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The Financial Determinants of Firms' Cash holding: Evidence from Different Economic sectors of Pakistan

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Abstract: *The study aims to analyze the financial determinants of firms' cash holdings in different sectors of economy of Pakistan such as Textile, Manufacturing, Energy, Information & Communication, Chemical and Food. The study analyzes a sample of 305 listed companies on the Pakistan Stock Exchange (PSX) from 2017 to 2022 and provides a comparative sectoral analysis using three regression models, namely: Ordinary least square (OLS), fixed effects, and random effects models, based on trade-off theory and pecking order theory. The results show sector-specific relationships: in the textile sector, cash holdings are positively related with debt ratio, liquidity, and firm size but negatively associated with return on assets and market-to-book value. In the manufacturing space, there are negative correlations between cash and liquidity as well as debt. In information and communication sector, on the other hand, leverage, liquidity, market-to-book ratio and firm size have positive effect on cash holdings. The chemical industry has positive relationships between liquidity, dividends, and cash holdings, and a negative relationship with firm size. Similarly, in the energy sector, liquidity and dividend payout have a positive effect on cash holdings. In the food sector, liquidity and market-to-book value are inversely associated with cash holdings. The results highlight the sector-specific nature of financial determinants impacting cash management policies. Also, industries with more active business and less protection of shareholders hold on to more cash. As the economic environment changes, this indicates the need to include insights from trade-off theory and pecking order theory when formulating cash management strategies.*

Keywords: Cash holding, Economic sectors, Financial Determinants

Introduction

In the financial environment, cash holding is the most important part while making the financial decisions by the different companies, some companies hold a larger amount of cash and some are holding less amount of cash. How much to hold cash, for this purpose, the companies form different policies from the perspective of their financial objectives.

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This study focuses on the financial determinants of firms' cash holding. Keynes (1936) worked first time on cash holding, the study recommended two important reasons for allocating cash; first, is minimizing cost transactions which helps to avoid transaction cost, when the firm holds more cash so that firm does not need to hold more other liquid assets. The second is; the precautionary motive, where the firm can manage future vulnerability by holding cash. Two important theories support to take an optimal decision of cash holding. The first is, Trade-off theory; the trade-off theory has presented cost and benefit motives for holding cash (Miller, 1966). The hierarchy hypothesis (pecking order theory) has suggested that a firm should not directly focus on equity because the cost of equity is expensive than other sources, such as internal source or debt. So that firms always prefer retained earnings which is an internal source of funding and less expensive than debt and equity after that debt should be preferred if funds are needed more and finally firm can go for equity when more funds are needed. By the Hierarchy hypothesis (pecking order theory), there is no optimal level of firms' cash holding as well as there is no ideal level of debt for organizations (Myers & Majluf, 1984).

Corporate cash holding decisions are important for financial stability, investment opportunities and risk management. But in developing economies like Pakistan the additional challenges become harsher due to financial restriction, weaker investor protection and macroeconomic volatility (Al-Najjar, 2013; Ashfaq, 2021). It examines how factors like profitability, leverage, liquidity, and firm size influence corporate decisions regarding cash holdings. Furthermore, the analysis analyzes the role of macroeconomic environment in determining liquidity management strategies of firms. In addition, it assesses whether the Trade-off Theory and Pecking Order Theory are applicable in the financial context of Pakistan and whether firms in Pakistan maintain the same cash holding trends as those conditional correlations that are found from extensive research in developed markets or if some country-specific economic and institutional characteristics drive firms in Pakistan to behave differently.

Problem Statement

Previous Studies with Firms in Pakistan (Khalil Jebran, 2019) are also not helpful because either their sample of firms sized is too small or could not cover the needed period for a crisis analysis, however, the studies did not provide a holistic insight into the key financial factors, as all the studies provides piecemeal evidence. Conflicting evidence for vital financial determinants including leverage, firm size, liquidity, and profitability observes a general need for a more robust empirical analysis.

Objective of study

The objective of this study is to fill these gaps through reassessing the financial determinants of corporate cash holdings in Pakistan based on a large dataset and rigorous econometric methodologies, while taking into account the latest developments in the economy and the latest empirical evidence. Although the findings will extend financial theory,

they will also offer implications for practice for corporate managers, policymakers, and investors in emerging economies.

Significance of the Study

Offers new empirical evidence on cash holding determinants in Pakistan. Assists corporate managers in designing appropriate liquidity management structures. Further, helps sound the alarm for policymakers in setting rules for finance that help to improve corporate governance and financial stability. This helps to develop the cash holding literature globally and provides implications for other emerging markets.

