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DETERMINANTS OF CORPORATE CASH HOLDINGS: EVIDENCE FROM PAKISTANI CORPORATE SECTOR

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ABSTRACT. This study examines the determinants of corporate cash holdings using the data of non-financial firms listed on the Karachi Stock Exchange. Using various firm-specific determinants of cash holdings, we extend our analysis to the firm specific, industry specific and group-affiliation effects in determining the cross-sectional differences in corporate cash holdings. We affirm most of the past theories and contradict only a few. Consistent with the past studies we find that Pakistani firms' cash holdings are highly influenced by a precautionary need. Our results indicate that the cash holdings of Pakistani firms increases with increase in cash flow/ net asset, market to book ratio and volatility of cash flows. We find that net working capital, leverage and capital expenditures are negatively related with corporate cash holdings of the firms.
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1. Introduction

In perfect financial markets cash is supposed to easily obtain at zero cost in the absence of liquidity premium and therefore holding cash is unlikely to be necessary. Now if organizations invest in liquid assets by borrowing money from shareholders it does not add value to their wealth. In the real world, however, obtaining cash is costly and firms can avoid this cost by holding liquid assets. Firms have to make a cost-benefit analysis before entering into an undertaking with cash holdings i.e. firms equate the benefits of holding liquid assets with the cost of shorting liquid assets. Financial literature offers three distinct motives to explain why corporations to carry significant amount of liquid assets in their investment portfolios. Firstly, liquidity is required in order to adjust their financial transactions (transac-

tional motive) (Ross et al. 2000). Organizations need cash for their transactional purposes and holding cash in their balance sheets enables them to adjust the difference between cash inflows and outflows. Literature discerns two ways explaining how firms satisfy their cash holdings appetite by selling long term-assets or holding liquid assets. Selling long term assets may be costly as it may require time and holding liquid assets may increase the opportunity cost of funds blocked in liquid assets. Therefore, organizations have to make a trade-off between sale of long-term assets and holding liquid assets to attain an optimal level of cash holdings called target level. Cash-balance model by Miller et al. (1966) follows similar approach to deal with daily cash inflows and outflows fluctuating randomly. Baumol (1952) makes a trade-off between opportunity costs and trading costs using higher and lower levels of cash holdings to conclude a target level of cash holdings.

Secondly, maintaining liquid reserves by the firms may express their precautionary motive (Diamond et al. 1984, Stiglitz et al. 1981) against unexpected variations in cash flows. A high volatility in cash flows and uncertainty prevailing in the market may compel organizations to hold excess cash as precautionary measures. However, Jenson (1986) cautions about the agency cost associated with holding too much cash i.e. cost associated with free cash flow. Yitikim et al. (2001) use the cash flows' volatility as a proxy for precautionary measures to explain the financial motives of the firms.

Lastly, liquid assets held by the organizations may express their motive to finance some positive projects when the external financing is either costly or not easily available. Pecking order theory offered by Myers et al. (1984) explains the financing motive by documenting that firms prefer internal capital to external financing, and if funding requirements exceeds retained earnings, debt issues are preferred to equity issues. They offer two explanations in favor of this theory information asymmetry and transaction costs. Asymmetric information can lead shareholders to be reluctant to accept new equity issues. External financing is expensive because of the transactional costs. These factors may lead firms to build an internal capital market where liquid reserves allow management to make investments that the financial market would not be willing to finance.

Despite the availability of bulk of literature on determinants of corporate capital, many of the frictions need more attention regarding their effect on cash holdings, especially in emerging and developing financial markets. This lack of attention is striking considering the role that cash holdings play in terms of dividend policy, hedging, and incremental capital structure decisions in these markets. Dividend policy is affected by the cash holding positions of the companies since companies pay dividend to their share holders when they possess extra cash. Decisions related to hedging – a guard against financial distress – is also dependent on the firms' cash holding positions. Theoretically

the purpose of the hedging strategy is to provide cash when the firm is shorting cash. Finally, decisions related to capital structure of the company also depend upon the internal funding available to the company. Therefore examining the role of corporate cash holdings outside the Modigliani and Millers world, where asymmetric information and frictions do exist, is very relevant to understand hedging, dividend policy and financing pattern.

