt to total assets; DPO is the dividend payout ratio measured by dividends per share divided by earnings per share; ROE is the return on equity ratio measured by net income divided by owners equity; SIZE is the natural logarithm of total sales; Q TOBIN measured by dividing the market value of a company by the book value of the firm's assets; OC is the ratio of shares held by major shareholders.

5. Results

In order to investigate our hypotheses, we use the following model:

$$〚Cash〛_{it}=\beta_0+\beta_1 〚LIQ〛_{it}+\beta_2 〚LEV〛_{it}+\beta_3 〚DPO〛_{it}+\beta_4 〚ROE〛_{it}+\beta_5 〚SIZE〛_{it}+\beta_6 〚Q\ TOBIN〛_{it}+\beta_7 〚OC〛_{it}+\varepsilon_{it}$$

Where Cash is the natural logarithm of cash and equivalents; LIQ is the liquidity measures (VT,NT,TR and TP); LEV is the leverage ratio, measured by total debt to total assets; DPO is the dividend payout ratio measured by dividends per share divided by earnings per share; ROE is the return on equity ratio measured by net income divided by owners equity; SIZE is the natural logarithm of total sales; Q TOBIN measured by dividing the market value of a company by the book value of the firm's assets; OC is the ratio of shares held by major shareholders; ε is the error term.

We use the Ordinary Least Square to estimate our model parameters. OLS is based on the assumption that the dependent variable has normal distribution. For normality the skewness and kurtosis of cash ratio distribution must be 0 and 3 respectively; but Table 1 shows that our dependent variable has abnormal distribution. We used Johnson's transformation to make non-normal data normal.

Table 2 shows the correlation matrix in which we notice that there are no high correlations among the independent variables (less than 0.7), and hence multicollinearity is not a concern.

Table 2 Correlation matrix

Correlation Probability	CASH	VT	NT	TR	TP	LEV	DPO	ROE	SIZE	QTOBIN	OC
CASH	1										
VT	0.607	1									
	0.000										
NT	0.549	0.875	1								
	0.000	0.000									
TR	-0.004	0.352	0.437	1							
	0.908	0.000	0.000								
TP	0.254	0.545	0.661	0.280	1						
	0.000	0.000	0.000	0.000							
LEV	-0.157	-0.249	-0.102	0.046	-0.098	1					
	0.000	0.000	0.014	0.267	0.019						
DPO	-0.043	-0.075	-0.025	-0.009	-0.025	0.145	1				
	0.301	0.072	0.546	0.826	0.544	0.000					
ROE	0.118	0.092	-0.075	-0.087	-0.051	-0.070	-0.147	1			
	0.004	0.028	0.074	0.038	0.225	0.093	0.000				
SIZE	0.746	0.628	0.592	-0.138	0.320	-0.046	-0.047	0.096	1		
	0.000	0.000	0.000	0.000	0.000	0.271	0.263	0.022			
QTOBIN	0.006	0.307	0.082	-0.000	0.020	-0.168	-0.061	0.290	-0.034	1	
	0.875	0.000	0.050	0.988	0.634	0.000	0.141	0.000	0.419		
OC	0.021	-0.092	-0.188	-0.294	-0.125	-0.102	-0.054	0.115	0.104	0.121	1
	0.605	0.028	0.000	0.000	0.002	0.014	0.194	0.005	0.013	0.003	

In order to determine the appropriate estimating model, Chow test, Hausman's test (1978) and Breusch-Pagan (1980) test are used. We have an unbalanced panel dataset. To decide between a fixed effects and a random effects model we ran Hausman test. If the Chi-square statistic p value < 0.05, reject the Hausman null hypothesis and do not use random effects. If the Chi-square statistic p value > 0.05, do not reject the Hausman null hypothesis and use random effects. The Hausman test supports a fixed effects for model 1 and suggests that random effects may be the preferred model specification for others. We conducted the Breusch–Pagan test to examine the presence of heteroscedasticity. It tests whether the estimated variance of the residuals from a regression are dependent on the values of the independent variables. The results show that there is heteroscedasticity (p value < 0.05), so generalized least squares (GLS) is applied (see Table 3).