Literature Review

There are many studies conducted on cash holding. Some include Kumar and Symss (2024); Al-Najjar (2013); Khalil Jebran (2019); Iftikhar (2017); Ozkan and Ozkan (2004); Anjum and Malik (2013). While in developing countries cash holding phenomena are not limited. From previous literature some theories are playing very essential role in cash holding.

Trade-off theory

The trade-off theory is concerned with the cost and benefit of firms' cash holding. The theory explained the three motives of cash holding. First is the minimization of transaction cost means the firm should hold more cash when the cost is higher (identified with the cash shortage) (Dittmar, 2003; Miller, 1966). Second, the precautionary motive depends on the firm that may face contingencies such as price increases or any other change in the market. In such condition, firm needs to hold more cash. Third, speculative motive, the firm holds more cash for investing or other profitable opportunities. Such opportunities which are not in a regular manner for example sudden fall in the price of raw material. These opportunities could be in the form of a low-interest rate or other government policy. Ferreira (2004) contend that when a firm holds more money, the financial risk for that firm will be lower and it will create more opportunities for investment and the firm can make a strong optimal investment policy. The availability of more cash will increase liquidity and firm can get funds by outside sources due to strong liquidity. If organizations keep goal to increase wealth of the shareholder, then the firms can have only cost which is lower retained earnings in comparison with other investments which is bearing the same level risk. When the firm does not work in the interest of shareholders so agency costs may incur for the firm because the firm ignores the shareholder to give dividends (Jensen, 1986). In Pakistan, bankruptcy cost is also important because of market fluctuation is more than any developed market. Opler (1999) found the reality of an ideal level of cash is when the marginal expense of cash deficiency matches with the minimal expense of holding money.

Pecking Order Theory

The optimal level of cash holding is not defined by the pecking order theory. Myers and Majluf (1984) suggested that minimization of cost is linked with asymmetry information among managers and financial specialists. By the pecking-order theory managers prefer debt when the financial position of the firm is positive in future perspectives and prefer issue equity when they are not sure about future perspectives. The company always prefer internal source of finance like as retained earnings over the equity because internal finance is much cheaper than outside finance (Gardon Donaldson). hierarchical model reported that managers always prefer internal finance than debt and at the end they prefer equity when funds are more needed (Myers & Majluf, 1984). Cash is very essential at the time of paying obligation or any other financing activity (Ferreira, 2004).

Al-Najjar (2013) examined corporate cash holding in different emerging markets. His research paper was mainly focused on dividend policy and capital structure's impact is on cash holding by using cross-sectional and time series models. The sample was taken from the emerging market of four countries (India, China, Brazil, Russia). The sample consists of 1992 non-financial firms from 2002-2008. The result shows that the capital structure and dividend policy are very essential proxies of firms' cash holding in both developed and developing countries. Further, it disclosed that when firms hold more cash it will be a cause of low shareholder's protection. Ashfaq (2021) concludes the managerial optimism impacts on the decision of a firm's cash holding, and for the constrained firms it is highly costly. Ozkan and Ozkan (2004) examined the factors of corporate cash holding by utilizing an example of 1029 UK firms with the time of 1984 to 1999. They had focused on the significance of regulatory possessions among other corporate administration attributes. Proof that there is a major relationship between administrative proprietorship and cash holding. Further, they observed that how administrative possession power on cash holding does not change with board structure and nearness of the finance controller. The result discloses that the determinants of firms' cash holding are liquid assets, leverage, growth opportunities, bank debt, and cash flow.

Kumar and Symss (2024) examine corporate cash holdings and firm resilience in terms of geopolitical stability. Their study highlights that companies take deliberate actions to stockpile cash reserves to hedge themselves against the risk of financial distress due to unforeseen economic shocks. The frameworks of pecking order theory find its compelling explanation of firms' cash-holding behavior, especially during strains as also during wars and times of pandemics as emphasised by the authors. Moreover, they highlight that firms in geopolitically fragile regions generally implement adaptive financial policies, such as maintaining larger cash buffers, to protect against shocks to liquidity. They further suggest that the benefits of geographic diversification are important as diversified firms have better access to alternative sources of funding thus providing significant benefits by reducing the need to hold excess amounts of cash which can help to build firms' resilience during Brownout in uncertain times.