In advance economies, extensive work has been done to explore the determinants of cash holdings in organizations. Distant studies offer different determinants of organizational cash holdings. For instance, Chudson (1945) finds that in general there exists a negative relation between firm's cash to asset ratio and its size but he documents positive relationship in case of government securities. He also observes cash to asset ratio of the profitable organization higher than the unprofitable organizations. The findings of Chang et al. (2006) and Dittmar et al. (2003) are also consistent with that of Chudson (1945). Kim et al. (1998) observes that firm size tends to be negatively related to liquidity. John (1993) empirically concludes that firms investments in liquid assets increasing in cost of financial distress. Furthermore, cash holdings are negatively related to proxies of alternative sources of anticipated liquidity. Kim et al. (1998) prove that cash-holdings level increases in proportionate to the cost of internal financing, variance of future cash flows, and returns on future investment opportunities. Opler et al. (1999) explain that organizations with high growth opportunities and volatile cash flows hold high ratio of cash to total assets. They further extend that organizations having easy excess to financial markets hold fewer amounts of cash.

Most of the existing studies take one of the three motives to explain the determinants of corporate cash holdings. Furthermore, available financial literature on determinants of cash holdings is limited to the advanced economies only, and thus provides us an opportunity to test if same determinants behave differently in the developing economies for instance Pakistan. We contribute to the existing literature by analyzing the determinants of cash holdings in a developing world like Pakistan. This study focuses on developing financial market and combines all the three motives, existing in literature, in a unified model. We further extend our analysis by testing the existing theories at group-affiliation, industry and firm level. Most of our results are consistent with the past studies; however, some of the results are contradicting as well. Our findings confirm the transaction motive and Pecking order theory in corporate cash holdings behavior but disaffirm the relation between size and firms' cash holdings.

Rest of this article follows as: Section 2 explains the data we use in our analysis. Research design and methodology is presented in Section 3 and

Section 4 reports the empirical analysis. Finally, Section 5 concludes our results.

2. The Data

The annual data for this study has been obtained from Karachi Stock Exchange (KSE) and spans over 1998-2007. KSE is responsible to publish the annual reports for all listed firms on …. The original data contains 700 KSE listed Pakistani firms but we use data of 300 firms for our analysis. The omitted firms involve incomplete reporting, missing variables and misleading reports. We restrict our analysis to non-financial services or corporate firms as firms providing financial services may carry mandatory cash reserves to meet capital requirements set by the prudent supervisor.[1] Items of financial information are compiled from financial statements published in company's annual reports. The data of economic variables has been sourced from the statistical bulletin, a monthly publication by Sate Bank of Pakistan, which is then adjusted to the annual frequency. We further classify all the sampled companies into 30 different industry specific businesses. While perusing data it appears that there are 22 families which own majority shares of KSE listed companies. We take this observation into account and distribute our sampled companies into group-affiliated and individual companies to distinctly observe their asset management behavior.

3. Research Design and Methodology

Though we have data limitations in our analysis, yet, luckily, most of the variables that have been used in past research to explore all the three motives of corporate cash holdings are available to us. This provides us with an opportunity to select a few past theories to test and a way forward to extend our analysis. To keep our analysis simple and systematic, we first develop the hypothesis based on the available theories and then construct the models to test these hypotheses.

3.1. The Hypotheses

Since our major objective is to test if all the three motives of cash holdings in corporate sector hold in a developing market using a unified econometric model, we start with these motives to develop the relevant hypotheses.

According to Barclay and Smith (1996) the cost to generate funds from outside the company is less for the larger firms because they are known to the market and they have excess to the financial markets. Using size of the

firm and the net working capital as a proxy for the transactional motive, we test the expectation of a negative relationship between the firm size and liquid assets.