Table 3 Panel Test Results

Variables	Model 1	Model 2	Model 3	Model 4
VT	0.0694* (0.0223)	-	-	-
NT	-	0.0936** (0.0004)	-	-
TR	-	-	0.3375** (0.0008)	-
TP	-	-	-	0.0304 (0.8321)
LEV	0.1733 (0.3524)	-0.3839* (0.0030)	-0.4126* (0.0168)	0.4174* (0.0173)
DPO	0.0081 (0.3370)	0.0003 (0.9532)	-0.0004 (0.9894)	-0.0008 (0.8054)
ROE	0.0006 (0.4781)	0.0013 (0.0807)	0.0010 (0.3318)	0.0011 (0.3105)
SIZE	0.3830** (0.0000)	0.3950** (0.0000)	0.4499** (0.0000)	0.4449** (0.0000)
Q TOBIN	-0.0406 (0.6888)	-0.1091 (0.0829)	-0.0886 (0.1875)	-0.0707 (0.3031)
OC	-0.0009 (0.7688)	-0.0004 (0.8339)	-0.0011 (0.5872)	-0.0024 (0.2763)
AR(1)	0.5141** (0.0000)	-	-	-
Constant	-12.133** (0.0000)	-11.110** (0.0000)	-11.864** (0.0000)	-11.605** (0.0000)
Chow test	3.934 (0.0000)	4.052 (0.0000)	4.298 (0.0000)	4.206 (0.0000)
Hausman test	19.546 (0.0066)	1.857 (0.0996)	11.655 (0.1125)	9.385 (0.2262)
Jarque-bera	12.990 (0.0615)	12.818 (0.0616)	12.616 (0.0618)	14.974 (0.0605)
Breusch-Pagan	5.255 (0.0000)	5.699 (0.0000)	5.991 (0.0000)	5.296 (0.0000)
Durbin-Watson	2.228	1.818	1.833	1.802
Ramsey	0.4314	0.3351	0.5714	0.7520
F-statistic	100.925** (0.0000)	57.029** (0.0000)	56.558** (0.0000)	52.925** (0.0000)
R^2	0.6988	0.4170	0.4154	0.3990

Note: Variables are defined in Table 1. The numbers in parentheses are p-values.
* Significant at 5% level.
** Significant at 1% level.

It should be noted that to solve the residual autocorrelation problem, we added a new term of AR(1) to model 1.

The F test is used to test the significance of the regression model as a whole. More specifically, the F test determines that at least one of the regression coefficients is different from zero. On the basis of the p value obtained, it can be concluded that all the models are significant with 95% confidence.

In addition, The R-square value of models reported in table 3 indicates that about 69.88%, 41.70%, 41.54% and 39.90% of the variation in cash holding levels has been explained by the models respectively.

Under the classical assumptions of regression, we ran Jarque-bera test to examine the normality of regression residuals. This test determines whether the data have the skew and kurtosis matching a normal distribution. We computed the p values of the normality test over 0.05 that leads to the conclusion that residuals follow a normal distribution. Furthermore, Independence of residuals tested by the Durbin-Watson coefficient, which should be between 1.5 and 2.5 for independent observations. The computed values of Durbin-Watson statistic were seen to be in the acceptable range. Hence, there is no autocorrelation among the residuals. We also ran ramsey test. The p values are greater than 0.05 that confirm the correctness of functional forms of our models.

Table 3 shows four models. The coefficients of our main variables in the first three models are positive and statistically significant. This is consistent with the findings of Chen et al. (2012) and Nyborg & Wang (2013). For model 4, the p value indicates that there is no relation between trading probability and cash holdings at 95% confidence level.

6. Conclusion

In this paper, we have examined the relation between stock liquidity and the value of cash holdings among Iranian firms, using panel data for the period 2007-2012. For the liquidity measures, we used four proxies, namely the value of transactions (VT), the number of transactions (NT), the turnover rate (TR), and the trading probability (TP). We have provided evidence that supports the idea that there is a channel from the stock market to corporate financial policy. In particular, controlling for firm size and other standard variables in the cash holding literature, we have found that increasing in the first three proxies for liquidity (VT, NT and TR) that we used, leads to more cash holdings; but we found no relation between trading probability and cash ratios.

There is still room for further studies, using variables beyond those studied here (e.g., other proxies of stock liquidity) and their influence on cash-holding levels. In addition, future studies can investigate generalizations of the findings beyond the Iranian firms. The other control variables such as industry sectors and comparing the results, could be studied.

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