Ahn, Bae, and Zhou (2024) add to this burgeoning literature by showing that monetary policy has state-dependent effects on firms' balance sheets and on real economic activities. Earlier research propounds that firms with better liquidity positions alleviate the negative fallout of monetary tightening (Ippolito, Ozdagli, & Perez-Orive, 2018; Karasoy Can, 2024; Jeenas & Lagos, 2024) because they are less dependent on external financing and can maintain investment and employment (Ippolito et al., 2018). If equal firms are carrying large amounts of cash, during rate hike cycles, it has been shown that firms are gaining higher interest income, that will offset debt servicing costs, allowing them to operate well (Tawiah & Keefe, 2022; Bräuning, Fillat, & Joaquim, 2023). Ahn et al. (2024) expand upon this discussion by showing empirically that extraordinary cash accumulation during the COVID-19 period insulated the economy from the effects of monetary tightening, and decoupled corporate investment and employment from contractionary forces. Their results are consistent with recent literature about resilience in the post-pandemic economy (Dao, Jirasavetakul, & Zhou, 2024; Kitsul, Lang, & Samadi, 2023): the muted effect of interest rate rises is in part due to plentiful liquidity, fixed-rate debt structures and a tight labour market.

Liu (2024) examines the effect of litigation risk on corporate cash holdings, using a large dataset of China's A-share listed firms over the period 2012-2023. There is a strong positive relation of litigation risk with cash holding which supports precautionary motive theory that states that firms increase cash reserves to reduce possible legal liabilities. Moreover, the research shows that this relationship is stronger in firms with long-tenured CEOs due to their higher level of risk aversion. These results add to the literature on corporate cash management by highlighting the importance of legal uncertainties and executive characteristics in influencing the financial policies of firms. From a practical perspective, the study emphasizes the significance of litigation risk for capital market agents: investors, corporate managers, and policymakers.

B. Al-Najjar and Belghitar (2011) examines the corporate cash holding and dividend policy. 400 companies had been selected as a sample over the time of 1991 to 2008. The result of this examination shows that dividend profitability, leverage, firm size, growth opportunities, and working capital ratio have a noteworthy connection with cash holding while cash and other determinants influenced the dividend policy. Iftikhar (2017) scrutinized the outcomes of cash holding on firm performance using a sample of 163 companies with the period 2010-2014. They had centered that what components influences cash holding. It is uncovered that organizations increment cash holding in the light of more income exposure. It is likewise demonstrated that the significant positive relation of ROA (Return on Assets) to firms' cash holding and negative connection among leverage and cash holding. Further, he mentioned that conservative cash holding could short term increase a firm's current market value but in the long term would be less profitable on the assets.

Guizani (2017) this paper breaks down the cash-related determinant of cash holding. A data is accumulated from Saudi Arabia firms since the period of 2006 to 2014. This

assessment by using static and dynamic board models. The eventual outcome of this assessment is the impact on, size, capital utilization net working capital, and income are the factors of cash holding. The sample of this study separated into four sub social events (petrochemical) and (non-petrochemical firms). After examining, the outcome shows that there is a noteworthy contrast among determinants and cash holding. Further, this paper referenced that moderate firms have a low debt to asset ratio and the enormous firm has low venture consumption and low-income instability. Right now, the board estimation demonstrated the Saudi firm modifies its liquidity into an endogenous objective cash ratio.

Anjum and Malik (2013) is based on factors of corporate liquidity: analysis of cash holding. She had the focus that determines and measures how and to what extent firm size. The sample had been selected of 395 non-financial firms of Pakistan listed with KSE over the time of 2005 to 2011. The result of this appraisal that the networking capital influence change cycle had a positive association with cash holding however sales growth has not a significant connection with cash holding. Khalil Jebran (2019) was examined determinants of cash holding pre and post financial crisis, his study revealed that size, leverage, liquidity, tangibility are the financial determinants of cash holding. Islam (2012) this assessment is on the determinants of cash holding in gathering firms of Bangladesh. The objective of this assessment is to make sense of what mediators accept a critical activity in taking decisions for holding cash by firms. The sample had accumulated 134 manufacturing organizations firms from 2006 to 2010. The least squared regression model had been applied at this moment. Results show up there is a critical association between Tobin's Q and volatility of cash flow with a cash holding yet Net working capital shows an insignificant association.

Opler (1999) choked firms with higher growth opportunities and less secure cash flow hold a high cash ratio to assets. Those firms who are having a good ability to go to capital markets like a large firm hold low cash ratio to total Assets. Simultaneously nevertheless they found proof that companies that do well find to stockpile high cash than the forecast static trade-off model where management (managers) increase the wealth of shareholders. Guney (2007) have shown that cash holdings and leverage have an important relationship and it relies upon nation explicit qualities such as legal protection for the creditor, investors, and ownership.