A high fluctuation in cash flows and prevailing uncertainty in the market lead the firms to hold excess cash in their portfolio holdings which explains the precautionary motives of a firm; however, Jenson (1986) associated agency cost with holding too much cash. In order to test if precautionary motives exist in Pakistani listed corporate sector, we follow Yitikim et al. (2001) and take volatility of cash flows as a proxy for the precautionary motives.

Pecking order theory explains that firms prefer internal capital to finance externally and if funding requirements exceeds retained earnings, debt issues are preferred to equity issues. To explore if this theory holds in a developing economy like Pakistan, we use leverage as a proxy for financing motives to test if it has a negative impact on cash holdings of the firms.

Some incentives may lead Pakistani firms to develop an internal market to mobilize financial resources. The group[2] can control their subsidiaries/ divisions more easily than relying on the external capital market. Secondly, considering the fact that capital markets in Pakistan are poorly developed, this may lead firms to develop and make use of the internal capital markets as one of their significant source of generating funds. Lastly, multiple companies in a group provide the group with added advantage of internal capital markets. If a member firm performs poorly, her assets can be re-deployed and combined with another asset/firm in the group. On the other hand, an external provider of the firm has to sell the assets in the open market and may be un-able to extract their full value. These factors may incite a group to develop internal capital markets for financial resources mobilization. And thus, firms can hold lower cash holdings as the surplus cash is distributable in the group and deficient firms may be financed with the cash if required. We expect that companies with access to internal capital markets maintain low levels of cash holdings. In summary we test the following major hypothesis in our analysis:

H_0: *there exists a negative relationship between the firm size and liquid assets*

H_0: *high fluctuation in cash flows leads the firms to hold excess cash in their portfolio holdings*

H_0: *cash flow volatility has a positive impact on cash holdings of the firms*

3.2. The Model

To answer the above said hypotheses regarding determinants of the cash holdings for the Pakistani corporate firms, we follow Opler et al. (1999),

Pinkowitz et al. (2001) and Kim et al. (1998) to develop the following regression model: The model is given by the following equation:

$$LNCASH_{it} = \beta_0 + \beta_1 LNSIZE_{it} + \beta_2 MB_{it} + \beta_3 CF_{it} + \beta_4 NWC_{it} + \beta_5 LEV_{it} + \beta_6 CAPEXP_{it} + \beta_7 IS_{it} + \varepsilon_t \quad ..(1)$$

Here β_0 is the average effect in time *t*, β_1, β_2, β_3, β_4 and β_5 are loadings of firm size, book-to-market ratio, capital flows, networking capital, leverage, capital expenditures and volatility of cash flows of the firms in time *t*. ε_t is IID. The dependent variable is cash holdings. The details of the definitions have been provided in Appendix A.

To examine the cross-sectional firm-specific and industry-specific effects, we introduce a dummy variable in the regression equation (1) that takes a value of '1' for a specific industry and zero otherwise. We use *Di* as the dummy for *ith* industry and develop the following augmented and extend Equation (1) to develop the following equation:

$$LNCASH_{it} = \beta_0 + \beta_1 LNSIZE_{it} + \beta_2 MB_{it} + \beta_3 CF_{it} + \beta_4 NWC_{it} + \beta_5 LEV_{it} + \beta_6 CAPEXP_{it} + \beta_7 IS_{it} + \beta_i D_i + \varepsilon_t \quad --(2)$$

As discussed earlier group-affiliated and non-group businesses may have different cash holding patterns; therefore, we divide the firms into two groups i.e. group affiliated and non-group businesses. Next we introduce a new dummy variable in Equation (1) that takes value '1' the firm is group-affiliated and '0' for non-group businesses. We identify 30 groups in our sample firms and construct the augment the following regression equation:

$$LNCASH_{it} = \beta_0 + \beta_1 LNSIZE_{it} + \beta_2 MB_{it} + \beta_3 CF_{it} + \beta_4 NWC_{it} + \beta_5 LEV_{it} + \beta_6 CAPEXP_{it} + \beta_7 IS_{it} + \beta_1 D_1 + \varepsilon_t \quad --(3)$$

Here D_1 is a dummy variable that takes the value '1' if the firm is group-affiliated and '0' for non-grouped businesses.