Table 1: Summary of Previous Empirical Results on Cash Holding

Variable	AL-Najjar, 2013	Yilmaz Guney, 2006	Muddessar, 2017	Guizani, 2017	Eric R. Brisker, 2013	Sara Anjum, 2013	AL-Najjar, 2013
Firm size	+	-	-	+	-	+	-
Leverage	-	-	-	-	-	-	-
Liquidity	-	+					
Dividend payout	-	-		*	-		+
Return on Assets	-		+	*			-
Market to book value		+			+		+

This table indicates some empirical results of different researchers for financial determinants of firms' cash holding. Here, a + sign shows a positive relationship, a - sign shows a negative relationship, and * shows an insignificant relationship.

Hypothesis Development

In this section, two models are predicated: trade-off model and pecking-order theory along with some results of researchers about determinates of firms' cash holdings: Leverage (LEV), liquidity (LIQ), dividend-payout (DPO), return on asset (ROA), market to book value (MTB) and firm size (FS). Following hypothesis are formulated.

H1: There is a negative relationship between Leverage and cash holding.
H2: There is an inverse connection between liquidity and cash holding.
H3: There is an inverse relationship between Dividend payout and cash holding.
H4: There is a positive relationship between Return on Assets and cash holding.
H5: Market to book negative/positive associated with firm size and cash holdings.
H6: Size is negatively associated with cash holding.

Data, Variable, And Methods

In this part, we start with the population of the study then the importance of sample, further we discuss the description of our data and in the last part of this section empirical model is explained.

The population of the study

The population consists of all economic sectors of Pakistan. As our main area of study is on the different economic sectors of Pakistan such as textile, manufacturing, chemical, energy, information & communication, and food sector.

Sample Overview

Our sample is based on listed non-financial firms in the Textile, Manufacturing, Chemical, Energy, information & communication, and food sector. We have selected these sectors to analyze the comparative analysis because they are playing a vital role in the growing economy of Pakistan.

Data

We use the State bank of Pakistan as a source of data to create a sample of 305 listed companies for the period 2017 to 2022 in the different sectors of Pakistan. This study has selected non-financial firms and the sample is selected based on the availability of secondary data from the The SBP issues an annual report that often contains detailed economic and financial statistics.

Variables

This research consists of seven variables. The dependent variable is cash holding and independent variables include Liquidity, leverage, Return on Assets, Dividend payout, Price to Book Value and Firm size.

Measurement of Cash holding

In this study, cash holding is measured by cash to net assets. Net Assets are defined as total assets less cash.

$$\text{Cash Holding } (Y_i) = \frac{\text{Cash}}{\text{Total Assets}} \tag{1}$$

Table 2: Variables definitions with predicated relationship

Variables		Definition	Predicated relationship	
			Trade-off theory	Pecking order theory
Dependent variable	CH	Cash is the cash ratio which is measured by cash to net assets		
Cash holding		Net assets are defined as total assets - cash		
Independent variable				
Leverage	LEV	Leverage ratio of total obligations to total assets	+/-	-
Liquidity	LIQ	Liquidity ratio of current assets to current liabilities	-	N/A
Dividend payout	DPO	Ratio of dividend per share to earnings per share	-	N/A
Return on assets	ROA	Ratio of profit after taxes to total assets	-	+
Market to book value	MTB	Ratio of market value of equity to book value of equity	+	+
Firm size	FS	Firm size refers to natural logarithm of total assets	-	+

This table shows the variables along with the definitions and presents the relationship of financial determinants of cash holding shown in the light of two models. Here a + sign indicates the positive relationship of a specific factor with cash holding. A - sign indicates a negative relationship between the specific factor with cash holding. N/A indicates the model does not make any assumption on cash holding.

Methods

To examine our hypothesis of this study we are using three techniques to analyze the panel model (i.e. OLS, Fixed Effect and Random Effect). Further, the Hausman test is applied to select the best model from random and fixed effects. The following models are used.

$$\text{CASH}_{it} = \beta_0 + \beta_1 \text{LIQ} + \beta_2 \text{LEV} + \beta_3 \text{DPO} + \beta_4 \text{ROA} + \beta_5 \text{MTB} + \beta_6 \text{FS} + \epsilon_{it} \quad \text{(OLS)}$$
$$\text{CASH}_{it} = \beta_0 + \beta_1 \text{LIQ} + \beta_2 \text{LEV} + \beta_3 \text{DPO} + \beta_4 \text{ROA} + \beta_5 \text{MTB} + \beta_6 \text{FS} + \mu_{it} \quad \text{(FE)}$$
$$\text{CASH}_{it} = \beta_0 + \beta_1 \text{LIQ} + \beta_2 \text{LEV} + \beta_3 \text{DPO} + \beta_4 \text{ROA} + \beta_5 \text{MTB} + \beta_6 \text{FS} + \epsilon_{it} + \mu_{it} \quad \text{(RE)}$$

Descriptive Statistics

In descriptive statistics overall sample show average mean of cash to assets is 13.95% with the comparison analysis, we have found Indonesian companies hold 16.9% cash to assets, 12.17% MNC of Pakistan and 7 to 8 percent of Portuguese companies. Overall, world average cash to the asset is 12.44% (Kusnadi, 2003). In individual sector textile holds high cash to total assets which is 23.5%, while manufacturing 7.8%, chemical 5.3%, energy 7%, information and communication 6.8%, and food 6.8% cash to total assets. Textile sector holds high cash compares to other sectors which mean it relies on more debt and to pay long term debt payment. Average mean of total borrowing to total assets 86.3% in textile while in manufacturing 53.9%, chemical 73.6%, energy 58.8%, information and communication 71% and food 48% and overall leverage in whole sample is 53.25% comparatively pervious study leverage was 58% of Pakistani firms (Jamil, Anwar, Afzaal, Tariq, & Asif, 2016).

Table 3: Descriptive statistics - Individual sector

Sector	No. of obs.	Cash	Leverage	LIQ	DPO	ROA	MTB	FS
Textile	750	0.235	0.863	2.668	0.133	0.0039	0.988	14.41
Manufacturing	560	0.078	0.5394	2.63	0.6694	0.0635	5.71	15.34
Chemical	227	0.0536	0.736	1.318	0.33171	0.0214	1.69	14.94
Energy	182	0.07	0.588	1.96	0.346	0.027	1.69	17.1
Info & Communication	66	0.068	0.71	1.47	0.481	0.01	2.93	16.27
Food	81	0.066	0.48	7.153	2.45	0.099	13.99	15.148

This table presents the summary of descriptive statistics (mean, minimum and maximum) of the variables for the study. This table shows average of each variable of different sectors of Pakistan

Table 4: Descriptive statistics - Whole sample

Variables	Obs	Mean	Min	Max
Cash	1,812	0.1396	0	0.8244
LEV	1,812	0.5325	0.019	1.42
LIQ	1,812	1.42	0	10.52
DPO	1,812	0.3636195	-14.49	129.84
ROA	1,812	.2.47	-3.17	7.67
MTB	1,811	2.728202	-37.46	248.22
FS	1,812	15.10543	8.01	20.32

Note: Cash is the cash ratio which is measured by cash to total assets, LIQ is the liquidity ratio which is measured by current assets to current liability, LEV is the leverage ratio which is measured by total obligations to total assets, DPO is dividend payout ratio which is measure by dividend per share to earnings per share, ROA is the Return on Assets which is measured by Profit after taxes to total assets MTB is the market to book value which is measured by the market value of equity to book value of equity, FS is the firm size which is measured by the natural logarithm of total assets.

The Average mean of liquidity is 1.42:1 of overall sample. This indicated that the Pakistani sectors have more liquidity, and they can pay short term obligations easily which is a very positive sign for investors to see its liquidity. Sector wise, Food sector hold more liquidity 7.15 to short-term obligation which means they can pay 7 times more current obligation by current assets; textile hold 2.67, manufacturing 2.63, chemical 1.31, energy 1.96, information and communication 1.47. Average mean of dividend payout ratio of whole sample is 0.3636 this indicate of overall Pakistan firms are paying 36.36% dividends to shareholders compare to higher than India 17.78, Russia 15.73, China 25.53 and Brazil 22.57 (Al-Najjar, 2013). In individual sectors: Pakistan textile 0.133:1, manufacturing 0.669:1, chemical 0.33:1, energy 0.346:1, information and communication 0.48:1. The average mean of return of an asset is 2.7 in Pakistan comparatively less than other developing countries such as India, Russia, China (Al-Najjar, 2013). It indicates in Pakistan resources are not utilized properly. In sector-wise return on assets food sector earn high return on assets which 10% than sectors such as textile 0.39% manufacturing 6.3%, chemical 2.1%, energy 2.7%, Information and communication 1%. The whole sample shows 2.72 market to book value in Pakistan. The Overall price to book ratio is 2.72:1 while sector-wise, food sector of Pakistan hold high price-to-book value 13.99, this is s good sign for the investment in food sector. While in textile 0.98:1, manufacturing 5.71, chemical and energy show similar price to book value 1.69 and Information and information and communication hold 2.93. Average mean of firm Size of different sectors of Pakistan sector is 15.1 comparatively less than previous studies. All MNC's of Pakistan's total firm size is 22 (Jamil et al., 2016) but in range as was mentioned in (Al-Najjar, 2013) that firm size in developing countries is between 13 to 17. In individual sector energy sector holds high firm size ratio compared to other sectors, while textile 14.41, manufacturing 15.34, chemical 14.94, information and communication 16.27 and food 15.148.