4. Empirical Analysis

This section provides the interpretation of the results for the determinants of corporate cash holdings developed in regression Equations (1), (2) and (3). The results of regression Equation (1) are presented in Table 1. These results show that most of the variables are significant. We use firm size and net working capital to test the presence of transactional motive in Pakistani firms' portfolio choice. We find the coefficient of the firm size positive and insignificant which is contradicting to past theories as these theories document a significant relationship. The insignificance of the size coefficient indicates that size of the

firm does not affect cash to asset ratio of the Pakistani firms. Since, in Pakistan, many large organizations are owned and managed by the Government and the managers of these organizations are mostly conservative, their risk aversion characteristic may explain why they hold large amount of cash at their balance sheets. Literature on corporate cash holdings documents both negative and positive effects of net working capital on corporate cash holdings. In our study of Pakistani corporate firms, Table 5 presents significantly positive effect of net working capital on corporate cash holdings indicating that the length of the cash conversion cycle has a positive relationship with the higher corporate cash holdings. On the basis of these results we suggest cash to net asset ratio of Pakistani firm's closely related to the transactional motivation when proxied by the firm size and net working capital.

Table 1
Determinants of corporate cash holding (Firm factors only)

Variables	Regression Coefficients
Firm size	0.0095
	(0.0073)
Market-to-book ratio	0.0270***
	(0.0040)
Cash flow	0.0850***
	(0.0061)
Net working capital	0.0316***
	(0.0069)
Leverage	-0.0156***
	(0.0057)
Capital expenditures	-0.0823***
	(0.0062)
Cash flow sensitivity	0.0000*
	(0.0000)
Constants	(0.0121)
	0.0224
R-squared	0.099
Adj R- squared.	0.096

Table 1 Exposes the regression results of different cash holdings determinants on corporate cash holdings. Column I presents the variables while column II exposes their effects. Standard errors are presented in parenthesis.
***Significant at 1%, **Significant at 5%, *Significant at 10%

Following Yitikim et al. (2001) we use standard deviation of operating cash flows to proxy the precautionary need of the firms. Table 1 indicates a positive and statistically significant of cash flow volatility suggesting that Pakistani companies are sensitive to the cash flow volatility: and thus, verifies the presence of precautionary motive in the portfolio management of the firms. Our findings are consistent with Diamond et al. (1984) and Stiglitz et al. (1981) to explain that firm's credit quality is determined by the information asymmetry between the firm and its lender. Furthermore, difficulty level in assessment of credit quality of the firms increases with increasing the information asymmetry between the lender and the firm. Organizations hold larger amount of cash in times of uncertainty. They can survive in times of tight credit by using internal funds available to finance positive NPV projects. In efficient markets organizations can generate cash from the market to reduce the gap caused by unexpected fluctuation of cash flow. But in case of inefficient markets organizations have to hold cash reserves in order to meet the unexpected gap between cash inflows and out flows.

We explore financing motive of cash holdings in Pakistani corporate sector by using leverage as a proxy to identify the existence of this motive in firm's fund management behavior. We find a negative relation between leverage and corporate cash holdings affirming that Pakistani corporate sector follow pecking order theory in its fund management behavior. Companies operating at high level of financial leverage hold less cash.

Other than the three motives, we also investigate a few other determinants of corporate cash holdings. We use market to book ratio as a proxy of the firm's growth and find a significantly positive relationship between the corporate cash holdings and growth of the firm. These results can be explained by the fact that high growth organization hold larger amount of cash in order to ensure the expected future benefits even if the capital is not available externally. These findings are consistent the results of Kim et al. (1998). We also incorporate capital expenditures of the firms in our model to explore its effect on corporate cash holdings. We observe a significantly negative relationship between capital expenditure and firm's cash holdings suggesting that organizations finance their capital expenditures with debt. Furthermore, leverage level increases as organizations increase their capital expenditures.

To examine the firm-specific effect in determining the cash-holding pattern for the firm, a dummy variable is included in the equation (1) for each firm along with all other variables of the equation. We do not find any dummy variable significant indicating the absence of any firm specific in this case. In order to incorporate industry effect in terms of corporate cash holdings, we include a dummy variable for each industry in the equation (1) along

with all other variables. The results are reported in Table 2. Our results show that some of the dummies are signification suggesting some industry variation in terms of cash holding patterns of the firms. Coefficients for other variables have the same signs and significance as reported in Table 1.

Table 2
Regression using firm variables and industry dummies

Variables	Regression Coefficients
Firm size	0.0066391
	(0.405)
Market-to-book ratio	0.0270***
	(0.0040)
Cash flow	0.0850***
	(0.0061)
Net working capital	0.0316***
	(0.0069)
Leverage	-0.0156***
	(0.0057)
Capital expenditures	-0.0823***
	(0.0062)
Cash flow sensitivity	0.0000*
	(0.0000)
Constants	(0.0121)
	0.0224
R-squared	0.099
Adj R- squared.	0.096

Table 2 Exposes the regression results of different cash holdings determinants on corporate cash holdings. Column I presents the variables while column II exposes their effects. Standard errors are presented in parenthesis.
***Significant at 1%, **Significant at 5%, *Significant at 10%

In addition to examining the firm-specific and industry-specific effects on the cash-holding patterns for the firms, we also examine whether the firms belonging to various groups have different cash holding patterns than the non-group firms. For this purpose, we include a dummy variable in equation (1) that takes on a value of one for group-affiliated firms and zero for non-group firms. There were 30 groups in the sample firms. We used one dummy variable that represented all the firms affiliated to one these groups. Results for the dummy variable regression equation (3) are reported in Table 3. Results

indicate that the coefficient for the dummy variable is not statistically significant, suggesting that there are no differences in the patterns of cash holdings between the group-affiliated and the non-group businesses.

Table 3
Regression using dummy variable with group affiliations

Variables	Regression Coefficients
Firm size	0.011 (0.0074)
Market-to-book ratio	0.0266*** (0.0266)
Cash flow	0.0849*** (0.0849)
Net working capital	0.031*** (0.031)
Leverage	-0.0156*** (-0.0156)
Capital expenditures	-0.0823*** (-0.0823)
Cash flow sensitivity	0 (0)
D1	-0.0128 (-0.0128)
D2	Droped
Constants	0.0129 (0.0129)
Adj R-sqared	0.0965

Table 3 Exposes the regression results of different cash holdings determinants on corporate cash holdings. Column I presents the variables while column II exposes their effects. Standard errors are presented in parenthesis.
***Significant at 1%, **Significant at 5%, *Significant at 10%

As an alternative to the dummy variable regression results, we also run regression equation (1) separately for group affiliated and non-group businesses to examine whether there are differences in the cash holding patterns for these firms. Results for this dispensation are provided in Table 4 (non-group businesses) and Table 5 (group-affiliated firms).

Table 4
Regression using Dummy variable with non-group affiliations

Variables	Regression Coefficients
Firm size	0.0205*
	(0.0105)
Market-to-book ratio	0.0235***
	(0.0051)
Cash flow	0.0879***
	(0.0076)
Net working capital	0.0272***
	(0.0087)
Leverage	-0.0148**
	(0.0068)
Capital expenditures	-0.0856***
	(0.0075)
Cash flow sensitivity	0
	(0)
Constants	-0.0116
	(0.0312)
Adj R-squared	0.0972

Table 4 Exposes the regression results of different cash holdings determinants on corporate cash holdings. Column I presents the variables while column II exposes their effects. Standard errors are presented in parenthesis.
***Significant at 1%, **Significant at 5%, *Significant at 10%

In line with the non-group firms, coefficient cash flow variable with the cash-to-asset ratio is positive and significant in all the three cases. This indicates that the group as well as the non-group firms relies on their internal cash flows. These results re-affirm the earlier conclusions that there are no differences in the cash holding patterns for group and non-group affiliated firms.