Table 5: Correlation matrix

	LEV	LIQ	DPO	ROA	MTB	FS	CASH
Panel A: Textile							
LEV	1	-0.0794	-0.604	0.0186	-0.0445	-0.4431	0.2579
LIQ		1	-0.0129	0.2033	0.0224	-0.2307	0.0033
DPO			1	0.0196	0.052	0.121	-0.0126
ROA				1	-0.1029	-0.0025	0.0805
MTB					1	-0.1029	0.0003
FS						1	-0.1532
CASH							1
Panel B: Manufacturing							
LEV	1	-0.1827	-0.0793	-0.314	-0.0002	-0.2115	-0.1652
LIQ		1	0.097	0.0269	-0.0245	-0.1298	0.0245
DPO			1	0.0068	0.2432	-0.0368	-0.045
ROA				1	0.1118	0.3269	0.154
MTB					1	0.1236	0.0021
FS						1	0.1531
CASH							1
Panel C: Chemical							
LEV	1	0.5042	-0.1804	-0.442	-0.21	-0.3287	-0.2204
LIQ		1	0.0983	0.243	0.2455	-0.0324	0.2781
DPO			1	0.1646	0.134	0.2312	0.3481
ROA				1	0.2311	0.312	0.1068
MTB					1	0.0624	0.0991
FS						1	0.0894
CASH							1
Panel D: Energy							
LEV	1	-0.459	-0.0558	0.0268	0.1459	0.3649	-0.1185
LIQ		1	-0.0149	-0.063	-0.0916	-0.2499	0.0876
DPO			1	0.1633	0.0643	0.1547	0.1261
ROA				1	0.184	0.4736	0.108
MTB					1	0.2579	0.1211
FS						1	-0.015
CASH							1
Panel E: Information and Communication							
LEV 1		-0.725	-0.2278	-0.551	-0.227	0.3088	-0.2302
LIQ		1	0.1126	0.3521	0.1302	-0.2972	0.2719
DPO			1	0.2336	0.126	0.1906	0.0066
ROA				1	0.4433	-0.0923	0.2176
MTB					1	-0.1361	0.1166
FS						1	0.0022
CASH							1
Panel F: Food							
LEV 1		-0.4448	-0.2577	-0.02	0.4489	0.4153	-0.3409
LIQ		1	0.0905	-0.067	-0.0949	-0.3266	-0.0818
DPO			1	-0.06	-0.0493	-0.2232	-0.0314
ROA				1	0.4449	0.3786	0.3683
MTB					1	0.2772	-0.0325
FS						1	0.1117
CASH							1
Panel G: Whole Sample							
LEV 1		-0.0911	-0.0421	-0.062	-0.0399	-0.3106	0.2345
LIQ		1	0.0327	0.1726	-0.0016	-0.1587	0.0051
DPO			1	0.0151	0.2362	0.0145	-0.0052
ROA				1	0.0318	0.1153	0.0712
MTB					1	0.0563	-0.0038
FS						1	-0.0972
CASH							1

This table shows the correlation between the independent variable and the dependent variable in each panel. Note: Variables are defined in table 2.

Regression Results

This section indicates the result of estimation regression models; In regression analysis, three models are used to analyze the hypothesis in this study. To recall the models are the panel model to examine each determinant of firm cash holding.