Table 5
With Group

Variables	Regression Coefficients
Firm size	0.0091 (0.0074)
Market-to-book ratio	0.0268*** (0.0041)
Cash flow	0.0314*** (0.007)
Net working capital	0.0853*** (0.0063)
Leverage	-0.0155*** (0.0057)
Capital expenditures	-0.0828*** (0.0063)
Cash flow sensitivity	0* (0)
Constants	0.0142 (0.0228)
Adj R-squared	0.0958

Table 5 Exposes the regression results of different cash holdings determinants on corporate cash holdings. Column I presents the variables while column II exposes their effects. Standard errors are presented in parenthesis.

***Significant at 1%, **Significant at 5%, *Significant at 10%

5. Conclusions

This paper examines the determinants of corporate cash holdings for non-financial firms listed on the Karachi Stock Exchange. We unify all the three motives of holding cash in a single regression model and extend our empirical analysis to explore if industry and group affiliations factors have some common movements with cash holding patterns of corporate firms. A few of our findings are contradicting with the past theories. For instance we find that the coefficient of the firm size is positive but not statistically significant indicating that cash to asset ratio of the Pakistani firms is un-affected by firm size. We offer risk aversion of the managers in big and influential Pakistani firms as the potential explanation.

Consistent with the studies in advance economies, we find that net working capital significantly and positively affects cash holding character of the firms operating in developing markets, indicating that the length of the cash conversion cycle in these markets may have a positive relationship with the higher corporate cash holdings. Our results support the theory that firms' cash to net asset ratio is closely related to the transactional motivation, when proxied by the firm size and net working capital.

Using volatility of cash flow as a proxy for the precautionary, we conclude that Pakistani companies are highly influenced by a precautionary need. These findings support the theory that higher information asymmetry between the lender and the firm makes it more difficult to assess the credit quality of the firm.

Our findings expose that corporate cash holdings are negatively related with the leverage which is consistent with the pecking order theory. Companies operating at high level of financial leverage hold less cash. The negative relation also indicates that firms reduce debt and hold more cash holdings when the leverage is high. These results are consistent with other countries.

Our results indicate a positive relationship between the corporate cash holdings and growth of the firm and thus inline with the theory that high growth organization hold larger amount of cash in order to ensure that they can realize expected future benefits, even if the capital is not available externally.

We do not find any commonality between firm (industry) specific effects and cash holding patterns of the Pakistani corporate sector. Results remain unchanged when we extend our analysis to group-affiliated and the non-group businesses. Using regression analysis we conclude that both the group and non-grouped firms rely on their internal cash flows. Furthermore, these results re-affirm the earlier conclusions that there are no differences in the cash holding patterns for group and non-group affiliated firms.

NOTE

1. State Bank of Pakistan.
2. We define a group as same proprietor holding more than one firm.

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Appendix A

Appendix A explains the variables that we use in different models presented above.

$LNCASH_{it}$ = Logarithm of cash divided by net asset (cash-asset)

$LNSIZE_{it}$ = Logarithm of total asset

MB_{it} = (Book value of asset-book value of equity + market value of equity)/book value to total asset

CF_{it} = (Operating income+ depreciation)/ total asset

NWC_{it} = (Current asset- Current liability-cash)/total asset

LEV_{it} = Long-term plus short-term debt divided by total assets.

$CAPEXP_{it}$ = (Changes in fixed asset + depreciation)/total asset