Table 6: Sector-specific Analysis

Sector	Leverage	Liquidity	Dividend Payout	ROA	MTB	Firm Size	Constant	No. of Obs
Textile	0.923*** (0.000)	0.013*** (0.000)	0.0215 (0.664)	-2.60*** (0.000)	-0.024*** (0.001)	0.586*** (0.003)	-8.99*** (0.002)	632
Manufacturing	-0.157*** (0.001)	-0.0019** (0.022)	0.0008 (0.222)	0.0315 (0.440)	-0.0001 (0.731)	-0.0050 (0.765)	0.246 (0.342)	486
Chemical	-0.0007 (0.963)	0.0104* (0.081)	0.0266*** (0.000)	-0.0016 (0.684)	0.0001 (0.844)	-0.0266* (0.067)	0.4135** (0.050)	189
Energy	0.1012 (0.377)	0.0116*** (0.011)	0.0210** (0.020)	0.0114 (0.829)	0.00199 (0.631)	-0.0448 (0.120)	0.7403 (0.136)	155
Info	0.0801** (0.021)	0.0287** (0.030)	0.0039 (0.649)	0.0544 (0.175)	0.00175** (0.012)	0.1582*** (0.000)	-2.617*** (0.000)	55
Food	0.1418 (0.102)	-0.0012*** (0.004)	0.00027 (0.432)	0.2710** (0.050)	-0.0005** (0.043)	-0.0112 (0.452)	0.1637 (0.487)	68

This table exhibits the result obtained by applying fixed effect regression models after Hausman test. Variables are defined in table 3. Statistical significance is represented *,** and *** indicate a significant level at 10 percent,5 percent, and 1 percent.

In textile sector leverage, liquidity, return on assets, market to book value, and firm size are main determinants of cash holding. Results suggested that leverage is the positive significant relation with cash holding as suggested by trade off theory. it would be the cause of bankruptcy due to pressure repayment of debt to creditors so that's the reason high leverage holds more cash by firms (Ferreira, 2004) but leverage result is contradictory with H1. Liquidity is positive significant relationship with cash holding but negates with H2, the result endorsed that liquidity is positively significant to cash holding which means firms have need more cash reserves at time precautions level as suggested by (Keynes, 1936) in precautions motive. In the light of the 3rd hypothesis (H3); the regression results suggested that DPO has no significant relationship with cash holding. this result indicated that most companies don't pay the dividend in the textile sector of Pakistan and when this data compared with other sectors, we found cash is lower than other sectors such as the chemical and manufacturing sectors. In the light of fourth hypothesis H4; Return on assets is the negative relationship with cash holding as suggested by trade-off theory and this is supported by (Al-Najjar, 2013) paper where most of developing countries have negative relation between return on assets and cash holding. In the line of the fifth hypothesis (H5); the regression results suggested that there is a negative significant relationship between markets to book value and cash holding. This is the inverse result of pervious empirical results (Chang-Soo Kim, 1998; Opler, 1999; Ferreira, 2004; Ozkan & Ozkan, 2004). This result does not support the trade-off theory and the pecking order theory. For the 6th hypothesis H6; the regression result suggested that firm size is the positive relationship with cash holding. this result supports by pecking order theory suggested the positive relationship because larger firms need more cash to expend their businesses.

In relation to the Manufacturing sector dividend payout, return on assets, market to book value and firm Size are not determinants of cash holding. Leverage is negatively

related to cash hold as predicted in H1, thus leverage may use as a substitute of financing the funds as debt financing is one of source of financing and less expenses than equity financing as mentioned in (Modigliani Miller) assumption on capital structure theory. Liquidity is negatively related with cash holding as was predicted in H2 and suggested by trade-off theory that firm can convert liquid assets into cash when cash is needed, there is no need to hold more cash. Divined payout ratio is not significant related with cash holding in contracted with H3 and financial theories as was suggested, reason for insignificant relation is firms may not pay high cash dividend.

As concerned with chemical sector, Liquidity, Dividend Payout ratio, and Firm Size are determinants of Cash Holding. Liquidity is positive relation with cash holding as may need more cash reserve to increase investment opportunity and hold more cash in precaution level. Dividend payout is shown positive relation with cash holding it indicated firms are pay dividend that's why they need hold more cash and they can maintain their reputation through way, this result is contradicted to trade-off theory and H3. Firm size is negatively associated with cash holding and was suggested with trade-off theory and was predicated it might be negative relation. This result indicates that large firm hold less cash because it can manage easily financial problems by having external source of a low level of risk and their risk is diversifiable. Small firms hold more cash to manage financial distress and they can expend their business through their own source of financing due to less availability of external source of finance.

In relation to energy sector, Liquidity and dividend payout are financial determinants of firms' cash holding. Liquidity is positive relation to cash holding, it may indicate firms needs more liquid assets to pay dividend and increase investment opportunity, it is contracted H2 and trade off theory. Dividend payout is positive related to firms' cash holding, it indicated firms need more cash to pay cash dividend. Leverage, return on assets, market to book value, and firm size are not significantly related to cash holding.

In information and communication sector, results are shown that leverage, liquidity, market to book value, and firm size are financial determinants of cash holding. Leverage is positive significant related to cash holding as was suggested by trade off theory, but it is inverse with H1. It may reason of positive relation high leverage firms need more cash to pay cost of debt and can save from bankruptcy cost, leverage can be cause of agency problem and agency cost may increase that can be the reasons to hold more cash by high leverage firms. In light of H2: Liquidity is also positive related to firms' cash holding same as in other sector, information and communication sector also need more liquidity assets like as cash to pay daily expenses and increase investment opportunity. Market to book value is shown positive relation with cash holding as was predicated in H5 and suggested my trade of theory and pecking order theory. High market to book value holds more cash to enhance more options in the investment opportunity. Opler (1999); Ferreira (2004); Chang-Soo Kim (1998); Ozkan and Ozkan (2004) mentioned that firm size is also shown positive relation with cash holding as predicted in H6 and as suggested by pecking order theory. Dividend Payout and Return on Assets are not financial determinants

of Cash Holding.

In related to food sector, Liquidity, Dividend, Return On Assets, Market To Book Value, and Firm Size are the financial determinants of Cash Holding, Liquidity is negatively related with cash holding as was predicated in H2 and trade off theory, it may indicate that food sector companies rely on more liquid assets other than cash. If the firms hold a larger amount of cash, it can be the cause of increasing the cost of holding cash like agency cost that may reason of negative relation with cash holding, return on assets is positively related to cash holding in food sectors as was predicated in H4 and pecking order theory, may be the reason more profitable firms hold more cash to reinvestment their income as less costly source of finance. Market to book value is shown negative relation with cash holding it contracted with H5 and trade off theory and pecking order theory. Firm size has also negative relation with cash holding was predicated in H6 and trade off theory. Large firm hold less cash because they have more financing options during the financial distress period, and they have a low level of risk and their risk is diversifiable. They prefer to investment if cash reserve is available.

Table 7: Overall sector wise comparison against predicated variable

	LEV	LIQ	DOP	ROA	MTB	FZ
Predicated variable	-	-	-	+	-/+	+
Sector						
Textile	+	+	Insignificant	-	-	+
Manufacturing	-	-	Insignificant	Insignificant	Insignificant	Insignificant
Chemical	Insignificant	+	+	Insignificant	Insignificant	-
Energy	Insignificant	+	+	Insignificant	Insignificant	Insignificant
Information/ Communication	+	+	Insignificant	Insignificant	+	+
Food	Insignificant	-	Insignificant	+	-	-

This table exhibits overall sector wise comparison against each predicated variable. + sign indicated positive relation, - sign indicates negative relation, and insignificant is shown no relation with cash holding.

Conclusion

In this paper, we have determined the financial determinants of firms' cash holding in the different economic sector of Pakistan based on two theoretical models ("trade-off theory & pecking order theory"). Data has been composed from listed firms of the Pakistan stock exchange from 2017 to 2022. Regression results are recommended that in textile sector Leverage, Liquidity, Return on Assets, Market to Book Value, and Firm Size are the financial determinants of Cash Holding, while Dividend Payout found insignificant result. In manufacturing sector, Leverage and Liquidity are the determinants of Firms' Cash Holding while others are not impacting on cash holding in manufacturing sector. In related to chemical sector, Liquidity, Dividend Payout, and Firm Size are the significant and play important role in firms' cash holding. Energy sector is recommended only Liquidity and Dividend Payout found significant and may impact of Cash Holding. In

information and communication sector, Leverage, Liquidity, Market to Book Value, and Firm Size are the financial determinants of Cash Holding while Dividend Payout and Return on Assets are not determinants of cash holding by regression result. In food sector, Liquidity, Return on Assets, Market to Book value is significant and found these are financial factors of firms Cash Holding, while Leverage and Dividend Payout are not affected on Cash Holding. The overall outcomes indicate that two theoretical models (trade-off theory & pecking order) are important to interpret cash related determinants. The trade-off theory and pecking order theory look greater in interpreting most of the factors in the Pakistan economic sectors.

Future Research

The restrictions of this study are, first, this study does not consider corporate governance due to the absence of access to data however corporate governance may influence firms' cash holding. Second, this study does not consider cash flow theory as well and this is additionally a significant theory to interpret the determinants of firms' cash holding. These components may be considered in future research.

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